State of Palestine دولة فلسطين

وزارة الحكـم المحلـي

Ministry of Local Government

مشروع المدن المتكاملة والتنمية الحضرية

Integrated Cities and Urban Development (ICUD) Project

WORLD BANK GROUP

صندوق تطوير وإقراض الهيئات المحلية

Municipal Development & Lending Fund

Strategic Environmental and Social Assessment for five Targeted Urban Areas in West Bank & Gaza

SESA REPORT

Prepared by:

TPA Thymio Papayannis and Associates Inc. spatial planning and design

AQUA Consulting Center

ENVECO S.A. ENVIRONMENTAL PROTECTION MANAGEMENT & ECONOMICS

EMCC المركز الإستشاري في الإدارة والهندسة Engineering & Management Consulting Center

June 2021

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ABBREVIATIONS

Abbreviation	Definition
ALECSO	Arab League Educational, Cultural and Educational Organization
AoI	Area of Interest
APLA	Association of Palestinian Local Authorities
ARIJ	Jerusalem Institute for Applied Research
BAT	Best Available Technologies
BOD	Biochemical oxygen demand
C&D	Construction and Demolition
CAT	Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment
CBD	Convention on Biological Diversity
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
CERD	International Convention on the Elimination of All Forms of Racial Discrimination
COM	Council of Ministers
CPHL	Central Public Health Laboratory
CRC	Convention on the Rights of the Child
CRC-OPAC	Optional Protocol to the Convention on the Rights of the Child on the Involvement of Children in armed conflict
CRPD	Convention on the Rights of Persons with Disabilities
CSO	Civil Society Organization
CVF	Climate Vulnerable Forum
CWD	Children With Disabilities
DOF	Department of Fisheries
E&S	Environment and Socio-economic
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EQA	Environmental Quality Authority
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Program
ESSF	Environmental and Social Screening Form
GHG	Green House Gases
GIZ	Gesellschraft Internationale Zusammenarbeit
GMO	Genetic Modified Organism
GS	Gaza Strip
GSWMP	Gaza Solid Waste Management Project
HPC	Higher level Planning Committees
ICCPR	International Covenant on Civil and Political Rights
ICESCR	The International Covenant on Economic, Social and Cultural Rights
ICUD	Integrated Cities and Urban Development
IEC	International Electrotechnical Commission
IEE	Initial Environmental Evaluation

Abbreviation	Definition
ILO	International Labor Organisation
ISESCO	Islamic Educational, Scientific and Cultural Organization
ITC	International Trade Centre
JCSPD	Joint Council for Services, Planning and Development
JICA	Japan International Cooperation Agency
JV	Joint venture
JSC	Joint Service Councils
JWC	Joint Water Committee
JWU	Jerusalem Water Undertaking
LET	Local Education and Training
LGU	Local Government Units
MDLF	Municipal Development and Lending Fund
MEPC	Coastal and Marine Environmental Protection Committee
MoA	Ministry of Agriculture
MoC	Ministry of Culture
MoFP	Ministry of Finance and Planning
MoH	Palestinian Ministry of Health
MoL	Ministry of Labor
MoLG	Ministry of Local Government
MoNE	Ministry of National Economy
MoPIC	Ministry of Planning and International Cooperation
MoPW	Ministry of Public Works
MoPWH	Ministry of Public Works and Housing
MoT	Ministry of Transport
MoTA	Ministry of Tourism and Antiquities
MoWA	Ministry of Women's Affairs
NAP	Palestine National Adaptation Plan
NARC	National Agricultural Research Center
NCCD	National Committee for Combating Desertification
NCCVAW	National Committee to Combat Violence against Women
NDC	Nationally Determined Contribution
NDP	Palestinian National Development Plan
NGO	Non-Governmental Organization
NPA	National Policy Agenda
NRW	Non-Revenue Water
NSSWM	National Strategy for Solid Waste Management
NWC	National Water Company
oPt	occupied Palestinian territory
PA	Palestinian Authority
PAP	Project affected persons
PAPA	Programme of Action for the Palestinian Authority
PAPP	Programme of Assistance to the Palestinian People
PCBS	Palestinian Central Bureau of Statistics
PCP	Palestine Coastal Police
PEA	Palestinian Environmental Assessment

Abbreviation	Definition
PEAP	Palestinian Environmental Assessment Policy
PECDAR	Palestinian Economic Council for Development and Reconstruction
PENRA	Palestinian Energy and Natural Resources Authority
PERC	Palestinian Electricity Regulatory Council
PES	Palestinian National Environmental Strategy
PHL	Public Health Law
PLA	Palestinian Land Authority
PLC	Palestinian Legislative Council
PLO	Palestine Liberation Organization
PMU	Project Management Unit
PNA	Palestinian National Authorization
PPA	Palestinian Pension Agency
PPE	Personal Protective Equipment
PPP	Public-Private Partnership
PSI	Palestinian Standards Institute
PWA	Palestinian Water Authority
PWD	Persons With Disabilities
SDG	Sustainable Development Goals
SDIP	Strategic Development and Investment Planning
SDP	Strategic Development Priorities
SEA	Strategic Environmental Assessment
SECP	Stakeholder Engagement and Consultation Plan
SESA	Strategic Environmental and Social Assessment
SP	Spatial Plan
SW	Solid Waste
SWEEPNET	Solid Waste Exchange of Information and Expertise Network
SWM	Solid Waste Management
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TSS	Total suspended solids
UN-DESA	United Nations Department of Economic and Social Affairs
UNCCD	UN Convention to Combat Desertification
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	UN Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
UNRWA	United Nations Relief and Works Agency
USD	United States, Dollar
WB	West Bank
WBWD	West Bank Water Department
WEEE or E-waste	Waste from Electronic and Electrical Equipment
WHO	Word Health Organization
WSRC	Water Sector Regulatory Council
WSSA	Water Supply and Sewage Authority

Abbreviation	Definition
WUAs	Water users' associations

CHAPTER 1 INTRODUCTION

1.1 ICUD Project Background

Integrated Cities and Urban Development project (ICUD) aims to support the Palestinian local government sector in an advanced and territorially integrated way that addresses the diverse needs of key local authorities. ICUD aims to strengthen the capacity of the five targeted urban areas (Nablus, Ramallah and Al Bireh, Bethlehem, Hebron and Gaza City) to plan for sustainable urban growth, hence enabling them to create regional socio-spatial economic growth frameworks under which metropolitan level investments can be substantiated and funded. ICUD also aims to strengthen the institutional and technical capacity of the participating urban areas to plan for sustainable urban growth through, inter alia, the provision of Technical Assistance (TA), and training. The project is supporting the Local Government Units (LGUs) of the participating urban areas to establish and maintain active LGU coordination mechanisms, where they do not already exist, to collectively deliver results; in this context, the project intends to respond to the needs of a growing population and the private sector for more sustainably and efficiently planned urban spaces and infrastructure.

Implementation of Strategic Environmental and Social Assessment (SESA) will act as a tool which will assist in the optimum use of the available natural resources for future growth, in a manner that avoids specific environmental constraints while maximizing benefits from environmental opportunities, thus informing future decision-making.

1.2 Introduction to SESA

SESA is an essential tool for understanding the social and environmental issues in the context of the proposed urban development alternatives for the benefit of the Palestinian National Authority (PNA), and it is also a dynamic system which incorporates such considerations into policies, plans, programs and strategies. In this context, SESA is undertaken to ensure that environmental and social considerations are taken into account and integrated into decision- making in support of sustainable development.

Impact assessment and decision-making are influenced by international conventions, national policies and laws, and a host of socio-economic imperatives. However, they must be informed by both scientific and local knowledge gathered during the impact assessment process (Figure 1.2-1). Theoretically, society's values are reflected by policies and laws, but value systems change in response to new information and evolving cultures. As illustrated below, impact assessment and decision-making must consider both science and value systems.

The *expected benefits* from the SESA for the five targeted urban areas are:

- Provision of support to future Master Plans in the identification of environmental and social opportunities and constrains;
- Provision of environmental and social indicators for monitoring performance of Master Plans;
- Facilitation of dialogue between relevant stakeholders;
- Awareness-raising regarding the integration of environmental and social considerations into urban planning among relevant stakeholders.

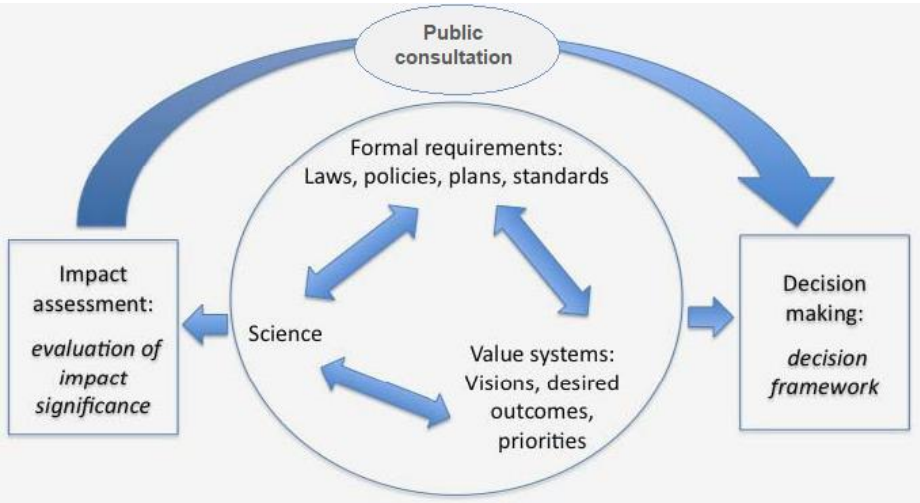


Figure 1.2-1: Impact Assessment and decision-making influences

Impact assessment and decision-making are influenced by international conventions, national policies and laws, and a host of socio-economic imperatives. However, they must be informed by both scientific and local knowledge gathered during the impact assessment process (Figure 1.2-1). Theoretically, society's values are reflected by policies and laws, but value systems change in response to new information and evolving cultures. As illustrated below, impact assessment and decision-making must consider both science and value systems.

1.3 Principles of SESA

The SESA provides an integrated framework to guide the identification, preparation, appraisal and implementation of environmental and social concerns at the planning and organizational levels. The proposed integrated framework is based on the following principles:

- Prevent adverse environmental and social impacts;
- Enhance the quality of life and the environment;
- Attract investments and improve economic growth; and
- Identify mitigation measures of possible adverse environmental and social impacts.

The implementation the SESA process has the following characteristics:

- **Integrated**: ensures an appropriate environmental assessment of all strategic decisions relevant to the achievement of sustainable development; addresses the interrelationships of biophysical, social and economic aspects; is tiered to policies in relevant sectors;
- **Sustainability-led**: facilitates the identification of development options and alternative proposals that are more sustainable;
- **Focused**: provides sufficient, reliable and usable information for development planning and decision-making; concentrates on key issues of sustainable development; is customized to the characteristics of the decision-making process; is cost and time effective;
- **Accountable**: is the responsibility of the leading agencies for the strategic decisions to be taken; is carried out with professionalism, rigor fairness, impartiality and balance; is subject to independent checks and verification; documents and justifies how sustainability issues were taken into account in decision-making;

- **Participative**: informs and involves interested and affected public and government bodies throughout the decision-making process; explicitly addresses their inputs and concerns in documentation and decision-making; has clear, easily understood information requirements and ensures sufficient access to all relevant information;
- **Iterative**: ensures availability of the assessment results early enough to influence the decision-making process and inspire future planning; provides sufficient information on the actual impacts of implementing a strategic decision to judge whether this decision should be amended;
- **Influential**: improves the implementation of strategic decision-making, promotes a change of attitudes towards sustainable options, thus influencing future policies.

1.4 Comparison between ESIA and SESA

SESA and ESIA (Environmental and Social Impact Assessment) are tools that share a common root - impact assessment, but have different assessment foci: strategies for future development with a high level of uncertainty in SESA; proposals and measures, concrete and objective, for the execution of projects in ESIA. This difference between SESA and ESIA in the object of assessment generates different methodological requirements related to the scale of assessment and to the decision-making process.

More specifically, the basic SESA process is similar to that of ESIA for projects, but SESA is generally more broad-brush, less detailed and quantitative, and more focused on broad directions of change (see Figure 1.4-1). This is largely due to the need for SESA to keep pace with the decision-making process, which may need to consider many ideas and options in a short period of time.

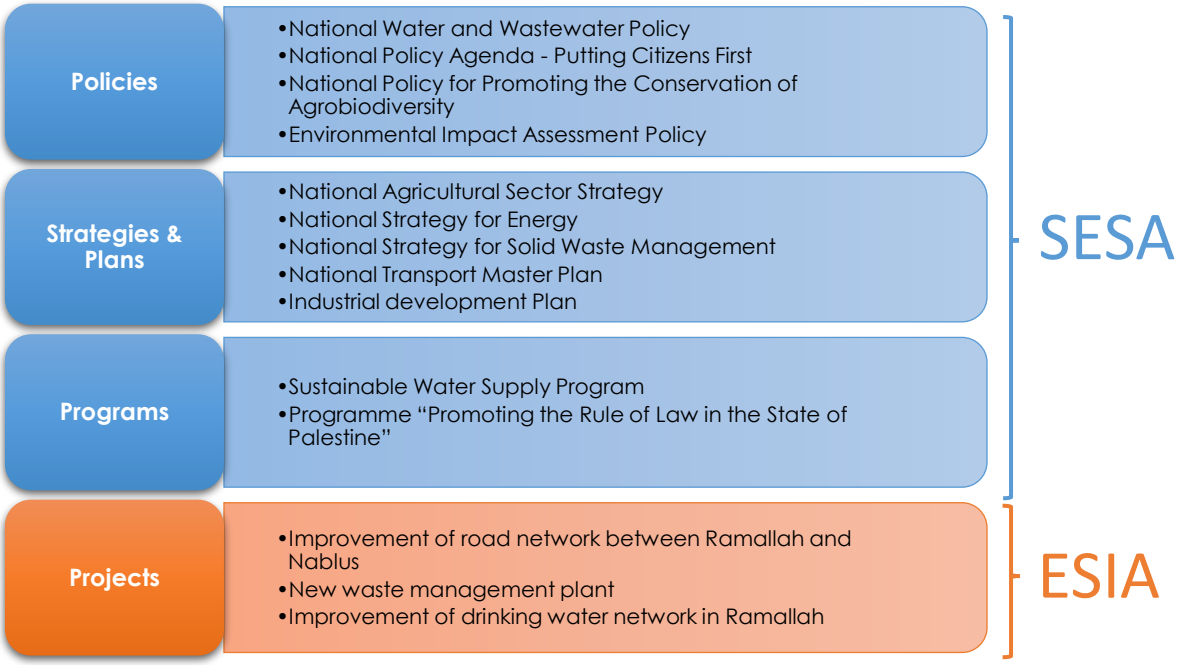


Figure 1.4-1: Comparison between ESIA & SESA

SESA approaches are more diverse than ESIA; in this context SESA:

- is *not* intended to recommend projects for urban development;
- is *not* intended to identify which of the proposed-planned projects (deriving from other level of planning) should proceed;
- is *not* a detailed environmental impact assessment of individual projects.

1.5 Objectives

The objectives of this SESA are presented as follows:

- Identification of the baseline conditions, environmental characteristics and related opportunities and constraints for future growth in the five targeted urban areas, aiming to develop a thorough understanding of the existing situation;
- Identification and assessment of policy, regulatory, institutional and capacity gaps to address key environmental and social issues associated with urban development in the five targeted urban areas;
- Identification and assessment of Strategic Development Priorities (SDP) against Environmental and Social (E&S) Objectives and identification of the potential synergies and conflicts between them;
- Preparation of an Environmental and Social Management Plan (ESMP) for the implementation of the proposed SDP. The ESMP will act as a guidance tool for decision-makers with respect to proposed interventions in order to achieve SDP in a manner that is sustainable over the long-term but also maximizes opportunities associated with the environmental characteristics. To this end, the ESMP will include measurable monitoring indicators and will identify roles, responsibilities as well as timing and monitoring frequency for proposed interventions.

CHAPTER 2 METHODOLOGY

2.1 Scope of SESA

The scope of the SESA covers development, environmental and socio-economic planning documentation for various sectors at various spatial planning levels. More specifically, for the purposes of this report, planning documentation (policies, plans and strategies) as well as relevant legislative and regulatory documentation for the following *sectors* have been reviewed, as presented below:

Table 2.1-1: Development, Environmental and Socio-economic Sectors

DEVELOPMENT	ENVIRONMENT	SOCIO-ECONOMIC
Agriculture, Forestry, Fishing	Biodiversity	Cultural Heritage
Energy	Climate Change	Education
Housing	Soil-Desertification	Employment / Economic development
Industry	Water & Wastewater	Demographics
Tourism	Air quality & Noise	Gender
Transportation	Natural hazards	Health
Urban and Strategic Planning	Solid Waste	Social Welfare

The reviewed planning documentation covered the following *spatial* planning *levels*:

- National, relevant to Palestine, West Bank & Gaza Strip;
- Regional, relevant to Governorates and
- Local, relevant to the five targeted Urban Areas/LGUs, as presented in detail in section 4.1.1 of this report.

2.2 Limitations

During implementation of the SESA process, the following limitations were encountered:

Data availability and collection: Inconsistent data availability, data quality and level of detail at the urban area level have considerably delayed the review and analysis phase of collected data; in addition to causing delays, this has also affected the level of certainty of the findings, as, in some cases, initial assumptions were superseded by updated information.

COVID-19 pandemic: As a response to the COVID-19 outbreak, the movement restrictions that were imposed at a world-wide level had the following implications on project progress and findings:

- Limited or no availability of stakeholders resulting in severe delays in the data collection and stakeholder consultation phases thus having implications on the project results

- Restriction of movement and closures of the Governorates in the West Bank and Gaza during the pandemic affected the movement as well as the coordination of the local staff with the stakeholders and ICUD team.

2.3 Steps and approach

2.3.1 Methodology – Interpretation of the Terms of Reference (ToR)

The basic requirements of the ToR have been interpreted in the adopted methodology; the SESA process consists of the following methodological steps, which are briefly discussed below. Each methodological step is further analyzed into Tasks that better formulate the undertaken course of action for serving the SESA objectives.

Step 1. Baseline Assessment
Task 1.1. Data collection
Task 1.2. Data review
Step 2. Policy, Legal and Institutional Framework Assessment
Task 2.1. Data collection
Task 2.2. Data review
Step 3. Strategic Environmental and Social Impact Assessment
Task 3.1. Development of Strategic E&S Objectives
Task 3.2. Assessment of Strategic Development Priorities
Step 4. Priority setting
Task 4.1 Priority setting
Task 4.2 Spatial Analysis
Step 5. Management Plan - Recommendations
Task 5.1 E&S Management Plan - Recommendations

Step 1: Identification of baseline conditions in the five targeted urban areas. The outcome of this step is a 'status quo' report, which includes identification as well as trends analysis (where possible) of environmental characteristics and related opportunities and constraints these entail for future growth in the five targeted urban areas. This is presented in CHAPTER 4 of this report.

Step 2: Review and assessment of Development Plans and Environmental & Social (E&S) Plans to

(i) identify existing Strategic E&S Objectives[1];

(ii) identify Strategic Development Objectives and Strategic Development Priorities (SDP).

This is presented in CHAPTER 5 of this report.

This step also involves an assessment of policy, legal, regulatory, institutional and capacity framework for addressing key environmental and social sustainability issues associated with urban development;

[1] *The definition "Strategic E&S Objectives" includes any strategic objectives that could have environmental or socio-economic implications.*

in this context, any policy, legal, regulatory and institutional gaps were identified. This is presented in CHAPTER 3 of this report.

Step 3: Strategic E&S Impact Assessment of proposed SDP against selected strategic E&S Objectives and identification of the potential synergies and conflicts between them. The overall aim of this step is to identify SDPs the implementation of which will optimize the use of existing environmental resources for future growth by exploiting the related opportunities while at the same time contributing to the minimization of related constraints. This is presented in CHAPTER 5 of this report.

Step 4: Prioritization of SDP in the five targeted urban areas and spatial analysis, as a tool for rapid assessment of future development and respective priority SDP in the five targeted urban areas. This is presented in CHAPTER 5 of this report.

Step 5: Preparation of an Environmental and Social Management Plan for the implementation of the proposed SDP. The ESMP includes preventative realistic management measures to address constraints and proposes interventions that could be implemented in order to maximize opportunities; to this purpose, measurable monitoring indicators, roles, responsibilities as well as timing and monitoring frequency for each of the proposed SDP are identified at a higher strategic level. This is presented in CHAPTER 6 of this report.

The methodological steps are presented in further detail in Section 2.3.2 below.

2.3.2 Detailed Methodology

2.3.2.1 STEP 1: Baseline Assessment

The objective of baseline assessment is to provide a 'status quo' report, which includes identification as well as trends analysis (where possible) of environmental characteristics and related opportunities and constraints for future growth in the five targeted urban areas, thus facilitating the development of strategic E&S Objectives.

Task 1.1. Data collection

Objective: To undertake a comprehensive environmental, geophysical, biological and socioeconomic data-gathering exercise using available information sources and previous studies. The level of detail of baseline data was limited to the best available information; when this was not available at the urban area level, extrapolation of regional and national data was used.

Outcome: All collected data was listed and indexed in the Baseline Data List, which is presented in CHAPTER 7 of this report and uploaded in the SESA Palestine ftp file sharing platform[2] order to be readily accessible for future reference.

Task 1.2. Data review

Objective: To review and assess all available data so as to provide an overview and a thorough understanding of the environmental, biological and social conditions in the five targeted urban areas, thus facilitating the development of Strategic E&S Objectives. In this context, environmental

[2] http://gofile.me/6J3So/FgBtWnGNW

and social characteristics and related opportunities and constraints were identified in the five targeted urban areas. Where possible, trends analysis for the identified E&S characteristics was included; trends analysis presents the trajectory of certain environmental parameters and serves as an indication on whether this is heading in a desirable or undesirable direction. In this context, the identification of trends provides an indication on whether an identified characteristic is likely to be more or less significant in the near future. This information was taken into consideration in the development of Strategic E&S Objectives.

Outcome: Extensive background information on E&S characteristics and related opportunities and constraints for future growth in the five targeted urban areas; trends analysis for the identified E&S characteristics (where possible).

2.3.2.2 STEP 2: Policy, Legal and Institutional Framework Assessment

The objective of the policy, legal and institutional framework assessment is to review existing policy, regulatory and legislative documentation and identify:

- Strategic Development Objectives and Strategic Development Priorities as well as any legislative and regulatory gaps in addressing E&S issues as identified in the previous step;
- Existing E&S Objectives as well as any legislative and regulatory gaps in the E&S framework.

Task 2.1. Data collection

Objective: To thoroughly record the laws, decrees and regulations, strategies, policies and plans that constitute the development, environmental and social management framework in the five targeted urban areas. In this context, the following were recorded:

- All relevant strategies, policies and plans regarding urban development at a national, regional and local level;
- All strategies, policies and plans regarding the protection of environmental and social parameters at a national, regional and local level;
- Current legislation and regulations related to land-uses (housing, industry, agriculture etc.) and urban/rural planning etc.;
- Laws and regulations related to the protection of environmental and social parameters (water, soil, air, biodiversity, cultural heritage, education etc.);

Outcome: All collected planning documentation (strategies, policies and plans) was listed and indexed in the List of Policies, Strategies and Plans which is presented in Annex IV of this report and uploaded in the SESA Palestine ftp file sharing platform in order to be readily accessible for future reference. All identified legislative and regulatory documentation is presented in Annex II and Annex III of this report.

Task 2.2. Data review

Objective: To identify existing Development Objectives and Strategic Development Priorities (SDP) as well as existing E&S Objectives from existing policy, regulatory and legislative documentation; any gaps in the existing policy, legal and institutional framework were also identified.

Identification of Development Objectives and Strategic Development Priorities

Review of policies and plans for development sectors and identification of a series of development objectives and Strategic Development Priorities (SDP); these are objectives purely related to physical planning/growth planning etc. The results of this process were recorded in the Development Objectives Matrix, which is presented in Annex V of this report and in the Strategic Development Priorities Matrix, which is presented in Annex VII of this report.

Identification of existing strategic E&S Objectives

Review of E&S policies and plans and identification of *existing* E&S Objectives; these are objectives purely related to E&S sectors. The results of this process were recorded in the Strategic E&S Objectives Matrix, which is presented in Annex VI of this report.

Identification of legislative and institutional gaps

Review of legislative and institutional framework and identification of key issues and gaps. The results of this process are presented in Annex II and Annex III of this report.

Outcomes: Development Objectives Matrix; E&S Objectives Matrix; Strategic Development Priorities Matrix; Identification of Legal and Institutional key issues and gaps.

2.3.2.3 STEP 3: Strategic Environmental and Social Impact Assessment

The objective of the Strategic Environmental and Social Impact Assessment is to assess Strategic Development Priorities (SDP) against Strategic E&S Objectives and to identify potential synergies and conflicts between them.

Task 3.1. Development of Strategic E&S Objectives

Objective: To develop a set of Strategic E&S Objectives as benchmarks which all proposed SDP would have to meet, according to the following process:

1. Selection of *existing* Strategic E&S Objectives from E&S Plans, as recorded in Task 2.2. During this step, out of the total Strategic Environment Objectives and Strategic Socio-economic Objectives identified, the SESA Strategic E&S Objectives considered as a) not relevant to SESA b) too generic, were omitted from further consideration in the SESA process. Of the remaining Strategic Environment Objectives and Strategic Socio-economic Objectives, those relevant to Legal/Institutional/Capacity Building were grouped separately, thus resulting in the initial selection of remaining Strategic Environment and Socio-economic Objectives.

2. Recommendation of *modified* existing Strategic E&S Objectives from E&S plans, as recorded in Task 2.2. Where E&S Objectives did not exist at a lower planning level, they were drawn from higher planning levels. In an effort to avoid duplications, Strategic E&S Objectives with

the same context were grouped together; in these cases, the original wording may be modified .

3. Development of *proposed* Strategic E&S Objectives; additional Strategic E&S Objectives that did not emerge from E&S planning and policy documentation but rather from JV expert judgement (i.e., Sustainable Development Goals and respective Targets) were considered for final adoption. The key source of information for the adoption of SDGs was the Atlas of Sustainable Development 2020[3], which identifies the most critical national priorities of the Government of Palestine presentation in detail is included the universally agreed 17 SDGs.

The final list of *adopted* Strategic E&S Objectives is a compilation of the above; these are presented in Section 0 of this report.

During Phase Two Consultation the final list of identified Strategic E&S Objectives was presented to critical stakeholders including, among others, MDLF, MoLG/ICUD and EQA; stakeholders' feedback was subsequently integrated into the assessment process.

Outcome: A final list of *adopted* Strategic E&S Objectives to be considered as benchmarks which all proposed SDP would have to meet.

Task 3.2. Assessment of Strategic Development Priorities

Objective: To identify SDP in order to achieve the optimum use of identified environmental characteristics at the national level taking into consideration the respective opportunities and constraints these entail for future growth; the following process was followed:

1. Selection of Strategic Development Priorities from Development Plans, as recorded in Task 2.2. During this step, out of the total SDP identified, those considered as a) not relevant to SESA b) too generic were screened out. Of the remaining SDP, those relevant to Legal/Institutional/Capacity Building were addressed horizontally, thus resulting in the initial selection of SDP relevant to physical planning/growth planning.

2. Recommendation of *modified* existing SDP from development plans, as recorded in Task 2.2. In an effort to avoid duplications, the wording of initially selected SDP was modified as required to integrate one or more strategic priorities per sector or between sectors in order to avoid duplications. As a result of steps 1 and 2 of this process, the final list of preselected SDP is presented in Section 5.2 and Table 5.2.1-1 of this report.

3. Identification of synergies and conflicts between the preselected SDP and adopted Strategic E&S Objectives at the national level; this refinement process leads to the exclusion of certain SDP from further consideration in the SESA at an early stage. The following color-coding was used in order to present the relations (i.e., synergies and conflicts) between the preselected SDP and the Strategic E&S Objectives.

+2	full synergy
+1	considerable synergy
0	no synergy or conflict
-1	considerable conflict
-2	absolute conflict
?	Uncertain interaction

[3] *State of Palestine, Atlas of Sustainable Development 2020, United Nations*

The result of this exercise identified the final list of adopted SDP which received highest total scores and were therefore considered as viable development solutions for future growth; these are summarized in the Refinement Process Matrix, which is presented in Table 5.2.2-1 of this report.

During Phase Two Consultation the final list of identified SDP was presented to critical stakeholders including, among others, MDLF, MoLG/ICUD and EQA; stakeholders' feedback was subsequently integrated into the assessment process.

Outcome: Refinement Process Matrix; identification of viable Strategic Development Priorities, the implementation of which will optimize the use of existing environmental resources for future growth by exploiting the related opportunities while at the same time contributing to the minimization of related constraints.

2.3.2.4 STEP 4: Priority Setting

Task 4.1. Priority Setting

Objective: The selection of SDP per urban area was based on the results from horizontal ranking, performed by the JV and from vertical ranking as performed by stakeholders during the public participation process. JV prioritization and stakeholder participation rankings each have a 50% weighting in the development of final results.

Details on the composition and expertise of the JV are presented in Annex VIII of this report.

Horizontal Ranking

In the horizontal ranking process, JV members ranked SDP using the following criteria:

A. Environmental Benefits;

B. Social and Health Benefits;

C. Institutional and Governance Gaps;

D. Cost.

JV members ranked SDP against these criteria in a low-medium-high scale. For Criteria A & B, 'Low' scored three points, 'Medium' received two points, and 'High' received one point; for Criteria C & D, 'Low' received one point, 'Medium' received two points and 'High' received three points. The horizontal ranking criteria, applied weightings and respective scoring are presented in Table 2.3.2-1 below.

Table 2.3.2-1: Horizontal Ranking Criteria and Ranking Scale

HORIZONTAL RANKING CRITERIA	WEIGHT	RANKING SCALE / POINTS ALLOCATED					
A. ENVIRONMENTAL BENEFIT	0.3	HIGH	1	MEDIUM	2	LOW	3
B. SOCIAL & HEALTH BENEFIT	0.3	HIGH	1	MEDIUM	2	LOW	3
C. INSTITUTIONAL/GOVERNANCE GAPS	0.2	HIGH	3	MEDIUM	2	LOW	1
D. COST	0.2	HIGH	3	MEDIUM	2	LOW	1

The scores of all JV members were then added and the lowest overall scores were used to identify the SDP top-5 priorities. JV experts were asked to complete the exercise having a national-level approach in mind, thus controlling bias for SDP that benefited specific regions.

The results of the horizontal ranking are presented in Annex VIII of this report.

Vertical Ranking

During the vertical ranking process, as part of Phase 3 Consultation, stakeholders were asked to select 5 out the 28 selected SDP that they consider as most significant, taking into consideration the overall needs of urban development for the targeted urban areas; each time an SDP was included in a stakeholder's top-5 list, it received one point. The score for each SDP was then added and potential priority SDP as a result of the vertical prioritization process were those that received the highest scores.

Local stakeholders were asked to complete the exercise taking into consideration the overall needs of urban development for the targeted urban areas and having a cross-sectoral approach in mind, thus controlling bias for SDP that benefited their field of expertise.

This is standard process in Policy SESA, as mentioned in bibliography[4]. The results of the vertical ranking are presented in Annex VIII of this report.

Outcome: Prioritization of SDP per targeted urban area, based on the results of horizontal and vertical ranking

Final Ranking

Final ranking of SDP is the combination of horizontal ranking and vertical ranking and is linked to the spatial mapping. In order to control regional or sectoral bias, equal weighting was applied to the horizontal and vertical ranking across urban areas.

The following criteria have been applied in order to categorize likely differentiations between ranking scores.

Score difference between vertical and final ranking	Description
≤ 5 points	negligible
≤ 10 points	moderate
>10 points	high

Overall, when the score difference between the vertical and the final ranking is equal to or lower that 5 points, than this differentiation is considered as negligible; this applies to most SDP for any of the targeted urban areas.

When the score difference is equal to or lower than 10 points, the differentiation is considered as moderate; this applies to 2 out of 28 SDP and can be mainly attributed to the application of horizontal ranking criteria.

[4] *'World Bank. 2008. Sierra Leone - Mining Sector Reform: A Strategic Environmental and Social Assessment. Washington, DC.'* https://openknowledge.worldbank.org/handle/10986/8087

When the score difference in higher than 10 points, the differentiation is considered as high and, again, is attributed to the application of horizontal ranking criteria. This applies to 5 out of a total of 280 combinations (i.e. in approximately 2%) and does not affect the overall reliability of the final ranking results. These cases are discussed in detail in section 5.3.3 of this report.

Task 4.2. Spatial Analysis

Development of environmental and social sensitivity GIS-based maps for each urban area identify

- areas where key development sectors are excluded or restricted for environmental reasons ('no-go areas'); these are areas where there is absolute conflict between proposed development and existing environmental conditions;

- areas that may be developed with certain restrictions ('go-but areas'); these are areas where there is some conflict between proposed development and existing environmental conditions, therefore developments in these areas would need to be subjected to an E&S assessment prior to approval and certain restrictions may be applied;

- areas where opportunities for development arise without any environmental restrictions ('go areas'); these are areas where there are synergies between proposed development and existing environmental conditions.

The spatial mapping outputs where 'Priority areas' ('go' and 'go-but' areas) and 'Exclusion areas' ('no-go' areas) are identified, form a basis for SESA recommendations for future development. Spatial analysis focuses on *key development sectors*, which were considered critical for future development across all targeted urban areas, namely *Agriculture, Forestry and Fishing, Urban and Strategic Planning (including Housing), Tourism and Industry*. Spatial analysis for key development sectors was based on environmental criteria, as presented in Table 2.3.2-2 below.

SESA process assumes that Palestine will achieve its independence and will be able to exercise full control over its resources; therefore, land use restrictions and access restrictions (i.e., Area C (including settlements) and Area H2 in West Bank as well as No-go zone and restricted area (300m) in Gaza) were not included in the set of environmental criteria applied. However, these restrictions have been included in the spatial analysis output for reasons of consistency with the baseline land use analysis.

Environmental criteria – Key development sectors

For the delimitation of 'go areas' and 'go-but areas' *all* mentioned criteria must apply simultaneously (AND); the delimitation of 'no-go areas' is defined by *anyone* of the mentioned criteria (OR) The full set of environmental criteria was applied for all targeted areas in West Bank.

It must be noted that even though all environmental criteria, as presented in Table 2.3.2-2 were taken into consideration for the calculation of 'go' and 'go-but' areas for industry, only the worst-case scenario environmental criteria (i.e., for high-nuisance industry) have been presented in the visualization of environmental criteria for industry. The maps capturing the implementation of the environmental criteria for medium and low-nuisance industry are included in Annex IX of this report.

For Gaza Urban Area, applicability of criteria was limited; streams and protected areas were not identified within Gaza Urban Area and vulnerability to groundwater pollution data were not

available. Furthermore, all available archaeological sites were identified within built-up areas and therefore no buffer could be applied. The remaining environmental criteria were applied; due to the limited availability of land, only environmental criteria for low-nuisance industry with minimum buffers from residential sites were applied.

Table 2.3.2-2: Environmental criteria for key development sectors – spatial analysis for future development

Key Development Sectors	Environmental Criteria		Go Areas	Go-but Areas	No-go Areas
Agriculture, Forestry, Fishing	Agricultural Land Classification (productivity)		High	High or Medium	Low or Forests
	Vulnerability to groundwater pollution		Not Sensitive or Low	Not Sensitive or Low, Moderate or High	Extreme
	Distance (x) from streams		x < 1km	x > 1km	-
	Protected areas (Nature Reserves and biodiversity hotspots)		not intersecting	not intersecting	within
Urban and Strategic Planning	Distance (x) from existing High nuisance industries (LU1)		x > 2 km	300m < x < 2km	x <300
	Distance (x) from existing Medium nuisance industries (LU1)		x > 1km	200m < x < 1km	x <200
	Distance (x) from existing Low nuisance industries (LU1)		x > 500m	100m < x < 500m	x <100
	Distance (x) from existing or proposed antiquities areas (from LU1 and LU3)		x > 500m	x < 500m *	inside
	Protected areas (Nature Reserves and biodiversity hotspots)		not intersecting	not intersecting	within
	Agricultural Land Classification (productivity)		Medium or Low	Medium or Low	High
Tourism	Distance (x) from existing High nuisance industries (LU1)		x > 2 km	300m < x < 2km	x <300m
	Distance (x) from existing Medium nuisance industries (LU1)		x > 1km	200m < x < 1km	x <200m
	Distance (x) from existing Low nuisance industries (LU1)		x > 500m	100m < x < 500m	x <100m
	Distance (x) from existing or proposed tourism areas (from LU1 and LU3)		x < 2km	> 2km	-
	Distance (x) from existing or proposed antiquities areas (from LU1 and LU3)		x < 2km	> 2km	-
	Protected areas (Nature Reserves and biodiversity hotspots)		not intersecting	within **	-
	Agricultural Land Classification (productivity)		Medium or Low	High, Medium or Low	-
Industry[5]	**High nuisance**	Distance (x) from existing built-up area (LU1 and LU2)	x > 2km	300m < x < 2km	x < 300m
		Distance (x) from existing or proposed antiquities areas (from LU1 and LU3)	x > 2km	300m < x <2km	x < 300m
		Distance (x) from Protected areas (Nature Reserves and biodiversity hotspots)	x > 500m	x > 500m	x < 500m
		Agricultural Land Classification (productivity)	Medium or Low	Medium or Low	High
	Medium nuisance	Distance (x) from existing built-up area (LU1 and LU2)	x > 1km	200m < x < 1km	x < 200m
		Distance (x) from existing or proposed antiquities areas (from LU1 and LU3)	x > 1km	200m < x < 1km	x < 200m
		Distance (x) from Protected areas (Nature Reserves and biodiversity hotspots)	x > 300m	x > 300m	x < 300m

[5] ***High nuisance industry:*** *Industrial Zones + Quarries & Saws, as defined in existing Master Plans*
Medium nuisance industry: *Industrial Artificial and Light Industry & Special Regulations, as defined in existing Master Plans*
Low nuisance industry: *Industrial Artificial and Light Industry as defined in existing Master Plans*

Key Development Sectors	Environmental Criteria		Go Areas	Go-but Areas	No-go Areas
		Agricultural Land Classification (productivity)	Medium or Low	Medium or Low	High
	Low nuisance	Distance (x) from existing built-up area (LU1 and LU2)	x > 500m	100m < x < 500m	x <100m
		Distance (x) from existing or proposed antiquities areas (from LU1 and LU3)	x > 500m	100m < x < 500m	x <100m
		Distance (x) from Protected areas (Nature Reserves and biodiversity hotspots)	x > 200m	x > 200m	x < 200m
		Agricultural Land Classification (productivity)	Medium or Low	Medium or Low	High

Legend

criteria used for Gaza Urban Area

Notes:

** Urban development of positive likely environmental impact (i.e., open areas, Urban Green Spaces etc.)*

*** Sustainable tourism / ecotourism*

'Supporting sectors' are considered essential for the evolution of all key development sectors and therefore are not presented individually in the spatial analysis maps; however, they are discussed separately. These include the *energy, transportation, water & wastewater and solid waste* sectors; construction and/or upgrade of critical infrastructure in these sectors is considered a prerequisite for any type of agriculture, urban, industry and tourism development. Furthermore, *education and health* have been included in the 'supporting sectors' as development of such infrastructure is considered the foundation to any future *human* development.

Environmental criteria that can be used as stand-alone guidelines for the spatial implications of future development per supporting sector are also presented in Table 2.3.2-3 below.

Environmental criteria – Supporting sectors

As mentioned above, Table 2.3.2-3 below presents environmental criteria that can be used as stand-alone guidelines for the siting of 'supporting sector' infrastructure, which is considered essential for the evolution of *all* key development sectors.

Table 2.3.2-3: Environmental criteria for supporting sectors – stand-alone guidelines

No	Environmental Criteria	Supporting Sectors					
		Energy	Transport	Health	Education	Wastewater Management	Solid Waste Management
1	Away from areas of high flooding potential	X	X	X	X	X	X
2	Away from highly permeable hydrogeological environments (alluvial plains and karst terrains)					X	X
3	Away from impermeable soils (i.e. clays) to reduce runoff					X	
4	Away from industrial areas			X	X		
5	Away from seismically active regions	X		X	X	X	X
6	Away from terrains with high slopes (over 20%)	X(1)		X	X		X
7	Minimum conflicts with agricultural lands of high value	X					
8	Minimum conflicts with existing transport infrastructure		X				
9	Minimum conflicts with nature conservation areas	X	X	X	X	X	X

No	Environmental Criteria	Supporting Sectors					
		Energy	Transport	Health	Education	Wastewater Management	Solid Waste Management
10	Minimum conflicts with sensitive groundwater receptors					X	X
11	Minimum conflicts with sensitive land uses (residential, education & health infrastructure)	X	X			X	X
12	Minimum conflicts with sites of archaeological importance	X	X	X	X	X	X
13	Minimum conflicts with surface watercourses					X[(2)]	X
14	Prevailing wind direction away from sensitive receptors					X	X
15	Proximity to existing waste facilities (e.g. transfer stations etc.)						X
16	Proximity to major wastewater generators (i.e. industries)					X	
17	Proximity to public transport routes			X	X		
18	Proximity to road network - accessibility	X		X	X	X	X
19	Proximity to the electrical grid	X		X	X	X	X
20	Proximity to water supply			X	X		X
22	Within areas of average wind speed potential of no less than 6.0m/s - for wind parks[6]	X					

Notes:

[(1)] For PV, flat terrains with <2.5% slope are preferable
[(2)] to minimise the potential for polluting downstream waters

Priority SDP from key development and supportive sectors were discussed for each targeted urban area. In this context, GIS maps act as a tool to facilitate rapid assessments of future development and respective priority SDP, which are an outcome of the horizontal and vertical ranking process. These are presented in section 5.4 of this report.

Outcome: GIS maps, as tools for rapid assessment of future development and respective priority SDP in the five targeted urban areas; recommendations for future growth of targeted urban areas.

2.3.2.5 STEP 5: Management Plan - Recommendations

Task 5.1. Management Plan - Recommendations

Objective: Based on the identified Strategic Development Priorities that were identified to optimize the use of natural resources for future growth, the Environmental and Social Management Plan (ESMP) presents proposed interventions and emerging technologies to achieve implementation of SDP. In this context, the ESMP forms the basis of regular monitoring for urban development planning of the five targeted urban areas.

For each SDP, the following mitigation measures are identified:

- Short-term actions (1-2 years)
- Medium-term actions (3-5 years)

[6] *Hilmi S. Salem, Sustainable Development Research Institute, The Potential of Wind Energy In Palestine with Healthcare and Residential Examples In the West Bank and the Gaza Strip, Bethlehem, 2019*

- Long-term actions (>5 years)

Furthermore, for each SDP, measurable monitoring indicators are identified.

Finally, roles, responsible parties and monitoring frequency will be provided as part of the ESMP.

Outcome: An Environmental and Social Management Plan which will act as a guidance tool for decision-makers with respect to proposed interventions in order to achieve SDP in a manner that is sustainable over the long-term but also maximizes opportunities associated with the environmental characteristics.

2.3.3 Key data sources

The key data sources used for the preparation of the SESA report are presented in detail in CHAPTER 7 of this report; in summary, the following data sources have been used:

- Available previous studies which focus on the environmental, biological and social conditions of Palestine, including:
  - Urban development studies of national scale;
  - Environmental and Social studies of national, regional and local scale;
  - Environmental and Social Impact Assessment studies for various projects.
  - World Bank publications;
  - OECD databases and publications;
- Existing development, environmental and social planning documentation at the national, regional and local planning levels as well as relevant legislative and regulatory documentation for various sectors, as presented in section 2.1 of this report. The full list of planning and legislative documentation is presented in CHAPTER 7 of this report.
- The MoLG-ICUD GIS database has been used as an additional source of information in order to provide an overview of the baseline condition in the five targeted urban areas.
- During Phase One Consultation, relevant authorities and data holders provided data upon JV request; the list of relevant authorities and data holders contacted is included in section 5.1 and Appendix A of the SECP report which is presented in Annex X of this report.

  The following data collection framework was implemented:
  - Official requests for data collection were sent to authorities and other data holders;
  - Relevant authorities and data holders were contacted through phone for confirming receipt of official requests;
  - Project team visited authorities or data holders in order to facilitate data collection through custom-made questionnaires as and when required.

In cases where data was not available in the required format then one of the following options was applied:

- raw data was processed to become usable;
- raw data mining techniques were used.

Any remaining identified data gaps from the above-mentioned process were covered through:

- expert judgement based on relevant existing data;
- extrapolation from publicly available data at the regional level.

2.3.4 Stakeholder Identification and Analysis

2.3.4.1 Stakeholder identification

For the purposes of the SESA, stakeholders were defined as individuals, organisations or groups likely to be affected by, or have an interest in, the outcomes of the SESA and / or the ability to influence its outcome, either positively or negatively.

The preliminary stakeholder identification exercise focused on those stakeholders which either hold or own environmental and / or social data that may be required to determine existing baseline conditions across the five target urban areas.

Given the extensive geographical scope of the five urban areas and the populations residing in these areas, the engagement and consultation programme targeted key decision-makers and strategic stakeholders, as well as groups or committees deemed representative of the broader communities.

In preparation for the key phases of the SESA consultation programme (Phases 2 and 3), the stakeholder identification process determined stakeholders and organisations which may have a leadership, decision-making or implementation role in future urban development planning for the target urban areas. Further to this, they may also be end-users of the SESA or required to take SESA outcomes into consideration in future policy development and urban planning.

Attention was paid to ensuring that community stakeholders considered to be vulnerable or disadvantaged were appropriately represented. Given the political, security and social context prevalent across Gaza and the West Bank, there is a significant number of vulnerable, disadvantaged or marginalised people residing across the five urban areas. For the purpose of the SESA, the consulting team has identified groups which:

- may be more likely to be negatively affected by the impacts of future urban development planning and project execution;
- more limited than others in their ability to take advantage of future benefits arising from urban development; and / or
- maybe excluded from or unable to participate fully in the SESA consultation process.

The outcome of this process was a comprehensive stakeholder list covering each of the targeted urban areas as well as national stakeholders; it is important to note that the stakeholder list is a live document which was reviewed and updated on a continual basis throughout the SESA process as additional stakeholders were identified. The stakeholder list is presented in Appendix A of the SECP report which is presented in Annex X of this report.

2.3.4.2 Stakeholder analysis

Each identified stakeholder authority included in the final SESA Stakeholder List, as presented in Appendix A of the SECP report (Annex X of this report) was prioritised according to their influence over, and interest in, the SESA process and its outcomes as well as their attitude toward the project (from favourable to hostile)

Stakeholder authorities and their assessment have been mapped against a Stakeholder Mapping Matrix, which serves as a broad illustration of the stakeholder landscape. The Stakeholder Mapping Matrix, as presented in Figure 2.3.4-1 below, is divided into four key priority areas (1 - 4) as determined by:

a. stakeholder *influence* over the SESA process and / or the assessment outcomes;

b. stakeholder *interest* in the SESA process and / or the assessment outcomes; and

c. stakeholders' *general attitude* toward the SESA and implementation of the assessment outcomes.

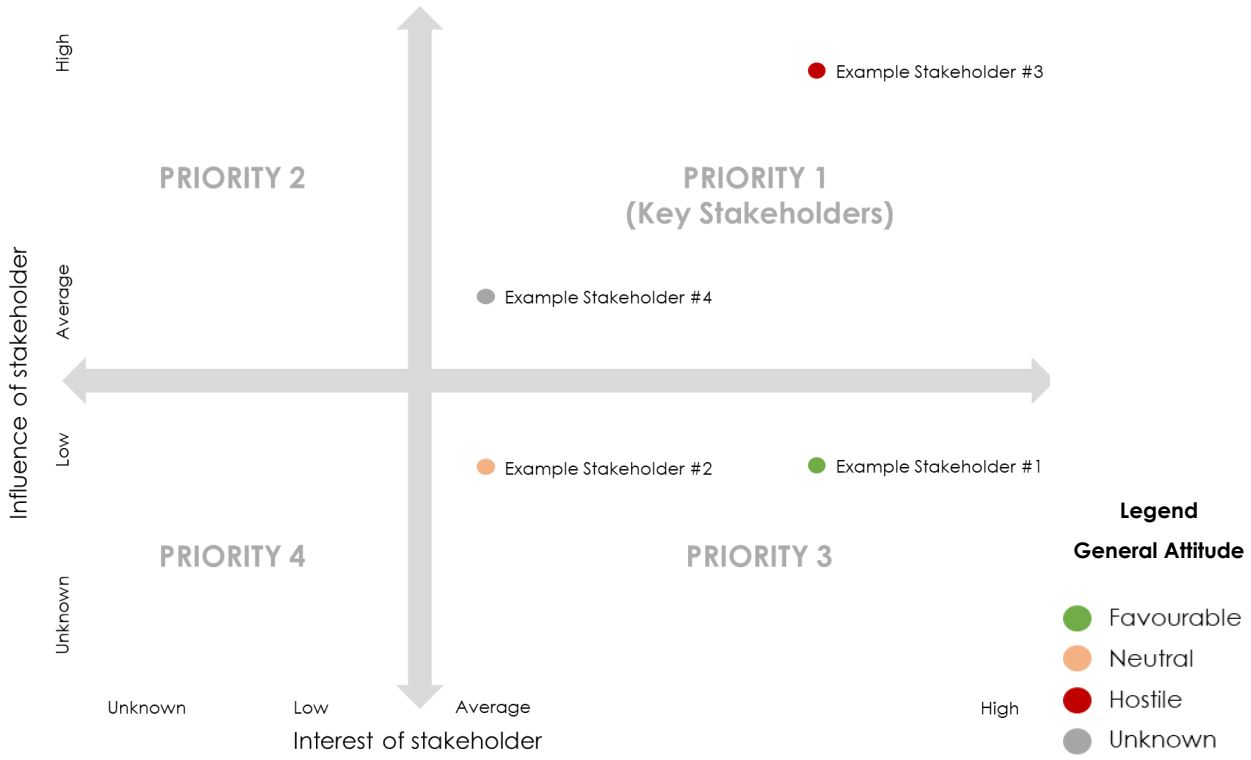


Figure 2.3.4-1: Stakeholder Mapping Matrix

In ranking each stakeholder, the following guide has been used.

Category	Guide for determination
Influence	▪ Degree of influence or power which the stakeholder is able to exert (either positively or negatively) over the SESA process and / or its outcomes. ▪ Ranking: High – Average – Low – Unknown. o Does this individual / organisation have a regulatory role? o Do they have a key role in providing data and information critical to the success of the assessment process? o Will they have a key role in implementing the SESA outcomes and recommendations or accounting for these outcomes in future project planning?
Interest	▪ Degree of interest which the stakeholder has in the SESA process or its outcomes. ▪ High – Average – Low – Unknown o Is this individual / organisation an end user of the SESA outcomes? o Will they have a role in future implementation of the assessment outcomes? o Are they likely to benefit from the SESA outcomes or be disenfranchised?
General Attitude	▪ Extent to which the individual / organisation views the SESA process and / or outcomes favourably. ▪ Favourable – Neutral – Hostile – Unknown o Is this individual / organisation helpful and responsive to requests pertaining to the SESA?

The results of this process were presented in six Stakeholder Mapping Matrices, one for representative stakeholders for each of the five targeted urban areas and an additional Matrix for representative stakeholders at the national level.

The outcomes of the mapping exercise, in part, determined the focus of the engagement and consultations activities throughout the SESA process.

2.3.5 Consultation and public participation

In order to ensure the participatory character of the SESA process, stakeholder consultation and public participation is required throughout project implementation. In this context, stakeholder consultation is treated as an on-going feedback mechanism, complementary for each methodological step and therefore considered crucial for efficient project delivery.

The consultation and public participation programme was structured into four phases:

- Phase One: Baseline Data Collection
- Phase Two: Baseline Key Issues, E&S Objectives and Strategic Development Priorities (SDP)
- Phase Three: Priority Setting
- Phase Four: Final SESA Presentation and Disclosure

The consultation phases are presented in detail in Chapter 4 of the SECP report which is presented in Annex X of this report.

The engagement and consultation materials and methods utilised during each phase of the engagement and consultation programme are briefly presented below; these are also presented in detail in Chapter 4 of the SECP report which is presented in Annex X of this report.

Consultation materials

To aid and support information disclosure, engagement and consultation activities a range of communications materials were produced in Arabic and English including:

- SESA fact sheets to provide basic information about the SESA process and information gathered during the assessment. Fact sheets were provided in either hardcopy, for those in attendance, or electronically for those who were not physically able to attend.

- Contact sheet containing the telephone and email details for the JV Assessment Team in Gaza and the West Bank.

- Presentations to support engagement and consultation activities.

- Questionnaires to assist in facilitating stakeholder feedback in a structured and efficient manner.

- Internal Q&A to ensure that all members of the JV assessment team were able to answer frequently asked questions in a consistent manner.

Where necessary, formal requests and letters were also used to support a structured engagement and consultation approach. For every engagement or consultation activity an agenda and meeting minutes were recorded.

The consultation material produced is included in the SESA Final Report and has been uploaded in the SESA Palestine ftp file sharing platform[7].

Consultation methods

During Phase 1 Engagement, relevant authorities and data holders were contacted by the JV via a range of mechanisms as summarised below:

- Official requests for data collection were sent;
- Phone calls for confirming receipt of official requests were made;
- Visits in order to facilitate data collection through custom-made questionnaires as and when required;

During Phase Two and Phase Three Consultation, representatives from the JV assessment team:

- Presented the findings of the baseline data review of relevance to the stakeholder group in attendance. This also included key environmental and social issues and gaps in the existing Legal and Institutional Framework of Palestine.
- Facilitated discussions amongst participants regarding the data presented as well as any environmental and social issues and objectives stakeholders had pertaining to sustainable urban growth within their communities. This also included identification of Strategic E&S Objectives, Strategic Development Objectives and Strategic Development Priorities (SDP).
- Used presentations to support facilitation and consensus and ensure a structured and efficient discussion.
- Captured feedback through the use of Fact Sheets – Questionnaires provided and integrated this into the assessment process as appropriate.
- Provided the contact details of the JV assessment team to ensure that stakeholders were able to continue to provide input should they feel inclined to do so.

[7] http://gofile.me/6J3So/FgBtWnGNW

During the fourth and final consultation phase, participants were presented with the final SESA deliverable, including conclusions and recommendations of the SESA process. During this phase the final SESA recommendations were presented to the client and selected representatives from key Ministries and Authorities. A summary of the fourth consultation phase is presented in Annex V of the Final report.

All Stakeholder consultations were conducted according to the principles of the environmental legislation and in close cooperation with the Environmental Quality Authority (EQA).

Given COVID-19 restrictions, the approach and methodology for continuing stakeholder consultation and engagement during all consultation phases was adjusted, taking into consideration the '*Technical Note on Public Consultations and Stakeholder Engagement in WB-supported operations when there are constraints on conducting public meetings*'; more specifically:

- Consultations took place in small-group sessions, such as focus group meetings and one-on-one meetings;
- Traditional channels of communications (dedicated phone-lines and mail) were employed when stakeholders did not have access to online communication channels or did not use them frequently;
- All reasonable efforts were made to conduct meetings through online channels such as zoom; virtual stakeholder meetings were attended by international and local experts.

The Consultation and Public Participation programme implemented is discussed in detail in the Stakeholder Engagement and Consultation Plan (SECP), which is presented in Annex X of this report. The SECP is a working document which has been reviewed and updated as information and feedback was gathered throughout the SESA process.

CHAPTER 3 LEGAL AND INSTITUTIONAL FRAMEWORK

3.1 Legal and Institutional Framework Objective (consider "Objective and methodology of the analysis")

In this chapter, a detailed analysis of the Palestinian legislative and the institutional framework related to the SESA study is performed.

The analysis will follow a cross-sectoral as well as sectoral analysis regarding both the legislative and the institutional framework:

Cross-sectoral analysis: The cross-sectoral analysis presents environmental legislation, strategies and the main institutions involved, on subjects that cut across other environmental legislation and the environmental sectors as presented below. In contrast to the sectoral analysis, the cross-sectoral analysis should be procedural in character and provide the methods and mechanisms aimed at improving decision-making, legislative development and implementation.

Sectoral analysis: Sectoral analysis refers to a more analytical approach regarding the main sectors involved for the scope of the SESA.

In the 1st part of this chapter, a summary of the cross-sectoral legislation related to the SESA study is presented, with a specific reference to the legislative framework governing the EIA and the SESA.

In the 2nd part, a similar analysis focuses in the cross-sectoral institutional framework and presents the main agencies involved in the processes of producing new, as well as regulating, enforcing and monitoring existing legislation.

In the 3rd part, an in-depth analysis of the sectoral legislation as well as the sectoral institutional synthesis is presented. For each sector, a gap analysis is performed based on the review of the specific legislation and the main institutions involved.

Given that the SESA employs a cross-sectoral analysis, the sectors under detailed examination include:

- Biodiversity
- Air quality and noise
- Energy, Climate change and Desertification
- Water and Wastewater
- Solid waste
- Agriculture and fishing
- Urban development (including transportation)
- Social policy (including culture, education and tourism)

Finally, an examination of the SESA report in comparison to the following policies and frameworks is performed:

- World Bank Safeguard Policies
- ICUD's Environmental and Social Management Framework
- Palestinian Environmental Assessment Policy &
- Palestinian Environmental Legislation

The aim of this review was on one hand to identify the main legal and institutional framework governing urban development, while, on the other, to assess gap identification for each sector separately.

The assessment of the strategies presented in this chapter in terms of the qualitative and quantitative targets as well as the performance of the institutional stakeholders in relation to them, is not in the scope of this chapter. Such an assessment, mainly related to the targets for each sector, will be presented in the following chapters.

The outcomes of this review have been updated based on the feedback of the SESA consultation process before the draft submission of the SESA report.

3.2 Cross-sectoral legal framework

According to the World Bank report ASPIRE (2020)[8], the legal and institutional framework concerning Palestine is quite exceptional. The laws and regulations applied vary depending on whether the subject area is in the Gaza Strip, or in Areas "A", "B" or "C" in the West Bank. The relevant laws span the Ottoman regime, the British Mandatory period, the Jordanian administration of the West Bank, the Egyptian administration of the Gaza Strip, the Israeli occupation of the occupied Palestinian territory (oPt) and East Jerusalem, and the Palestinian Authority's (PA) administration over certain areas in Palestine. However, it remains a challenge to seek remedies in the PA court system because of the uncertainty concerning enforcement and the institutional limitations of a court system operating under occupation.

The laws and ordinances applicable to the Gaza Strip and West Bank before 1967 were adopted into the PA legal regime as Decision No. 1 of the Elected Palestinian Council on 20 May 1994. The decision provided that "The laws, regulations and orders which were in force before 5 June 1967 in the West Bank and Gaza Strip shall remain in force until unified." In addition to the applicable laws, and according to law No.12, the Office of the President issued presidential decrees placing the Palestinian Environmental Assessment Policy (PEAP) and PEAP-related projects under the President's jurisdiction (World Bank, 2020).

Despite all the particularities, the Palestinian Environmental regulatory framework is modern and comprehensive, covering environmental protection, conservation of natural resources, and preservation of biodiversity. The Palestinian Environmental Law addresses various environmental issues, including Environmental Impact Assessment (EIA) and auditing, permitting of development projects, monitoring of environmental compliance, and enforcement. The Palestinian Environmental Assessment Policy represents three sequential stages in the project life-cycle. The environment review process and approval include the application for Environmental Assessment, the Initial Environmental Evaluation (IEE) and the Environmental Impact Assessment (World Bank 2019). The EIA and the Strategic EIA will be presented more comprehensively in the following chapters.

There are four levels of environmental legislation and instructions according to the Swedish International Development Cooperation Agency's report (ORGUT, 2017):

1. Laws,

[8] http://documents1.worldbank.org/curated/en/442921585877419951/pdf/Resettlement-Framework-Advancing-Sustainability-in-Performance-Infrastructure-and-Reliability-of-the-Energy-Sector-in-the-West-Bank-and-Gaza-P170928.pdf

2. Bylaws,
3. Regulations and Cabinet decisions
4. Decisions by the competent Minister, and

Other, mainly technical guidelines complementing the existing legislation are provided through "standards", "guidelines" and "technical instructions". They are also called legal steering documents.

3.2.1 Laws

The **Palestinian Basic Law** (2003) asserts the right, in its article 33, to a "clean and a balanced environment as a basic right of every Palestinian" and the national duty for "preservation of the Palestinian environment for the sake of both present and future generations". The Palestinian Basic Law functions as a temporary constitution for the Palestinian Authority. The Basic Law was passed by the Palestinian Legislative Council in 1997 and ratified by President Yasser Arafat in 2002. It has subsequently been amended twice; in 2003 the political system was changed to introduce a prime minister. In 2005 it was amended to conform to the new Election Law. The 2003 reform was comprehensive and affected the whole nature of the Palestinian political system, whereas the 2005 amendment was only minor and affected only a few paragraphs[9].

The **Environmental Law number 7 of 1999** is the main governing law for the Environmental Quality Authority (EQA). It is based on Article 33 of the Constitution (Basic Law), which states: "*The clean and balanced environment is a human right. The conservation and protection of the Palestinian environment for future generations is a national responsibility*". Law 7 of 1999 constitutes the general framework for environmental protection and consists of 82 articles and states that the Palestinian National Authority has the right and responsibility to study and assess any environmental impacts of projects. More specifically, Article 2 of the Environmental Law outlines the objectives of the law such as the protection of the environment against all forms and types of pollution as well as the protection of the public health and well-being, while Article 33 of the Palestinian Basic Law states that "*The enjoyment of a balanced and clean environment is a human right. The preservation and protection of the Palestinian environment from pollution for the sake of present and future generations is a national duty*." The Environmental Law number 7 of 1999 consists of 5 distinctive parts:

Part one is the introductory part of the law and elaborates on general issues and mandates. The law aims at protecting the public health and social welfare, biodiversity and the sensitive environmental areas. It also aims at incorporating the concerns of environmental protection into the economic and social development plans, encouraging sustainable development, and increasing the public awareness of environmental matters. Of the principles emphasized in part one is the right of the public to prosecute any person or entity who causes damage to the environment, in addition to their right to obtain official and reliable data on any development or activity to perceive its impact on the environment.

Part two tackles aspects of environmental protection covering earth environment (solid waste handling, excavation surplus and residual materials, hazardous substances pesticides and fertilizers, desertification and soil erosion), air environment (air pollution, noise pollution, and radioactive emissions), aquatic environment (potable water, wastewater and stormwater collection, treatment and reuse), marine environment, and archeological and historical areas; where the core issue emphasized is the mandate of the EQA (in coordination with the other inline relevant ministries) to

[9] https://www.palestinianbasiclaw.org/basic-law/2003-amended-basic-law

set quality and implementation standards, formulate management plans, and monitor implementation and compliance.

Part three of the law is devoted to EIA and associated issues. It states the mandate of the a specialized agency of the Ministry (which became the EQA) in coordination with relevant authorities to set the standards for the identification and listing of projects and activities for which EIA is a prerequisite, in addition to outlining the methods and procedures for conducting the EIA. It also emphasizes the responsibility of relevant authorities to prevent environmental harm by encouraging all environmentally friendly projects. The EQA in coordination with the relevant authorities should specify the projects that must not be licensed unless environmental approval by the EQA is issued following an EIA study. The law addresses the follow up on the implementation of the environmental law by monitoring installations, projects, and activities to assure their adherence to the set standards and regulations. The right of inspectors (from EQA) to visit and check installations, to acquire samples, and to carry out inspections to verify adherence with the conditions of pollution prevention is presented as one of the monitoring tools. In addition, relevant authorities are granted the right to suspend the work of any project or installation that are violating the law and causing harm to the environment, where resuming work is not to be authorized unless the violation is stopped, adverse effects are remedied, and all are subjected to the inspection and approval of the relevant authorities.

Part four of the law establishes penalties for contravening the standards and instructions relating to the protection of the environment as per the clauses of the environment law.

Part five addresses Palestine's relationship with other countries regarding regional and international agreements and treaties on the environment.

In terms of sustainability, law 7 of 1999 sets the basis for the integration of environmental protection in social and economic development plans. Moreover, it encourages the sustainable development of vital resources in a manner that preserves the rights of future generations (Mahmiyat.ps report 2017).

Complementary to the abovementioned, the environment is also regulated in other laws, most importantly in the following seven fields:

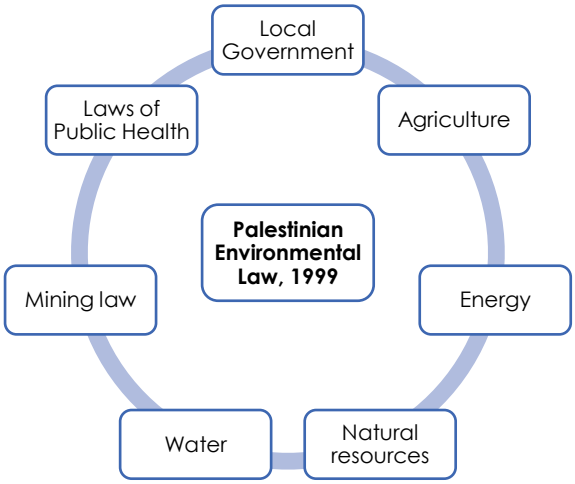


Figure 3.2.1-1: Complementary laws to the main Environmental legislation

These sector-based laws cover environmental protection in their scope of relevance in that specific sector and they include:

- Law no. 20 of Public Health, 2004
- Law no. 2 of Agriculture, 2003
- Decree No. 14 Water Law, 2014 (new Water Law)
- Law no. 1 of Natural Resources 1999
- Law No. (12) of 1995 on the establishment of the Palestinian Energy Authority and the Legislative Decree No. 14 of 2015 on
- renewable energy and energy efficiency
- Law no. 15 of Industrial Estates and Free Industrial Zones, 1998 and Legislative Decree No. (10) of 2011 on the law of industry
- Law no. 1 of Local Bodies Councils 1997

In ANNEX III of this report, a table summarizing the main legislation in force or prepared to come in force is presented.

All mentioned laws, orders and regulations have enforcement power, the main base of the enforcement system is the Palestinian **Public Health Law No 20** and the **Municipality regulatory system**. Enforcement actions are to be taken by the municipality directly in some cases and through the court, the police and sometimes the district governor for much-complicated cases (PWA, 2017).

3.2.2 Bylaws and Cabinet decisions

Under the framework environmental law, several bylaws and guidelines for environmental themes have been established on the basis of updating sectoral legislation as well as harmonizing with international treaties. According to the ORGUT report (2017), since 2010, six bylaws have been approved, and another four exist in an advanced draft form.

3.2.3 Legal steering documents

Standards development is the responsibility of the Palestinian Standards Institute (PSI) supported by the relevant institutions involved. Any standard with directing instruction is a compulsory standard where the related ministry or authority should follow up on the implementation. Standards also become compulsory if included in instructions or bylaws. In many cases where standards do not exist, international standards apply. Moreover, in cases where Palestinian standards are not as strict as International, the leading institution may choose to apply the strictest.

Environmental standards exist in four areas: Emissions, Air pollution, Water pollution and Noise pollution. The most important steering documents are the standards for drinking water, for air pollution, for industrial wastewater effluents and standards for treated wastewater.

Ministerial instructions from EQA exist alongside instructions from other ministries. Of particular importance are instructions referring to public health issues caused by environmental pollutions from the Ministry of Health.

3.2.4 Governing Strategies

For the purpose of the review and the assessment of the legal and institutional framework, several strategies were reviewed. The objective was to identify the main National policies leading to the formulation of national targets and eventually policies, which could eventually turn into regulations in the form of bylaws or other regulatory directives. For the purpose of this report, the main national strategies reviewed include the following:

- Palestinian National Environmental Strategy (PES) 2000-2010.
- Environmental cross sector Strategy 2017-2022.
- Palestinian National Development Plan (NDP) 2014-2016.
- Palestine National Adaptation Plan (NAP) 2016
- EQA Strategic Action Plan 2016-2020 (EQA is the lead institution involved in the SESA study)
- National Spatial Plan

On a sectoral level, the main strategies reviewed include:

- Climate Change Adaption Strategy[10] and the Desertification Strategy[11],
- Biodiversity Strategy[12] and the 5th report to the convention on biological diversity[13]
- Solid Waste Management Strategy (2017-2022)
- National Water and Wastewater Policy and Strategy for Palestine 2012-2032 and
- Environmental Awareness and Education Strategy.

For the sectoral analysis, a detailed presentation of all the strategies governing each sector is presented in sections 3.4.1-3.4.10 of this report

3.2.5 Participation in international conventions and treaties

On an international level, Palestine has ratified or participates in the following very relevant conventions. The reason they are presented here is that, the commitments coming from participation create targets and policies that in turn need to be integrated into existing or new legislation:

Table 3.2.5-1: Global Environmental Conventions the Palestinian Authority participates

Name of Convention	Date of ratification – signature and comments
UN Convention on Biological Diversity	Signed on April 02, 2014
Cartagena Protocol on Biosafety under the Convention on Biological Diversity	Signed on April 02, 2014
UN Framework Convention on Climate Change (UNFCCC)	Signed on December 01, 2015
UN Convention to Combat Desertification (UNCCD)	Ratified on December 29, 2017
Basel Convention on the Control of Trans-boundary Movements of Hazardous Waste and their Disposal	Signed on April 02, 2014
The Barcelona convention for the protection of the Mediterranean Sea against pollution	The EQA is involved in relevant programs and prepared a National Plan for the protection of marine environment and coastal areas. (Not signed yet)
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	Accession in 29/12/2017 and entry into force 29/03/2018

[10] https://eprints.lse.ac.uk/30777/1/PA-UNDP_climate_change.pdf
[11] https://environment.pna.ps/ar/files/The_National_Strategy_to_Combat_Desertification.pdf
[12] http://www.environment.pna.ps/ar/files/National%20Biodiversity%20Strategy%20And%20Action%20Plan%20For%20Palestine.pdf
[13] https://www.cbd.int/doc/world/ps/ps-nr-05-en.pdf

Name of Convention	Date of ratification – signature and comments
Montreal Protocol on Substances that Deplete the Ozone Layer	Accession in 18/03/2019
The Stockholm Convention on Persistent Organic Pollutants	Accession in 29/12/2017 and entry into force 29/03/2018
United Nations Convention on the Law of the Sea	02/01/2015
Minamata Convention on Mercury	Accession in 18/03/2019
United Nations International Covenant on Civil and Political Rights	29/12/2017
United Nations International Covenant on Economic, Social and Cultural Rights	Accession in 02/04/2014
United Nations Convention on the Rights of Persons with Disabilities	Accession in 02/04/2014

Source: Koyama, et al., 2019, Mahmiyat.ps., 2017

3.2.6 Environmental Impact Assessment

Historically, the Oslo I Accord (1993) and Oslo II Accord (1995) between Palestine and Israel addressed environmental issues. **In 1993, a draft environmental law** was prepared that dealt with Environmental Impact Assessments (EIA) and licensing of regulated facilities. In 1999 the Environmental Law was drafted[14]. The Environmental Law number 7 of 1999 introduced EIA into legislation and constitutes, until today, the "framework enabling law" for the EIA.

A more specific law, in the form of a "national detailed regulation" for the Environmental and Social Impact Assessments (ESIA), is The **Environmental Assessment Policy,** drafted in 1999 and adopted in 2000.

3.2.6.1 Palestinian Environmental Assessment Policy (2000)

The Palestinian Ministerial Council approved the **Palestinian Environmental Assessment Policy (PEAP)**, through resolution No: 27-23/4/2000[15]. The Palestinian Environmental Impact Assessment Policy describes the conditions, through standards and guidelines, under which any private or public development activity, in terms of environment protection, shall be implemented. A list of activities needing to conduct an Environmental Impact Assessment (EIA) or an Initial Environmental Evaluation (IEE) is also provided. The policy lies in two parts, where:

The **first part** consolidated a set of goals and principles. The main principles emphasized in the policy were:

- The transparent, equitable and effective implementation contributes to sustainability and environmental soundness of development and does not hinder or constrain it.
- Initiation of the EIA process when decided on as a pre-requisite for granting environmental approval and permitting at the early stages of planning for the project and utilizing the expertise of qualified experts to prepare the study and its relevant reports while relaying on internationally approved standards when equivalent Palestinian standards don't exist and emphasizing the role of stakeholder consultation and public access to information and results of studies in the whole process.
- The requisite that EA identifies mitigation measures of any adverse impacts on the environment with the associated monitoring and management programs through the life cycle of the project.

[14] https://pij.org/articles/426
[15] http://environment.pna.ps/ar/files/Environment_Impact_Assessment_Policy_en.pdf

The **second part** of the policy which is presented in the form of annexes to it provides more details about operation modalities and contents of assessment studies.

The Palestinian Environmental Impact Assessment Policy aimed to assist in meeting the following goals:

- Ensuring an adequate standard of life in all its aspects, and not negatively affecting the basic needs, and the social, cultural and historical values of people as a result of development activities.
- Preserving the capacity of the natural environment to clean and sustain itself.
- Conserving biodiversity, landscapes and the sustainable use of natural resources.
- Avoiding irreversible environmental damage, and minimizing reversible environmental damage, from development activities.

There are three types of EA reports that represent sequential stages in the project life cycle and the EA review process:

1. An Application for Environmental Approval,
2. An Initial Environmental Evaluation (IEE), and
3. An Environmental Impact Assessment.

The Ministry shall provide guidance on the content and preparation of these reports. The IEE is for projects where significant environmental impacts are uncertain, or where compliance with environmental regulations must be ensured; whereas An Environmental Impact Assessment (EIA) is required for projects which are likely to have significant environmental impacts. An EIA may be carried out as a result of an IEE.

Based on the Application for Environmental Approval, screening criteria are used to determine whether an Initial Environmental Evaluation or an Environmental Impact Assessment is required for a project. An EIA shall be conducted for the following types of major development projects:

1. Power plants (including gas turbines, substations and super tension lines)
2. Quarries and mines
3. Waste water treatment plants including main sewers
4. Cement plants
5. Solid waste disposal sites
6. Hazardous waste disposal sites
7. Plants producing, storing or using hazardous substances
8. Airports and landing strips
9. Seaports, jetties and harbors
10. Refineries
11. Industrial estates
12. Major dams and reservoirs
13. Major roads
14. Steel mills

For project types not listed above, a determination of whether or not an IEE or an EIA must be conducted will be based on a screening criteria. Extensions to existing projects of the types listed above shall be screened for the need for IEE or EIA studies.

EQA applies the following Palestinian Environmental Assessment Policy (PEAP)-defined screening process based on the requirements of relevant land use plans, to determine whether an *IEE* report or

an *EIA* report is required. According to PWA (2017), the screening process determines whether the project is likely to:

- Use a natural resource in a way that preempts other uses of that resource.
- Displace people or communities.
- Be located in or near environmentally sensitive areas such as natural reserves, wetlands, or registered archeological and cultural sites.
- Generate unacceptable levels of environmental impact.
- Create a state of public concern.
- Require further, related development activities that may cause significant environmental impacts.

The IEE is for projects where significant environmental impacts are uncertain, or where compliance with environmental regulations must be ensured, whereas an EIA is required for projects, which are likely to have significant environmental impacts.

Some of the main components of an EIA involve the following stages (more may be included in each EIA study):

Project Screening: to define which projects or developments need a full or partial environmental impact assessment study.

Scoping: a) to identify which impacts should be considered and assessed based on legislative requirements, international conventions, expert knowledge and public involvement, b) to identify alternative solutions that avoid, mitigate or compensate adverse impacts on biodiversity c) to derive terms of reference for the impact assessment.

Assessment and evaluation of impacts and development of alternatives: to predict and identify the likely environmental impacts of a proposed project or development, including the detailed elaboration of alternatives;

Reporting the Environmental Impact Statement (EIS) or EIA report: including an environmental management plan (EMP) and a non-technical summary for the general audience.

Review of the Environmental Impact Statement (EIS): based on the terms of reference (scoping) and public (including authority) participation.

Decision-making: whether to approve the project or not, and under what conditions

Monitoring, compliance, enforcement and environmental auditing: monitor whether the predicted impacts and proposed mitigation measures occur as defined in the EMP; verify the compliance of proponents with the EMP, to ensure that unpredicted impacts or failed mitigation measures are identified and addressed in a timely fashion.

The main areas of information gathered in our studies include (more may be assessed in each EIA study):

- Land use, landscape, and visual quality
- Geology, topography and soil.
- Hydrology, water quality and waste water treatment plans
- Air quality and climate
- Ecology: terrestrial and aquatic
- Fauna and flora

- Transportation
- Noise
- Socio-economic impacts
- Interrelationship between effects

The PEAP stated that stakeholder consultation is mandatory when undertaking an EIA. In consultation with the proponent and the EA Committee, EQA determines the minimum requirements for stakeholder consultation. At the minimum, the proponent must meet with the principal stakeholders to inform them about the proposed project and to solicit their views about it. The methods and results of the consultations must be documented.

According to World Bank (2010), for existing projects and developments, **Environmental Auditing** may be required. Its aim is to mitigate negative environmental impacts through evaluating their environmental management and performance. An environmental audit is prepared by the owner or operator of the development activity, and focuses on mitigation measures for existing environmental impacts to comply with relevant environmental standards and regulations. Decisions resulting from an Environmental Audit Report can include:

i) Suspension of the permit for the development activity by the permitting authority until specified measures are implemented;
ii) Agreement on conditions that will be applied to the development activity, including a plan of implementation; or
iii) Exemption of the development activity from further compliance with the EA Policy.

3.2.6.2 Strategic Environmental and social assessment framework

In some cases a Strategic Environmental Assessment (SEA) is required. The SEA is designed to address the cumulative and synergistic impacts of many projects in the same area. These types of impacts may be unavoidable at the project stage, and are more easily anticipated and avoided or mitigated at the preceding plan or program stage. SEA is most often used to guide public-sector decision-makers in the development of government plans and programs.

The concept of the Strategic Environmental and Social Impact Assessment (SESA) is not delineated in any of the previously mentioned legislation or other types of regulation.

In the PEAP (2000) a brief definition is provided: "***Strategic environmental assessment (SEA)****" means the environmental assessment of plans or programs*" (Chapter 1, Article 1: Definitions).

Moreover, in ANNEX 4 of the PEAP, in the initial scoping of EA requirements for plans and programs, it is stated that: IEE and EIA procedures and reports are designed to deal with individual projects. By dealing with plans and programs, the **SEA** is designed to address the cumulative and synergistic impacts of many projects in the same area. These types of impacts may be unavoidable at the project stage and are more easily anticipated and avoided or mitigated at the preceding plan or program stage. SEA is most often used to guide public-sector decision-makers in the development of government plans and programs. SEA may be used for plans and programs such as:

a) Power generation and supply

b) Solid waste management

c) Transportation infrastructure development

d) Tourism infrastructure development

e) Parks and natural reserves development and management

f) Development and management of industrial policy and estates

g) Master plans

h) Agricultural development programs.

3.3 Institutional framework

The institutional stakeholders related to the SESA can be divided into two main categories:

National level institutions: they are the stakeholders that are involved in policy making, strategy designing and the formation of legislation. They are the main regulating and monitoring authorities.

Operational level institutions: This mainly refers to the stakeholders with functional responsibilities involved in service delivery and regulatory functions. However, they can and they should be entrusted with the important role of managing environmental resources.

This level of analysis is attempted in the "sectoral institutional analysis", where the main stakeholders are divided into these categories.

3.3.1 National level institutions

3.3.1.1 Environmental Quality Authority (EQA)

On 10 December 1996, the Palestinian Environmental Authority was established. This was the first organization responsible for protecting the natural environment and mitigating effects on human health. The Palestinian Environmental Authority was created in parallel with the Oslo II Accords, which agreed to establish a number of ministries and authorities aimed at the planning, management and implementation of environmentally beneficial tasks within the Palestinian National Authority. By the end of 1997, a merger was constructed to join the Authority, the Environmental Planning Department and part of the Ministry of Planning.

In December 1998, a Minister of State for Environmental Affairs was appointed through Presidential Decree No 2, which granted the collaborative more power than the 1997 merger did. The order gave the Minister authorization over the Palestinian Environmental Authority.

Following Presidential Decree No. 2 designating an entire new Cabinet was appointed at that time to head various ministries, authorities and other institutions leading to the establishment of the Palestinian Ministry of Environmental Affairs (the Palestinian Environmental Authority was merged). As a result of administrative reforms, Presidential Decree No. 6 in June 2002 established the **Environmental Quality Authority** as the successor body to the Ministry.

According to ORGUT report (2017), EQA's mandate, based on the Environment Law number 7 for the year 1999 and Article 33 in the Palestinian Basic Law (2003), is: "*To monitor and implement all that is necessary for the protection of the Palestinian environment and the provision of a clean and healthy*

environment to ensure the right of all Palestinians to the highest attainable level of health and welfare as guaranteed in the Palestinian Basic Law and Environmental Law".

The mandate is found to be wide and not clearly formulated. As such it provides limited guidance to EQA and other stakeholders on EQA's roles and responsibilities. To further specify EQA's mandate could be useful for increased clarifications on its roles. According to the environment sector strategy 2011–2013, EQA's mission statement, based on the Environment Law, is formulated as (EQA, 2010): *"Maintaining and protecting the environment, preserving human health, curbing and reducing the depletion of natural resources, combating desertification, preventing the aggravation of environment pollution, promoting environmental awareness and ensuring sustainable environmental development.*

The Environment Law provides the basis for defining the roles and responsibilities of EQA. Based on it and the expectations raised by many stakeholders interviewed during the review, the following list of expected roles and responsibilities of EQA has been compiled (ORGUT, 2017):

1. Regulator
2. Planner and policy formulator for protection and prevention
3. Supervisor for ensuring compliance to regulations and taking mitigation measures
4. Provider of environmental knowledge
5. Public awareness mediator and initiator, educator and advocator
6. Partner for sustainable development
7. The Representative of Palestine internationally in the environment
8. Defender of Palestinian environmental rights.

In 2010, EQA established a 3-year strategy (2011-2013) that identified and prioritized objectives for itself and the Palestinian environment as a whole. EQA listed 48 specific objectives, among them issuing legal and other directives, issuing informational bulletins with statistical data, building human capacity at the EQA, reviewing and modernizing environmental laws and reviewing and evaluating institutional structures related to the environment (Manmiyat.ps., 2017).

The structure of the EQA comprises the President, vice-President and 6 main administrative departments, each with a set of directorates:

1. Environment Protection
2. Environmental Resources
3. Policies and Planning
4. Awareness and Environmental education
5. Projects and international relations
6. Administration and financial affairs

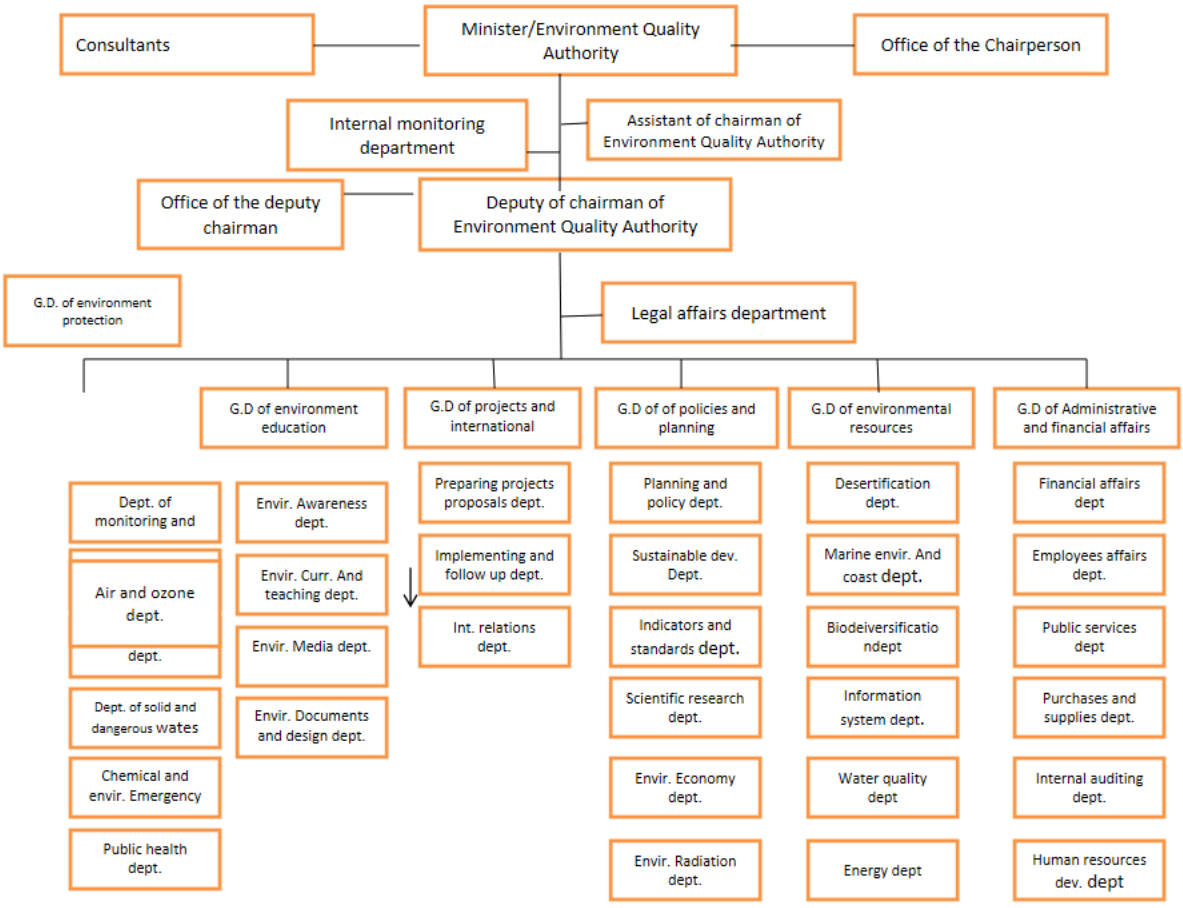


Figure 3.3.1-1: Structure of the EQA

Source: SIDA, Organizational Review of the Palestinian Environment Quality Authority (EQA)

Each general directorate is led by a General Director. Eight Regional offices in the West Bank fall under the responsibilities of the General Directorate for Environmental Protection. Each General Directorate is divided into a number of departments. These vary from three to seven between the General Directorates. Each department is further divided into two or three divisions.

EQA has its regional offices as the main point of interaction with society. The regional offices are located under the General Directorate for Environment Protection while their mandate is broader and, in most cases, include awareness raising.

3.3.1.2 Ministries with environmental related tasks

According the analysis following this document, in addition to the Environmental Quality Authority, many other ministries and authorities, as well as one international organization, have environment-related tasks. Among those specifically identified in the environmental strategy are:

- **Ministry of Local Government**, which deals with solid waste management and is therefore involved in the operation and financing of solid waste collection and disposal. Municipalities and village councils focus on collection, transport and disposal of municipal wastes. The United Nations Relief and Works **Agency for Palestine Refugees in the Near East (UNRWA)**, on the other hand, is responsible for these services in the refugee camps;
- **Ministry of Health**, which, via its Department of Environmental Health, is involved in the control and management of medical waste. It is also involved in the management of water and food quality, wastewater and solid waste, pest control, etc;

- **Ministry of Industry**, which is concerned with hazardous waste and industrial pollution control and management, environmental standards, natural resources and industrial safety and zoning
- **Ministry of Agriculture**, which is responsible for environmental management in the use of agrochemicals and protection of nature and biodiversity; Fisheries and Aquaculture Departments fall under the remit of the Ministry of Agriculture. While the MoA is responsible for resource management, EQA is responsible for the Quality Control of resources.
- **Ministry of Tourism and Antiquities**, which focuses on the protection and management of the cultural heritage;
- **Ministry of Interior**, which is involved in environmental law enforcement;
- **Ministry of Transport**, which is concerned with the environmental aspects of traffic and infrastructure.
- **Ministry of Education** also has a specific role through environmental education and awareness building.
- **Ministry of Social Development** is seeking in partnership and with coordination with the ministries, government institutions, civil society organizations and the private sector and international organizations, to provide social protection for the Palestinian people, through programs in areas of protection, care and prevention, empowerment and awareness-based approach based on rights. In addition, to ensure transparency and justice, and to strengthen the resilience of the citizens, and to maintain social cohesion and solidarity.

Besides, there are several authorities with environment-related mandates and functions:

3.3.1.3 Palestinian Water Authority

The Palestinian Water Authority (PWA) was established under Presidential Decree No 90 of 1995, which stated in article 1, the Palestinian water authority, as broad Water Act (2) for the year 1996 in article (2) on the establishment of the Palestinian water authority, which has independent legal personality and its own budget. Water Act No. 3 of 2002 authorized the Palestinian Water Authority the water sector management task, entrusted to regulate the sector and identified the relationship with the official, private enterprises and local government authorities, each according to his specialty and Legal reference[16].

According to the Water Law, No 14 of 2014 the PWA is the body responsible for monitoring and protecting the water resources in the West Bank and Gaza. Responsibilities of PWA include control of water pollution and water resources protection in order to ensure water-related health & safety issues of Palestinian people are addressed. More specifically, PWA has the overall responsibility for the management of the resources, setting policies, determining water allocations, protection of water quality, and project development.

According to the World Bank (2018), the PWA has a branch in Gaza, but its effectiveness has been constrained by a parallel PWA set up in Gaza. Bulk water provision in West Bank is the responsibility of the **West Bank Water Department (WBWD)**. The WBWD manages wells and purchases bulk water from Israel (Mekorot) and other sources, which it sells to **Service Providers**, and it operates some wells owned by the PWA. Most Service Providers are still governed under the 1997 MoLG Law, which assigns the water services to the **Local Government Units** (LGUs).

[16] http://www.pwa.ps/page.aspx?id=5W6F7La2541180510a5W6F7L

The 2014 Water Law provides for the establishment of the **National Water Company** (NWC) that would be the bulk provider for both West Bank and Gaza (on-going process, which is not completed). The 2014 Water Law was designed to clarify accountabilities and establish autonomous, **regional utilities** but implementation has been slow due to an incomplete legal structure, lack of financing, and lack of clarity of rules and responsibilities at the local level. Some Service Providers, function as Regional Utilities, while examples like the Jerusalem Water Undertaking (JWU) seem to be successful (PWA, 2015).

Finally, the **Water users' associations (WUAs)** are very important institutional partners in irrigation water management.

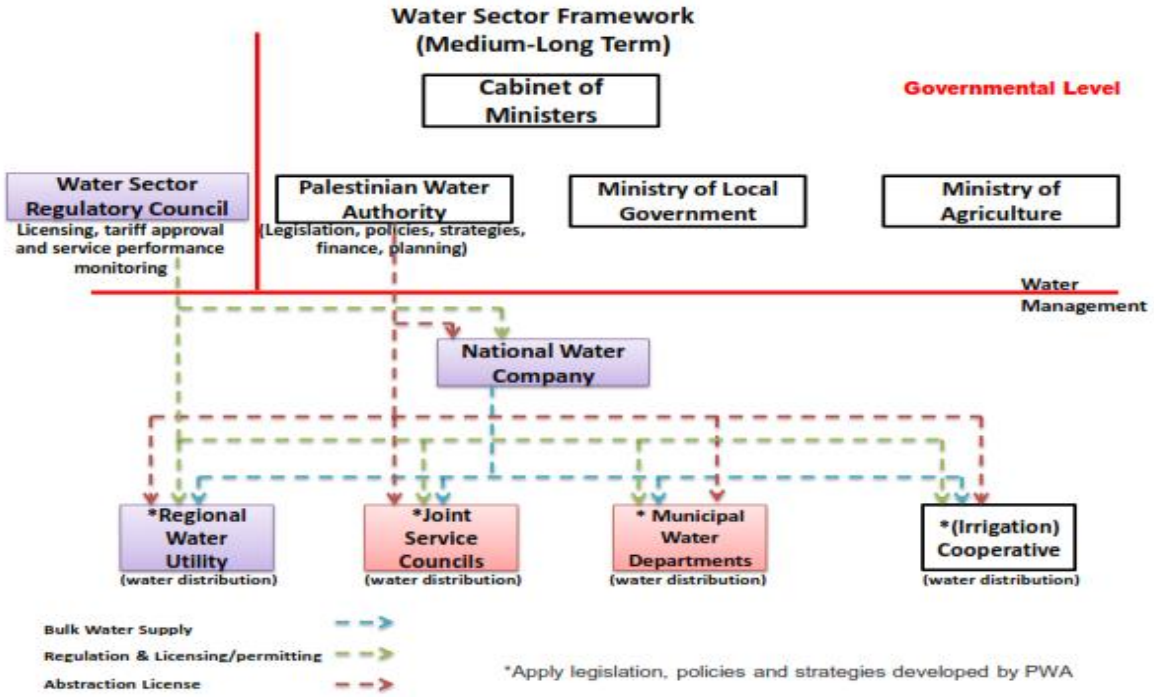


Figure 3.3.1-2: Water sector institutional framework according to 2014 Water Law

Source: PWA, 2015

Another water entity, related to PWA, is the **Project Management Unit (PMU)** which is essentially focused on project implementation. It provided project-oriented services to Donor-funded projects. Such services included water supply system design and review, construction supervision, procurement and contract management. The Director General of the PMU reports directly to PWA.

The PWA is in charge of the overall regulation of water producers and service providers and manage water resources, including:

- Allocation of water abstraction rights
- Regulation of the right of use of the resources
- Develop service providers
- Develop Water Tariff Policy
- Providing support to Palestinian Standards Institute (PSI) for the definition of standards related to drinking water and waste water management.

3.3.1.4 Palestinian Standards Institute

The Palestinian Standards Institute (PSI): establishes and adopts the national standards, as well as implements, adopted international standards, among which the ones related to SWM. It chairs also a national committee that is responsible for developing the directives or the technical regulations (GIZ-SWEEPNET, 2014).

3.3.1.5 Municipal Development and Lending Fund

The Municipal Development and Lending Fund (MDLF) has multiple roles in developing the developing the capacities of municipalities related to calculating fixed assets and supporting the design and construction of many development projects in order to improve the basic services provided to the public through the municipalities.

One of the main examples of participation in the development of critical environmental infrastructure is the management of the Southern component of the Gaza Solid Waste Management Project (GSWMP). MDLF, has taken this role since 2012 covering 3 of 5 governorates in Gaza Strip, namely the Middle Area, Khan Younis, and Rafah Governorates comprising approximately 64% of Gaza Strip's total geographic area inhabited by 46% of the total Gaza Strip's population, or approximately 800,000 people according the 2014 Palestinian Central Bureau of Statistics (PCBS) projections (Thöni and Matar, 2019).

3.3.2 Operational level institutions

3.3.2.1 Local Government Units

The **Local Government Units (LGU)** include the municipalities, village councils and project committees. LGUs play an important role regarding the provision of services to the local population, particularly in areas where the National and Regional Service Providers cannot facilitate the local population. LGUs represent the lowest level of governance and as local authorities they fulfill a critical role, not only as a key public service provider but also as the government tier closest to citizens, with elected councils critical for representation and accountability to citizens.

LGUs have full authority over local roads and are responsible for the planning, development, and maintenance of the network, with the Ministry of Public Works and Housing responsible for regional roads outside the municipal masterplans. LGUs also have full authority over solid waste management services, although disposal functions, and to a lesser extend primary collection and transfer functions, are generally delegated to a Joint Service Council. The MoLG is the policy making authority and also monitors LGU performance in the solid waste sector. However, the water and sanitation sector is characterized by a high level of fragmentation, with policy making and sector investment planning functions at the Palestinian Water Authority.

LGUs have been assigned with 27 functional responsibilities, but only deliver a fraction of those (World Bank, 2017). However, they play an important role in managing resources and environmental management. In the water sector, LGUs manage water services as part of the local government's allocated responsibilities. In the solid waste management sector LGUs are the main responsible for

the collection, transportation and disposal of municipal waste. In 2018 there were 427 LGUs in the WB and 20 in GS (MoLG_JICA, 2019).

Municipalities, falling under the LGUs have well-established service delivery and regulatory functions including electricity, water supply, sanitation, solid waste management, local roads, libraries, parks and recreation, slaughterhouses, markets, land use planning, building and development approval, and business and professional licensing.

3.3.2.2 Joint Service Councils

The **Joint Service Councils (JSC)** constitute an association of several LGUs to provide one or more services to all member municipalities to reduce costs and to efficiently coordinate services. Joint service provision can help in reaching economies of scale, increasing financial sustainability, and improving service delivery performance. The establishment and development of JSCs has been crucial to improving service delivery in Palestine since the adoption of the Local Government Act in 1997 and is an important element of the Palestinian Authority's consolidation effort to leverage economies of scale and sustain many existing village councils in recent years. Broadly, there are three types of JSCs: those providing a single service, those providing multiple services, and those that were established for planning and development. The Joint Services Provision Assessment carried out by the World Bank in 2015 identified that out of the 82 existing JSCs in the West Bank and the 10 in Gaza, only 55 are active. Most (32) active JSCs are categorized as planning and development, 16 as solid waste management, and 7 as water supply and sanitation services. Some JSCs provide multiple services to their member LGUs (World Bank, 2017).

3.3.2.3 Water sector operational institutions

The **Water Sector Regulatory Council (WSRC)** was established in 2014 with Decree-by-Law No. 14 as part of the ongoing water sector reform in Palestine. The main aim of its establishment was to monitor all matters related to the operations of service providers, including production, transportation, distribution, consumption and waste water management, to ensure water and wastewater service quality and efficiency to consumers in Palestine at reasonable prices. Thus, the WSRC aims to ensure that water and wastewater services are effective, sustainable, and are provided at affordable prices while maintaining the interests of all stakeholders.

Water service utilities including local, municipal, and regional entities are responsible for supplying drinking water to the Palestinian communities, maintaining water network infrastructure, and collecting water bills

The **Coastal Municipality Water Unit (CMWU)** is another major stakeholder that is part of the institutional framework. It holds a service provider role, which is important when it comes to operation and maintenance of the envisaged infrastructures, on a temporary or longer-term basis. According the mission[17] of the CMWU, its main task is to "*Providing the Gaza Strip' residents with integrated, distinct, and environmentally safe water and sanitation services through the optimal utilization of available resources and creative solutions*".

[17] http://cmwu.ps/en/ReadTopic.aspx?Static=22

3.3.2.4 The United Nations Relief and Works Agency for Palestine Refugees

The **United Nations Relief and Works Agency for Palestine Refugees** in the Near East (UNRWA) supervises the waste management of the 19 refugee camps in the West Bank and the 8 camps in Gaza, in coordination with municipalities and JSCs. Under its area of jurisdiction, the UNRWA support's role is to provide services and manage the camps. The organization is responsible for collecting waste from the refugee camps, which will be disposed of at sites run by municipalities against monthly payment to the dumpsite operating organization. UNRWA has also assisted municipalities in the Gaza Strip by being the channel through which equipment, provided by bilateral donors, has been provided to the municipalities.

3.3.2.5 Other important operational actors

The **private sector**: Service provision in sectors related to environmental and social management need to attract private investments. Private sector participation can play an important role sectors such as water management as well as solid waste management. However, at the moment, the legal framework to support and regulate private sector investments is not clear and needs further elaboration.

In the case of solid waste management, some companies can be contracted by municipalities/JSCs for the collection, transportation or/and disposal of waste or the management of certain facilities (like transfer stations) and private companies own and directly manage recycling/recovering activities. This practice does not require significant investments from the private entity, something that is very important in the water and waste-water management sector.

The **Informal sector**: unlicensed individuals, family-run businesses, industries and public institutions dealing in general with the reuse and recycling of specific waste (including E-waste for example), although the Palestinian legal and policy framework doesn't provide any specific regulations regarding it (Di Maria et al., 2017).

Donors have also a significant role in environmental management and comprise of governments, agencies, international organizations and NGOs, who provide the financial and technical resources and experts.

Non-Governmental Organizations (**NGOs)** are also important actors as they are involved in the environment and social field implementing projects, monitoring Israeli environmental violations, recording and documenting, conducting research and engaging in awareness raising in communities and schools. Funding is usually channeled from donors through NGOs and usually relate to the development of pilot practices, building capacity and engaging communities and broader stakeholders to information activities.

Other actors: In the field of solid waste management Waste pickers are the people who illegally collect some types of wastes such as plastic and sell it to sub-contractors/waste recovery factories. They can be noticed in dumpsites and near street waste containers. There are two types of waste pickers including the waste pickers in landfills/random dumpsites (even though they are prevented to access to the landfill sites) and those in the streets who are collecting plastics and food waste.

The **Palestinian Central Bureau of Statistics (PCBS)** collects and disseminates the national data about SWM, through its website and regular surveys like the household, environmental, economic and medical environmental surveys.

3.4 Sectoral legislation and institutional analysis

In sections 3.4.1 – 3.4.9 of this report, for all sectors identified in section 3.1 of this report, the existing legislative and institutional framework is presented and the respective legislative and institutional gaps are identified. A summary table, presenting the results of the sectoral legislative and institutional analysis and including the respective identification of gaps are presented in Annex III of this report.

3.4.1 Biodiversity

3.4.1.1 Sectoral legislation: Biodiversity

The major law governing the biodiversity sector is **Law No. 01 of the year 1999 for Natural Resources**. Other relevant laws include the:

- Environmental Law number 7 of 1999
- Bylaw on Nature Protection, Nature Reserves, Protected Areas and National Parks
- Agricultural Law 2/2003
- Forest and Afforestation and the Rangelands Bylaws

According to the report "State of Palestine: Fifth National Report to the Convention on Biological Diversity, 2015", the existing Environmental national legislation has overlapping jurisdictions with other laws associated with weak law enforcement. There are only limited provisions in the Environmental Law No. 7 for 1999 dealing with biodiversity. Furthermore, the existing provisions related to biodiversity are inadequate to be harmonized and comply with the resolutions and obligations of the Convention on Biological Diversity (CBD), they provide a basis for a national legislative framework for biodiversity conservation. Many factors lead to the inability of enforcement of legislation in Palestine, including lack of experienced staff, absence of Environmental policy, financial and technical capacity of responsible departments, and unclear enforcement procedures for existing legislation. Therefore, there is a strong need for a mechanism to harmonize the existing legislations and policies through a comprehensive review and assessment. Under the umbrella of the general government policies of the State of Palestine, there are a number of more specific policies, programs and plans that either deal directly with biodiversity conservation, or are of immediate concern to it.

The main governing law is **Law No. 01 of the year 1999 for Natural Resources**:

- The law is regulating the use and protection of Natural Resources in Palestine
- The law is defining the rules of the General Directorate of Natural Resources.
- The law is regulating the discovery of the minerals and the natural resources
- The law is defining the licensing for the minerals and Natural resources.
- The law includes the rules and regulations for the quarries and crushers.
- The law is defining the punishments, fines and payment for those who do anything against the law.

Other important legislative documents include:

- **Environmental Law number 7 of 1999** (Chapter 5, articles 40, 41, 42, 43 and 44 among others).
- **Bylaw on Nature Protection, Nature Reserves, Protected Areas and National Parks**: The Environment Quality Authority EQA (the legal successor of the Ministry of Environmental Affairs, which no longer exists) has been starting drafting the bylaw which will be developed in coordination with the Ministry of Agriculture and other relevant stakeholders in nature protection.
- **Agricultural Law 2/2003**: Through the Agriculture Law for the year 2003, the Ministry is responsible for implementing Article 9 of section 1 of this Law that states: "The Ministry in cooperation with other competent authorities shall develop a nature reserves management plan and conserve all plants and living organisms living in the protected area.
- Two other laws are the **Forest and Afforestation** and the **Rangelands Bylaws**. A draft law for protected areas was prepared in 2005, however, it is still not approved yet. A national committee for nature protection would be formed under that law (Qumsiyeh and Amr, 2016).
- **Palestinian Presidential Decree 2010**: Palestinian President issued a decree in January 2010 in which changes of forest and nature reserve lands to any use other than nature conservation were prohibited.
- The **Forest Law** issued in March 1926, during the British Mandate and its Amendments N° 8 (1928), N° 30 (1937), N° 7 (1942) are still valid in the Gaza Strip. In West Bank, however, it was replaced by the Jordanian Government Law 81/1951. Another new law was declared 'The United Law of Forests' and was implemented all over the land under Jordanian control on both banks of the River Jordan. The two laws mentioned above included general principles related to the protection of existing forests, the establishment of new protected forests and their management. They also include the rules for rangers and the appropriate regulations and methods for obtaining a license to benefit from the forest products or grazing resources. Chapters 4, 5, 6, 7, and 8 are concerned with protected forest areas, protection of trees, monitoring the protected forests, penalties, and crimes, respectively.

On a policy and strategic level, The Ministry of Agriculture in April 2005, issued the **National Policy and Legislation for Promoting the Conservation of Agrobiodiversity**. The rain fed agriculture (drylands) in Palestine predominates on more than 90 % of cultivated lands. The local varieties in those areas remain the major income-generating option for farming families (ORGUT 2017).

Due to the Israeli occupation power, and the absence of Palestinian sovereignty and control over their land and natural resources, a set of national priority initiatives (targets) were identified as part of the **1999 National Biodiversity Strategy and Action Plan** and they are considered the milestones used to assess the national performance under the various themes of environmental protection including biodiversity conservation.

On an international level, Palestine get accede to the **United Nations Convention on Biological Diversity** and by April 2nd 2015 it became a party to the Convention on Biological Diversity. In this framework, the Fifth National Report to the Convention on Biological Diversity was produced (EQA, 2015), which assessed the current (2015) status of biodiversity including trends and threats, assessed the current condition for endangered species and finally presents a range of objectives:

- Basic faunal and floral studies at specialized centers to understand exactly what exists and where and how best to manage these natural resources
- Development and Management of a Palestinian Protected Areas System
- Development of Management Plans/Structures in Designated Protected Areas Based on Biodiversity Surveys and Inventories
- Protecting and Using Traditional Indigenous Knowledge and Property Rights for Biological Diversity

- Implementation of Biosafety Measures on Biotechnology in SP
- Habitat Restoration (including rangelands, forests, wetlands, sacred groves and integrated agro-ecosystems)
- Collaborative Management of Biodiversity
- Combating Desertification and Coping with the Adverse Effects of Climate Change
- Elaborating and Enforcing a National Legislation/Legal Frameworks on Biodiversity
- Establishing a Biodiversity Information and Social Education Centre (Available as the Palestine Museum of Natural History)
- Promotion of Eco-tourism/Economical Aspects of Biodiversity
- Coastal Zone Management in Gaza Strip and the Dead Sea
- Establishment of a Gene Bank in Palestine

The **National Spatial Plan**, adopted in 2012 as a tool to mainstream the protection of natural resources, through a more integrated framework for local and regional spatial plans. The National Spatial Plan designated high and medium sensitivity areas for agriculture, open spaces, forests, biodiversity and natural conservation including, also, cultural and archaeological sites. This plan is not active at the moment.

3.4.1.2 Identification of sectoral legislation Gaps – Biodiversity

According to the report "State of Palestine: Fifth National Report to the Convention on Biological Diversity, 2015", the Palestinian Environmental Law (1999) is considered old and needs to be updated, this is because it is not comprehensive and not synchronized and harmonized with the CBD Strategic plan 2011-2020, and the CBD protocols, including Cartagena Protocol on Biosafety, and the Nagoya Protocol on Access and Equitable Benefit Sharing of Genetic Resources. In addition, it also lacks more detailed guidance on how the EQA should fulfill its obligations as stated mainly in Article (40) regarding the management of protected areas. Therefore, apart from the revision of the Palestinian Environmental Law (1999), **a comprehensive review and assessment of current environmental and agricultural laws is urgently needed to update and to resolve conservation issues**.

Considering protected areas in Palestine, on 3 February 2015, the Palestinian Council of Ministers approved the recommendations of the National Committee for the Geographical Names in Palestine on recognizing and approving protected areas in Palestine. This document includes **48 protected areas** with their names and their locations. 26 of these areas have been studied in detail and 19 are allocated in the **National Spatial Plan** and are to be declared as Nature Reserves by EQA, even though most of them are located within Area C and under the control of the Israeli civil administration and only 13 are within the Areas A and/or B accounting for 1.3% of the total reserve area and are therefore under Palestinian control

The main gap concerning the legislation related to biodiversity is the issue of the regime of the protected areas. Palestine as a nascent state still falls far behind on implementing provisions of the Convention on Biological Diversity (CBD) partly because it is a state that does not control most of its biodiversity important areas (EQA, 2015). Adding to this, the lack of established "management plans" for each protected area, which will use ecosystem approaches combined with social, cultural and economic characteristics of the areas leads to an absence of management and monitoring programs as well as institutional overlapping.

The **delay in adopting the "Natural reserves, protected areas and national parks Bylaw** (Draft, prepared in 2005 but not adopted yet)" is adding to this gap, since several fields remain unregulated.

The bylaw called for a national committee to be organized in order to manage, supervise and regulate protected areas (involving several authorities such as MoA, EQA, MoLG, academic partners, citizens, NGOs and other important actors). Therefore, an important gap in protected areas management still remains. Moreover, the implementation of the National Biodiversity Strategy and its particular goals, require a multidisciplinary approach and collaboration between partners. Therefore, the delay in adopting the necessary legal framework for cooperation, does not assist in monitoring progress towards the targets set by the country. Finally, the absence of a legislative regime that dictates the Governance type for every protected area, creates a mosaic of institutions related to management, including mainly the MoA and local entities and communities. In the future, the legislative framework for the creation of special "**Management Bodies" for legally identified protected areas** should be considered.

To update the existing legislation and to formulate new bylaws and regulations, the issue of data is critical. According to the State of Palestine: Fifth National Report to the Convention on Biological Diversity (2015), comprehensive fieldwork studies about protected areas management and conservation, populations, species numbers, distribution and dynamics in biodiversity (checklist of species) at a national scale should be starting to fill the existing gaps by conducting studies and fieldwork to acquire scientific data covering all areas of protected areas and potential protected areas by using the best available data collection methods on areas like geography, geology, hydrology, fauna, and flora.

Finally, existing legislation, which is old, needs to be updated to address and create the legal framework for contemporary urban challenges related to urban biodiversity, urban green spaces and other issues.

3.4.1.3 Sectoral institutional framework: Biodiversity

The main governmental and legal bodies tasked with managing biodiversity issues as well as nature protection in general, nature protection and protected areas are the **Environmental Quality Authority** and the **Ministry of Agriculture**:

Table 3.4.1-1: Authorities involved in issues of biodiversity and their responsibilities

Authority	Responsibility
EQA	• Responsible for the development of legislation, strategies and policies for the Palestinian Authority, in the context of overall environmental policy development in the West Bank.
Ministry of Agriculture	• Development of nature reserves management plan

At the national and regional level

EQA is responsible for the development of legislation, strategies and policies for the Palestinian Authority, in the context of overall environmental policy development in the West Bank and Gaza. Responsibility is delegated to the Biodiversity and protected areas Department of the Directorate of Environmental Resources. The General Directorate for Environmental Resources consists of seven persons in the West Bank with a general director and experts on biodiversity, water quality, GIS and remote sensing, renewable energy and combating desertification and the deputy director general with expertise in climate change. If the Gaza strip EQA is reinstated, one of the major challenges will be to start working with the sea and marine environment again (ORGUT report, 2017). In this direction, Article 40 in Chapter 5 of the Palestinian Environmental Law of 1999 states that the Environmental

Authority has the task to "prescribe bases and standards for the protection of natural reserves and national parks, monitor and declare them, and establish and designate the national parks and supervise them".

Through the Agriculture Law (2003), the **MoA** is responsible for implementing Article 9 of section 1 of this Law that states: "The Ministry in cooperation with other competent authorities shall develop a nature reserves management plan and conserve all plants and living organisms living in protected areas". The MoA implements the aspects of the agro-biodiversity policy of SP on the ground and some of the biodiversity aspects in coordination with EQA. This function is delegated to the Department of nature and Forests under the Directorate of Forests, Rangeland and Wildlife.

Moreover, according to the draft law for the protection of Natural Parks (prepared in 2005 but not yet adopted), a national committee for nature protection would be formed under that law with membership from **MoA, EQA, MoLG, universities, local NGOs and local communities**. The draft law continues by stating that "*The MoA is the authorized authority for protecting targeted areas for protection and includes nature reserves, protected areas, national parks and the natural heritage*".

The **Ministry of Planning and International Cooperation (MoPIC)** developed different plans – such as the National Spatial Plan, in which protected areas need to be incorporated and identified.

At the local level

Municipalities are strongly involved in the conservation practices of the agrobiodiversity resources, but none of the existing protected areas is being managed by local communities (community-based conservation and management). The Municipalities are engaged and considered principal stakeholders in protected areas management and conservation of biodiversity by EQA; for example in Wadi-Al-Quff protected area Municipalities are deeply involved in the management plan preparation.

3.4.1.4 Identification of sectoral Institutional gaps: Biodiversity

As it becomes clear from the previous analysis, **EQA and MoA have overlapping duties related to biodiversity management issues.** Therefore, a management authority needs to be established with clear duties that will be responsible for the management of all protected areas. Even though, currently, there are thoughts for passing this responsibility to Municipalities (Qumsiyeh & Amr, 2016) further work is needed on enhancing their capacity and knowledge on ecosystem-based management. In this direction, the extended role of the local communities and academic institutions in proposed management schemes needs to be re-examined and incorporated in strategic planning and upcoming legislation.

Regarding the role of the EQA in biodiversity management, according to the Organizational Review of the Palestinian Environment Quality Authority (ORGUT report, 2017), the Authority has developed a national strategy on biodiversity from 1999 that aims to conserve Palestine's biodiversity, ensure its sustainable use, enhance local knowledge, change people's attitudes and develop human capacity in the field of biodiversity. Up to 2007, there were funds to produce communication reports on biodiversity but when funds ceased, the activities were discontinued. **The biodiversity strategy identified 5 gaps that are still valid: 1) in information 2) in human resource 3) in legal framework 4) in lack of coordination, and 5) in lack of awareness and commitment**.

Data on biodiversity remains scattered and no recent updates exist, with community initiatives (CSO - Civil Society Organizations) being the main players. EQA has limited human resources and needs to establish planned cooperation with more resource-strong CSOs to document biodiversity, not least in terms of the effects from the separation wall and settlements.

Moreover, Issues related to biodiversity needs to be further **integrated into environmental approvals issued by EQA**, as it has been reported that factors such as weak communication between EQA's directorates and the lack of expert personnel in issues of biodiversity (mainly in regional offices) may hinder this process (ORGUT report, 2017, p. 30).

EQA needs to **lead and further supervise the work on biodiversity** by initiating interventions, studies and surveys such as the national survey of Palestinian Biodiversity and to ensure the quality of work carried by other actors. Finally, according to the same report, EQA lacks qualified staffs trained in the protected area.

3.4.2 Air quality

3.4.2.1 Sectoral legislation: Air quality

The major law governing the atmospheric sector is the **Environmental Law number 7 of 1999**. Other relevant laws include the:

- Transportation and Connectors Law (regarding pollution from vehicles).

Environmental Law number 7 of 1999 defines air pollution as 'any change in the characteristics or components of the natural air, which may cause harm to the environment'.

Furthermore, The Palestinian Authority has issued a National Policy Agenda (NPA, 2016), which sets national priorities and action plans for the period 2017–2022. In this document, National Priority 10 is to reduce and effectively control pollution and greenhouse gas emissions and to increase energy efficiency and reliance on renewable energy to ensure the resilience of the Palestinian people.

The **Palestinian Ambient Air Quality Standards (PS 801- 2010)** was developed by the Palestinian Standards Institution (PSI) through the Environment Committee. The result is health-based standards and objectives for several pollutants in the air, including particulate matter, nitrogen oxides, ozone and sulfur oxides. **PS-803-2005** regulates air pollution emissions from stationary sources.

According to UNEP (2020), The Palestinian Authority has been trying to tackle emissions from the largest contributor, the transportation sector, for several years. The Palestinian Authority **adopted European Union regulations** for all vehicles, which means that each vehicle in the occupied Palestinian territory should have achieved a fleet-average CO^2 emission target of 130 g/km by 2015 for all new cars registered by the Palestinian Authority.

According to a report[18] from the Ministry of Transport, the Palestinian Authority also developed a strategic action plan to reduce the pollution of vehicle exhaust gases, which included three main actions (Shaath & Sharbak, 2011):

- Reduction of the percentage of old cars on the road,
- Increase in the use of public transportation, and
- Adoption of clean fuel types.

Moreover, the **standards for particulate matter** and its effects on public health are set according to the World Health Organization and its reports on "air quality guidelines".

In terms of legislation for emissions from vehicles, section 3 of the Palestinian **Transportation and Connectors Law**, vehicles that exceed twenty years old, must acquire a specialized license twice a year. The crucial part is that, when these vehicles fail to meet authorizing regulations, they turn into a real issue as there are no particular arrangements to recycle them; also there are no real governmental plans, and regulations governing the end of life vehicles (Karaeen *et. al.*, 2017).

3.4.2.2 Identification of sectoral legislation Gaps – Air quality

Concluding from the above, the overall emissions from passenger cars in Palestine is regulated according to the European Union "EURO" Standards and Regulations.

Moreover, particulate matter concentrations and their impacts on human health are monitored against WHO standards on air quality. The same applies to indoor air quality standards, where **international legislation and guidelines have not been mainstreamed and adapted in Palestinian Laws or regulated by by-laws.**

WHO Air Quality Guidelines (2005) are recommended by the WB Environmental, Health and Safety Guidelines to be applied in the absence of national legislated standards, to prevent or minimize significant to ambient air, by ensuring that emissions do not result in pollutant concentrations that reach or exceed these guidelines and standards. Interim targets are provided in recognition of the need for a staged approach to achieving the recommended guidelines. In the next table, comparison between the WHO and Palestinian ambient air quality standards is presented.

Table 3.4.2-1: WHO and Palestinian Ambient Air Quality Guidelines

	Averaging Period	WHO Guideline value (µg/m3)	Palestinian Guideline value (µg/m3)
PM10	24-hour	150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)	150
	1-year	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)	70
NO2	1-hour	200 (guideline)	400
	24-hour	-	200
O3	1-hour	-	200
	8-hour	160 (Interim target-1)	120

[18] http://www.mot.gov.ps/wp-content/uploads/Portals/_Rainbow/Documents/Reports/MoT%20air%20pollution%20reduction%204.pdf

	Averaging Period	WHO Guideline value (µg/m3)	Palestinian Guideline value (µg/m3)
		100 (guideline)	
SO2	1-hour	-	350
	24-hour	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)	250
	1-year	-	60
	10-minute	500 (guideline)	-

There is an **absence of an "Air law" or an "air by-law"** that would regulate air quality based on the values for different pollutants. Adding to this absence, there is **no clear regulation of industrial emissions and the regulatory frameworks needed to control and mitigate sources of pollutants including "emission permits", reduction of emission based on Best Available Technologies (BAT)** and other schemes that would go a step further to even regulate specific activities.

One of the biggest limitations is the **absence of legislation for Pollutant Release and Transfer Register in Palestine**. The need for appropriate infrastructure (e.g. network of stations for atmospheric pollution), continuous monitoring and the right to make inspections to industries is part of the capacity needed to perform these tasks. However, the absence of a regulatory framework for this is a limiting factor.

This absence, in turn creates problems with enforcement of the existing legislation. An example in this direction is the **unregulated emissions in the atmosphere caused by "burning practices" of solid waste**. It is the standard practice used for waste volume reduction in unofficial dumpsites. This includes hazardous wastes (e-waste, cables etc.). Even though uncontrolled burning of waste is forbidden, the difficulties of law enforcement and punishment is adding to the issue of air pollution and can be harmful to human health.

Finally, **atmospheric pollution is a major issue, directly linked to human health as well as climate change** and in this direction, the major challenges include (State of Palestine – National report, 2014) (Implementation Roadmap for the Nationally Determined Contributions[19]):

- Develop and implement a standardized air quality control and monitoring program for key air pollutants such as sulfur dioxide (SO_2), oxides of nitrogen such as NO_2, and respirable fine particulate matter (PM_{10}, $PM_{2.5}$) to determine the status and trends of ambient air quality at least in selected highly polluted areas. Regular measurements will help to monitor compliance with air quality standards;
- Update regulations on permissible emissions from vehicles and industries. Establish and put into operation vehicle testing and air quality monitoring centers around cities;
- Review thematic/sectoral strategies and policies to ensure they are aligned with the National Action Plan.

3.4.2.3 Sectoral institutional framework: Air quality

The main institutional actors involved in air quality issues include:

[19] https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/State%20of%20Palestine%20First/NDC_State%20of%20Palestine_Implementation%20Road%20Map.pdf

Table 3.4.2-2: Authorities involved in issues of air quality and their responsibilities

Authority	Responsibility
EQA	• Issue environmental approvals for establishments who apply • Monitoring of emissions • Environmental audits • Develop and enforce primary source treatment systems (at the emissions' site)
Ministry of Transportation	• Monitoring of vehicles and their emissions
Ministry of Health	• Monitoring health effects
Palestinian Standard Institute	• Air pollution standards

At the national level

Major air polluters in Palestine include isolated industries, industrial settlements distributed around the West Bank, electricity generations plants, water treatment projects and facilities, the stone cutting industries, quarries and crushers, transport and the burning of waste.

Palestine suffers from substantial air pollution, especially in urban areas and their vicinities. In Palestine, transboundary air pollutants, industrial activities, population growth and the increase in the number of vehicles are the key reasons for deteriorating air quality. However, data about the concentration of the air pollutants or their types are not available because Palestine lacks air quality monitoring stations. Moreover, very few air pollutants studies have been conducted for Palestine (Khader and Martin, 2019)

The main responsibility for air pollutants clearly lies with **EQA** with supporting roles for **MoH** monitoring health threats and **MoT** for vehicles. The overall as well as the point source surveillance of air pollution is weak. Unlike some other areas, no other institutions are stepping in, so this in an uncontested area for EQA (ORGUT report, 2017).

At the operational level

According to the Law of Local authorities # 01 of 1997, the Municipalities have legal mandate related to air quality with reference to the protection of citizens from nuisances including smoke, odours and pollutants, as a result of abandoned buildings or small businesses such as restaurants etc.

Today, **municipalities** lack the appropriate equipment and trained staff in order to monitor ambient air quality and assist central authorities. **Academic and research institutes** can substitute monitoring authorities up to a certain point and only for research purposes. In this direction, also **donors and NGOs** can also play a role in developing air quality monitoring programs as well as developing strategic documents to assist in the direction of protection of the atmospheric environment.

3.4.2.4 Identification of sectoral Institutional gaps: Air quality

Even though the MoT as well as the MoH seem to have certain roles in air pollution issues, some **overlapping** may appear in the process of monitoring, evaluating and policymaking.

Especially in the fields of monitoring, evaluating and reporting there seems to be a major gap, since data is not sufficient. Therefore, the challenge of more institutions (for example academic) stepping in and reducing the overall effort of the EQA is needed.

The Palestinian Central Bureau of Statistics (PCBS) is also responsible for publishing data on air pollution. In 2012, the PCBS published data about emissions into the air (Palestinian Central Bureau of Statistics, 2012) based on 2006 calculations by the Intergovernmental Panel on Climate Change. The calculations deal with the energy, solid waste and agriculture sectors, but, due to a lack of the requisite data, not the industrial sector.

Finally, the MoLG and LGUs can play an important role in monitoring local sources of emmissions, industrial settings and other establishments. However, due to lack of proper monitoring equipment, lack of training and lack of expert staff, they do not an active role in air quality monitoring.

3.4.3 Noise

3.4.3.1 Sectoral legislation: Noise

Environmental Law 7 of 1999 is the main governing law for noise.

Guidelines for community noise from WHO (1999), provided suggested values for noise levels measured out of doors:

Table 3.4.3-1: WHO Outdoor Noise Level Guidelines

Receptor	One Hour (L_{Aeq}) (dBA)	
	Daytime (07 am – 10 pm)	Nighttime (07 am – 10 pm)
Residential, institutional, educational	55	45
Industrial, Commercial	70	70

In this case, Palestinian standards are stricter. The Palestinian Standards Institution has established the **Outdoor Noise Standards (PS 840- 2005)**, through the Environment Committee, to Provide information for the protection of public health against the outdoor noise level. The Palestinian and the WHO guidelines have almost the same levels, with the Palestinian guidelines having more detailed types of receptors:

Table 3.4.3-2: Palestinian Outdoor Noise Level Guidelines

Receptor	One Hour (L_{Aeq}) (dBA)	
	Daytime (07 am – 8 pm)	Nighttime (07 am – 8 pm)
Rural residential areas, hospitals, schools	40	30
Residential	50	40
Residential with some commercial activities, or along main roads	55	45
Commercial	65	60
Industrial	75	65

The **Palestinian Labour Law No.7, 2000** also provides guidelines for noise in working environments. Following the Labour Law, several resolutions and ministerial instructions were issued detailing health conditions and standards related to occupational safety at different workplaces. These include:

- The ministerial decrees No. 15, 17, and 21 of 2003 concerning health conditions and standards at workplaces, medical assistance procedures at the workplace, and safety standards at companies.

- The Decision of the Council of Ministers No. (49) of 2004 concerning the preventive list of work hazards and career diseases and work accidents.
- Instructions by the Minister of Labour no. (1) of 2005 concerning the precautions to protect workers in construction sites.
- **Instructions by the Minister of Labour no. 2-6 of 2005**, defining the range of chemical exposure limits and standards, exposure to ionizing radiation, **noise**, and safe levels of brightness of light and temperature at the workplace.
- Instructions by the Minister of Labour no. (7) of 2005 concerning the protection of workers working in the gas and petroleum sector.

For power generators, **international standard IEC 60076-10 on power transformers** applies.

3.4.3.2 Identification of sectoral legislation Gaps – Noise

Noise pollution poses a high environmental risk to human health, both direct and indirect, and it can be defined as unwanted or harmful outdoor sound with road traffic being the greatest contributor. Therefore, there is an urgent need for specific legislation (probably in the form of a bylaw) that would regulate noise in urban centers. The noise regulation would define several noise indicators to be applied in noise mapping and action planning. Based on the Palestinian standards, which are stricter than International ones (compared to WHO international standards), the regulation should go further and describe indicative measures to regulate noise coming from sources such as traffic, open markets, power generators and other urban sources, industry (which is usually placed close to urban centers due to restrictions in area C) and other sources.

3.4.3.3 Sectoral institutional framework: Noise

The main institutional actors involved in noise management include:

Table 3.4.3-3: Authorities involved in issues of noise and their responsibilities

Authority	Responsibility
EQA	• Monitoring of noise pollutions • Monitoring of ambient noise levels • Monitoring of noise levels in working environments • Environmental audits
Ministry of Transportation	• Monitoring of noise coming from vehicles and transportation
Ministry of Health	• Monitoring health effects
Ministry of Public Works and Housing	• Monitoring of noise levels in working environments • Monitoring of construction-related sources of noise
Palestinian Standard Institute	• Noise standards

At the national level

Environmental Law 7 of 1999 law gives a wide mandate to **EQA**, with a leading responsibility within 10 technical fields including noise pollution. In particular, in articles 25 & 26, noise pollution is addressed, where these articles state the mandate of the EQA in coordination with relevant authorities to determine the standards for controlling the noise in addition to monitoring the adherence of the various installations to these standards.

The **Palestinian Standards Institute** is charged with the responsibility of providing and updating standards on noise pollution.

There is no clear role for one authority to be responsible for monitoring noise levels and noise pollution. Even though EQA is responsible for monitoring and evaluating noise levels, there are other institutional stakeholders involved, including the **Ministry of Health** for issues related to human health, the **Ministry of Public Works and Housing** for construction-related sources of noise, the **Ministry of Transportation** for traffic and transportation-related sources of noise etc. In the case of project-specific noise monitoring, other authorities such as the **PWA** (for water and wastewater infrastructure projects) might be responsible for monitoring environmental impacts, including noise.

At the operational level

In terms of monitoring and enforcement of standards, **LGUs** also have a role as well as the **local police**.

3.4.3.4 Identification of sectoral Institutional gaps: Noise

As a result of the above, there is a sign of "**overlapping**" of responsibilities, with many stakeholders having a role. This overlapping appears on the regulatory as well as the enforcement level. Even though in urban centers, noise levels appear to be high and possibly connected to the deterioration of human health, noise monitoring is not in the agenda of the main institutions involved. As a result, there are very little systematic data provided on day-round noise measurements, which mainly come from academic research and other initiatives. It appears, that due to traffic noise and other sources (power generators, open markets etc.) noise is becoming a major issue for urban centers that need to be closely monitored and evaluated. As a result, "control of noise pollution principles" needs to be integrated in future planning (e.g. placement of schools next to noisy areas).

3.4.4 Energy, Climate change and Desertification

3.4.4.1 Sectoral legislation: Energy

The major law governing the energy sector is the **Electricity Law of 2009**. Other relevant laws include the:

- Palestinian Energy Authority's Constituting Law No 12 of 1995 on renewables
- Electricity Decree-Law No 14 of 2015
- Electricity Decree Law (2019)

On the legislative level, according to Marei (2016), the legislation of past regimes –including the Ottoman laws, the British mandate, the Jordanian laws in the West Bank, the Egyptian laws in the Gaza Strip and the Israeli military orders, have influenced the development of many facets of life, especially the regulation of the electricity sector. Some Jordanian and Egyptian laws, along with Israeli military orders, remain valid in force and influence electricity management. This presents the complexity of the legal status in different areas of the country.

In 1995, the sector was reorganized to cluster most of the former municipal service providers into six local distribution utilities. The **Electricity Law of 2009** created the Palestinian Electricity Regulatory Council (PERC), the sector regulator, with responsibility for tariff-setting, as well as PETL, a new transmission operator and wholesale power trade (World Bank Group, 2017). Apart from the creation of the new entity, the Electricity Law of 2009 created several new sector institutions and provided the

beginnings of a legal framework for Public-Private Partnership (PPP) in the sector. Also, the law provides a basis for new generation projects to be developed in the West Bank and Gaza on a PPP basis by classifying this as a licensed activity. Nevertheless, few details are provided about the detailed terms and conditions of licenses or their classification into different categories, and the law is silent about roles and responsibilities for the grid connection of new generation plants. In the absence of broader PPP framework legislation, these kinds of issues would need to be settled through secondary legislation or supporting regulations (World Bank Group. 2017).

The Electricity Law of 2009 aimed at restructuring and improving the sector in the area of national and foreign investment while at the same time guarantee a satisfactory power supply and reasonably priced service. Moreover, the decree stipulates the establishment of the **Palestinian Electricity Regulatory Council (PERC)**, entrusts it with financial and administrative discretion, and determines its duties and responsibilities. In turn, PERC has strived to unbundle the electricity service to avoid duplication in the practice of the three actions of generating, transmitting and distributing. Therefore, as suggested by PERC, the Palestinian Energy and Natural Resources Authority (PENRA) attempted to unify, regulate and re-license the electricity distributors in the West Bank under four main companies: the Jerusalem District Electricity Company, Northern Electricity Distribution Company, Southern Electric Company and Hebron Electric Power Company. PENRA and the Council of Ministers issued **by-laws and instructions** to ensure the effective enforcement of the Decree. The electricity tariff, the instructions to rectify the status of the companies and the local governing councils, the licensing roles and the licensing fees are all legal tools that form the regulatory framework of Palestine's electricity sector.

The Electricity Law of 2009 was modified several times to handle any related problems through Decision No. 16 in 2012 and Decision No.17 in 2018. Next, Decision No. 9 in 2010 which was confirmed by Decision No. 6/14/14 in 2012 that was published to set the general rules and laws for electric companies to operate and function.

PENRA moved forward in restructuring the electricity sector and issued the aforementioned **instructions 1 and 2 in 2010**, which called upon companies and local councils to comply with the Electricity Decree-Law and to rectify their status. To achieve the restructuring goal, in 2010, the Palestinian Council of Ministers also issued the **Rules of Licensing Electricity Companies**, and two years later, in 2012, the Council decided on the **regulations about licensing fees, as well as the electricity tariff**.

In terms of Renewable Energy Resources, the **Palestinian Energy Authority's Constituting Law[20] No 12 of 1995** forms the Legal base for electricity generated by renewable energy sources and is the firs to refer to renewable energy in its definition of energy as a term. The law stipulates that the research and development of all types of renewables is the responsibility of PENRA.

The **Electricity Decree-Law No 14 of 2015** also refers to renewables in two contexts. The first context is the law's requirement that the Electricity Council shall consider alternative energy when deciding upon any new electricity tariff (Marei, 2016). This is the main law that regulates, governs and encourages investment in renewable energy and energy efficiency. The law, about Renewable Energy and Energy Efficiency, is a decree-law, which was signed by the President. Like Decision N 16/127/13, the decree-law was issued based on the Electricity Decree-Law for 2009. The law also calls on local authorities that confer building licenses, the Engineers Association and engineering offices

[20] *Palestinian Energy Authority's Constituting Law N12 for 1995 (Palestine) 7 Palestine Gazette 10, art 1, art 3 s 7.*

to employ methods of exploiting renewable energy resources according to green building codes when preparing buildings' design sketches (article 17).

Through this law, instructions have been issued related to the net metering in 20 IS with the aim of covering the self-need of electric power for various sectors, especially the industry and services sectors. Additionally, **Decision No.11/79/17** handled utility-scale renewable energy plants in terms of tariff and purchase agreements. Finally, Decision No. 6 in 2017 indicated the PA's major interest in solar energy as this decision specifically handles the incentives for installed PV systems. For utility-scale PV plants that exceed 1 MWp, taxes reduction was introduced to encourage the private sector to invest in such projects, since such incentives increase the profitability of such systems.

Meanwhile, there are special incentives for net-metering projects owned by Palestinian Investment Fund (PIF), which is is a public fund owned by PA. PV systems projects are one of the activities of PIF, and thus, special incentives are given to projects owned and managed by PIF. These incentives are similar for the incentives provided by "Income taxis incentives", but with longer periods:

- Projects with a capacity of 20 kWp are given additional year for all stages.
- Projects with a capacity of 40 kWp are being given two more years for all stages (almost the whole lifetime).
- Projects with a capacity of 60 kWp are being given three more years for all stages (almost the whole lifetime)
- Any other PIF project that do benefit from the previous incentives, and its capacity have been developed to be up to 40 kWp at least, can benefit from an income tax of (2%) for two years.

On the other hand, purchase prices of electrical energy produced from solar energy projects are applied according to the following schemes:

Table 3.4.4-1: Solar energy tariff per scheme (Khatib *et al.*, 2021[21])

Station's Capacity and Classification	Purchase Prices (USD/kWh)
Domestic (within the Palestinian Initiative for solar energy, up to 5 kWp and for the first 1000 house)	(0.14–0.15) (same as normal electricity price for end-user)
Net-metering (bigger than 5 kWp and up to 999 kWp)	There is no specified purchasing tariff, those projects are treated as (unit versus unit), and according to the regulations of each project. PENRA defines "net metering" as a policy that forces DESCos to buy from PV system owners any excess electricity they may generate. In this case the energy meter runs backwards to provide credits for a whole year. Afterwards, the credit is set to zero at the beginning of April of each year. The consumer is then billed only based on the net electricity usage for each month.
Generation plants with a capacity of 1MW–5MW (offered by the investor to the government)	90% of the production will be purchased based on agreements with PETL. The price will be the average purchase price of various sources of conventional energy.
Generation plants with a capacity of 1–5 MW (called by the government and offered according to bidding process)	The lowest price among the competitive investors without exceeding 90% of the average purchase price from various sources of conventional energy
The lowest price among the competitive	The lowest price among the competitive

Prices in the previous table are regularly revised, when the technology prices face changes, when the capacity of the projects exceeds 56 MW or when the purchase prices of conventional energy

[21] *Khatib, T., Bazyan, A., Assi, H., and Malhis, S., 2021. Palestine Energy Policy for Photovoltaic Generation: Current Status and What Should Be Next? Sustainability 2021, 13, 2996. https://doi.org/10.3390/su13052996*

changes. Moreover, all the facilities that sell PV system related equipment and tools are exempted from customs duties.

The second context is the law's clear statement that PENRA should support research into alternative energy sources. It seems that the **Electricity Decree Law (2019)** builds a logical connection between PENRA and the EQA. It is a normal relation, especially because environmental approvals are necessary to construct any electricity generation plant. This complementation is also clear in the Electricity Decree Law's requirement that distribution and generation companies must comply with environmental protection prerequisites. Likewise, new projects should conform to environmental law provisions and procedures, such as environmental impact assessments, approvals and inspection procedures (Marei, 2016).

To facilitate the implementation of the renewable strategy, the Council of Ministers issued **COM Decision No 16/127/13 in 2012**. The Decision regulates the exploitation of renewable energy sources in Palestine, and includes in Article 1, for the first time, a definition of renewable energy sources. Article 2 asserts that the Decision approves the renewable energy strategy in order to increase the share of renewables in the energy mix.

On a strategic level, the **general strategy for renewable energy in Palestine** (PENRA, 2012) set the target for electricity production to be obtained from renewable sources by 2020. The strategy specifies certain prerequisites to achieve this goal. First is the approval of legislation and regulations that promote the relevant technologies. Second is the adoption of sufficient fiscal sources to provide remuneration for the feed-in tariffs that foster investment by the private sector. The third is capacity building for the workforce about renewable technologies and the fourth is the approval of the Palestinian Solar Initiative (PSI) 2012–15. Last is a development plan that improves and promotes renewable energy sources through to 2020.

3.4.4.2 Sectoral legislation: Climate change

In a strategic level, in 2010, EQA has developed a "**National Climate Change Adaptation Strategy**" with support from the UNDP, the London School of Economics, and other PA agencies, with an updated version – the NAP – published in 2016

The **Climate Change Adaptation Strategy and Programme of Action**[22] for Palestine were issued in 2010 by the EQA (UNDP, 2010). According to the strategy, in 2007, in consultations with the UNDP/PAPP, the EQA identified the need to develop Palestinian decision-making capacity for climate change adaptation. UNDP/PAPP and EQA jointly agreed on the terms of reference for the appointment of consultancy support for the initiative, and in October 2008 appointed a consultancy team to draft an adaptation strategy and program. It was agreed that this work should be guided by extensive stakeholder consultations.

This report was a companion volume to the **Climate Change Adaptation Strategy for the Occupied Palestinian Territory (UNDP/PAPP 2009)** released at the same time. The Climate Change Adaptation Strategy sets out in detail the Vulnerability Assessment and Future Climate Risks Assessment by which key adaptation needs and options.

[22] https://eprints.lse.ac.uk/30777/1/PA-UNDP_climate_change.pdf

This high degree of engagement in climate change is relatively recent. Before 2008, climate change was not considered a policy priority by the Palestinian Authority (for example: climate change was not mentioned in the Palestinian Reform and Development Plan 2008-2010). Since 2008, the UNDP Programme of Assistance to the Palestinian People (UNDP/PAPP) funded capacity building for climate change adaptation and the preparation of the Climate Change Adaptation Strategy, the Programme of Action for the Palestinian Authority (PAPA) in 2010 and the NAP. National plans and policies related to climate change supporting the PAPA and NAP include (Ministry of Foreign Affairs of the Netherlands, 2018):

- The Agricultural Sector Strategy "Resilience and Development", 2014-2016 including strategic objectives related to climate change such as:
    - Efficient and sustainable management of natural resources;
    - Enhanced agricultural production, productivity and competitiveness, as well as enhanced contribution of agriculture to food security.
- Water sector strategy and water sector reform plan70: measures considered in this plan are (i) groundwater supply development (drilling wells and rehabilitation of existing springs and wells); (ii) impact assessment of climate change; (iii) demand management and strategic planning (physical water loss, water use reduction, changing crop patterns and water use restrictions); (iv) water harvesting (including stormwater) and (v) mapping of alternative resources (purchased water, desalinization, reuse of wastewater).
- The National Strategy, Action Programme and Integrated Financing Strategy to Combat Desertification in the Occupied Palestinian Territory (EQA and UNCCD, 2012).
- Drought conditions and management strategies in Palestine (UN-DESA, 2014): measures to alleviate water scarcity include (i) reallocation management of water resources, (ii) actions to increase water availability and (iii) water demand management.
- Environmental Sector Strategy 2011-2013 (EQA, 2010).

In terms of the country's participation in climate negotiations and international treaties, prior to 2012 Palestine was an observer entity at the UNFCCC. In 2012 Palestine became a non-member observer state, after being granted a non-member observer state status by the UN General Assembly. Palestine submitted its formal instrument of accession of the UN Framework Convention on Climate Change (UNFCCC) on 2015, and was granted a formal 'party' status on 17 March 2016. Being a formal party enables active participation in international climate discussions and decisions and gives access to international climate finance, such as the Green Climate Fund. Since becoming a party to the UNFCCC Palestine has signed and ratified the Paris Agreement in April 2016 with it entering into force in November 2016. It also has submitted several documents such as "**The Initial Communication Report to the UNFCCC" (EQA, 2016a)** and a "**National Adaptation Plan" (EQA, 2016b)**. In 2017, Palestine submitted its Nationally Determined Contributions (NDCs). NDCs present the efforts each country is committed to participate in relation to the international efforts in dealing with climate change as a member of the NDC partnership[23], an international platform of developed and developing countries.

According to the report "Climate Change Profile: Palestinian Territories[24]" (2018), Palestine's First NDC notes that while its priority on climate change is adaptation, ' it is also committed to ensuring that its emissions pathway is in line with the objective of the UNFCCC to stabilize greenhouse gas emissions at a level that prevents dangerous anthropogenic interference with the climate system'. Palestine intends to reduce its CO2 emissions conditional on receiving international support in the form of

[23] https://ndcpartnership.org/
[24] https://reliefweb.int/report/occupied-palestinian-territory/climate-change-profile-palestinian-territories

finance, technology transfer and capacity building; unconditional actions will also be undertaken that will contribute to mitigation.

Finally, Palestine is a member of the Climate Vulnerable Forum (CVF) that includes 48 developing countries highly vulnerable to climate change.

3.4.4.3 Sectoral legislation: Desertification

The main strategy related to the issue of desertification for the country is The National Strategy, Action Programme and Integrated Financing Strategy to Combat Desertification in the Occupied Palestinian Territory (EQA, 2012). The overall objective of the strategy is "to prevent, halt and where possible, reverse the effects and impact of desertification, land degradation and droughts, to contribute to poverty alleviation, improve livelihoods of people and achieve Sustainable Development". The strategy has identified five priority projects that should be complementary to what has been identified in the NDP for the years 2011 2013, in the sum of USD 4.2 million, with lead agency as EQA in cooperation with other Palestinian stakeholders, including nongovernmental and private sector. The main causes of soil pollution were summarized in the environmental strategy as:

- Increased desertification and soil erosion,
- Soil pollution due to mismanagement of liquids and solid waste, natural and manmade soil erosion, and
- Soil pollution is caused by Israeli occupation power military activities.

This strategy is a tool to improve and enhance agricultural productivity through the conservation and improvement of agricultural soil fertility. Moreover, it is considered an effective mainstreaming strategy for biodiversity and protected areas conservation and development.

The Legal and regulatory framework regarding Desertification connects land degradation and drought to agriculture and therefore, most legal articles are included in both the environment and agriculture laws. Some relevant articles to desertification in agriculture, environment and cities, villages and building laws are listed below:

Palestinian Environment Law No. 7, 1999

- Article 17 states that to combat desertification and halt soil erosion, the Ministry of Environment in coordination and cooperation with MoA and other concerned institutions may take the necessary actions to plant the fallow lands.
- Article 18 prohibits the removal of soil and transfer of the soil for purposes other than agriculture, to improve its fertility or for building purposes.
- Article 78 identifies penalties and punishments.

Agriculture Law No. 2, 2003

- Article 2 identifies desertification as the decrease in the productive value of land use due to climate change and human activities.
- Item 7 of article 2 stipulates that combating desertification is one of MoA responsibilities in coordination with other parties.
- Article 10 prohibits moving or transfer of soil for purposes other than for reclamation and improvement of lands

- Article 11 imposes restrictions on building and fragmentation of agricultural lands Palestinian Environment Law No. 7, 1999. This law didn't define desertification, but article 1 defines soil movement as the removal of part of the soil.
- Article 17 states that in order to combat desertification and halt soil erosion, the Ministry of Environment in coordination and cooperation with MoA and other concerned institutions may take the necessary actions to plant the fallow lands
- Article 18 prohibits removal of soil and transfer of the soil for purposes other than agriculture, to improve its fertility or for building purposes

Cities, Villages and Building Law No. 79, 1966: Article 40 prohibits cutting of trees and flowers, and emphasizes measures for the protection of forest lands, parks and recreational lands, and requires the replacement of any trees that were cut from forest areas. In addition to this, other laws, such as Natural Resources Law No.1, 1999 and the Free Industrial Zones and Cities Law No. 10, 1998 and the bylaws, regulations and instructions derived from them include relevant articles to mitigation and combating desertification, land degradation and drought.

3.4.4.4 Identification of sectoral legislation Gaps – Energy and Climate change

The main gap identified in the Energy and Climate Change legislation is the lack of a regulatory framework that would integrate climate change considerations and targets across all sectoral legislation. Policy coordination is a critical issue because climate change represents a complex, long-term, knowledge-intensive problem, which poses a significant cross-sector and multi-level decision-making challenge. While appropriate responses in relation to Climate Change and especially adaptation policies are often related to the specific risks and vulnerabilities in local contexts (crisis management), action in one sector or locality can have negative spillovers in another, e.g., intense desertification phenomena or flooding. This suggests that the design and implementation of effective Climate Change policies require processes to help coordinate adaptive responses to climate change across multiple policy sectors and tiers of government.

This would mean that all sectoral strategies would need to include specific measures and actions in order to achieve the targets set by the regulatory framework. This would in turn signal a need for an institutional capacity-building program that would strengthen sectoral and Ministerial institutions in order to be able to gather data, monitor climate change indicators and report to EQA along with suggestions for further action for mitigation and adaptation.

In this direction, the **lack of a regulatory framework for climate change prevents organized implementation of any measures suggested by related national or sectoral strategies**.

Nationally Determined Contributions[25] stemming from the strategic documents (presented before), will not be achieved unless the abovementioned challenges are identified and further encountered:

1. Lack of mainstreaming environment and climate change in national development planning.
2. Lack of a legal/institutional framework to address climate change-related issues including but not limited to adaptation and low carbon sustainable development.

In this direction, **the formulation of a cross-sectoral Climate Change Law (Act) that would work as an umbrella-law should be considered.**

[25] *NDC available at https://www4.unfccc.int/sites/NDCStaging/Pages/Search.aspx?k=Palestine*

3.4.4.5 Identification of sectoral legislation Gaps – Desertification

Desertification is a form of land degradation in drylands. It results from unsustainable land management practices and climatic factors. Desertification is a **cross-cutting challenge** for many policy areas such as climate, environment, agriculture, research and economy.

As stated before, the main policy document for addressing the desertification challenge is "*The National Strategy, Action Programme and Integrated Financing Strategy to Combat Desertification in the Occupied Palestinian Territory*".

According to the strategy, even though Palestinian Environment Law No. 7, 1999 acknowledges the issue of desertification, the law didn't define as such, but article 1 defines soil movement as the removal of part of the soil. Moreover, even though Palestine Ratified the UN Convention to Combat Desertification (UNCCD) on December 29, 2017, **currently there is no clear framework for desertification**. Aspects of desertification are addressed under various strategies, action plans and policies (like the agriculture strategy and legislation). In addition, the critical issue of soil degradation, which leads to desertification is also not regulated, while there is also no strategic or policy framework on this. In this direction, a "Soil Protection Framework Directive" should be considered.

3.4.4.6 Sectoral institutional framework: Energy & Climate Change

In terms of the institutional synthesis, the following authorities are involved in issues of energy and climate change[26]:

Table 3.4.4-2: Authorities involved in issues of energy and climate change and their responsibilities

Authority	Responsibility
Palestine Energy and Natural Resource Authority	• Supervising and monitoring the generation, transmission and distribution of energy; • Setting energy standards; • Research and development of alternative sources of energy.
Palestinian Energy Authority (accountable to the President)	• Providing electricity at affordable prices; • Setting the legal, institutional, economic, financial and technical basis for system development; • Coordinating the sector, policy and system development, generation, transmission, distribution, tariffs and regulation; • Remedying system deficiencies and improving service delivery; • Supervising the construction, operation, and maintenance of electrical projects and networks; • Conducting research
Palestinian Energy and Environment Research Centre	• Studies and promotion of energy conservation, and renewable energy in Palestine.
Palestinian Electricity Regulatory Commission (PERC)	• Reviewing tariffs; • Providing recommendations on licenses and license conditions; • Resolving disputes between stakeholders of the sector; • Disseminating information.
Palestinian Electricity Transmission Company	• Build, own and operate the Palestinian electricity transmission system
Governorates (regional level)	• Coordination of services in their region
Municipalities (local level)	• Supply of electricity
MoLG	• Management and direction of implementation at the local level

[26] https://portal.cor.europa.eu/divisionpowers/Pages/Palestine-Energy.aspx

3.4.4.7 Sectoral institutional framework: Desertification

On the Institutional level, several public institutions are directly or indirectly involved in the planning, finance, implementation, and monitoring and evaluation of issues and activities related to mitigation and combating desertification, land degradation and drought. A review of the involved institutions and their relevant roles is given below:

Table 3.4.4-3: Authorities involved in issues of desertification and their responsibilities

Authority	Responsibility
National Committee for Combating Desertification (NCCD)	• It was established by a decree issued by the Prime Minister on March 2010. The Ministry of Agriculture chairs it while EQA is the deputy chair. In addition to the other eight public institutions, two universities, the Palestinian Environmental NGOs Network and five representatives from the private sector form the membership.
EQA	• Preparation and recommendation of draft laws, regulations and by-laws to the cabinet • Formulation and recommendation to the cabinet of strategies, plans, programs and agreements in consultation and cooperation with other institutions and stakeholders • Control and monitoring of the state of the environment, and protecting the environment from aggression and misuse • Implementation of certain interventions • Conduct awareness and education campaigns of the public • National focal point for UNCCD • A special department to combat desertification exists in EQA, it has two divisions, one for soil and other for desertification.
Ministry of Agriculture (There is a special section to combat desertification within the natural resources department in the MoA.)	• Design and Implementation of projects related to desertification. • Design and Implementation of projects related to land reclamation, rangeland development, soil and water conservation and harvesting, afforestation, natural resources and biodiversity • Responsible for the delivery of extension and veterinary services, applied for research and technology transfer. • Chairs the NCCD.
Ministry of Public Works and Housing	• Monitoring of noise levels in working environments • Monitoring of construction-related sources of noise
Palestinian Standard Institute	• Noise standards

Other public Ministries and institutions with certain tasks of relevance to desertification, such as:

- **Ministry of Finance:** budget allocation, control and audit
- **Ministry of National Economy:** import, export and mining licenses
- **Ministry of Interior:** control, protection, policing and enforcement of laws
- **Ministry of Education and Higher Education**: integrating environmental programs in the schools curricula
- **Ministry of Local Government:** cities and villages planning
- **Ministry of Information:** raising awareness, information and knowledge dissemination
- **Palestinian Water Authority:** management, planning, regulation of water resources and projects
- **Palestinian Energy Authority:** rationalization of energy use and promotion of alternative energy sources
- **Palestinian Lands Authority:** land management, registration system and protection of public lands
- **Universities and research centers:** under- and post-graduate programmers, training and research

3.4.4.8 Identification of sectoral Institutional gaps: Energy and climate change

EQA appears to be the responsible institution for evaluation, compilation, provision of guidance and data exchange related to climate change. However, the lack of a specialized unit in Climate Change in EQAs organogram does not assist in this direction. This unit would need to have expertise in mitigation and adaptation actions to be implemented as well as a commitment to long term adaptation and mitigation strategies.

Data collection for climate change is also a challenge-gap in the current structure. It appears, that there is a gap in data provision from all institutional stakeholders, as presented before. EQA needs to have a managing role in coordinating data collection, which should take place at the sectoral level, including institutions such as:

- The Palestinian Energy Authority – for energy (stationary sources) related mitigation and adaptation activities
- The Ministry of Transport – for energy (mobile sources) related mitigation and adaptation activities
- The Ministry of National Economy – for industrial process emissions when they become relevant (i.e. when cement production begins)
- The Ministry of Local Government – for solid waste-related mitigation and adaptation activities
- The Palestinian Water Authority – for wastewater water-related mitigation and adaptation activities
- The Ministry of Agriculture – for agriculture and forestry and other land-use mitigation and adaptation activities

Finally, as presented in the legislative analysis, Climate Change appears to be a cross-sectoral issue. Therefore, **the lack of a cross-sectoral committee (e.g. an inter-ministerial group of appointed people by all Ministries) working on Climate Change mitigation and adaptation policies forms a gap in the existing institutional arrangement (especially given the lack of the existence of a Ministry of Environment, the duties of which, are undertaken by EQA).**

3.4.4.9 Identification of sectoral Institutional gaps: Desertification

At the moment the main institutional stakeholder related to the desertification is the NCCD, which is chaired and co-chaired by the MoA and the EQA respectively.

The main issues that inhibit the work of the NCCD and the responsible agencies, appear to be:

- **Collection of data seems to be inadequate**, especially given the absence of a specific regulatory framework. In this direction, even collected data cannot be used adequately in order to address desertification coherently. For the establishment of a coherent database for desertification, indicators related to land degradation, land productivity, land cover and land-cover changes, and organic carbon in soil need to be monitored on a more systematic basis.
- **The major institutions have not established a commonly-agreed methodology for assessing desertification and land degradation within Palestine**. Through this methodology a common framework of performance, monitoring and evaluation is needed with a commonly accepted set of indicators.

- Finally, the **commitment of the main institutional stakeholders to long-term strategies and policies** is needed to address this cross-sectoral legislation.

3.4.5 Water - Wastewater

3.4.5.1 Sectoral legislation: Water

The major law governing the water sector is the **Decree No. 14 Water Law, 2014** (new water law). Other relevant laws include the:

- 1997 Local Government Law 1
- Water Law No. 3 of 2002
- natural resources law 1 of 1999
- Public Health Law 20/2004

At the legislative level, the PWA adopted a **Palestinian National Water Policy in 1995** to address key issues in water management and planning, such as legislation and the structure and tasks of entities in the water sector. In 1998, the **first Water Resources Management Strategy** was published based on the principles of the National Water Policy. A **National Water Plan** was prepared by the PWA in 2000, which was meant to set directions until 2020.

The **1997 Local Government Law 1** (Article 15, paragraph 3) states that the role of a local government unit in a defined geographic and administrative zone is to (a) provide the inhabitants with quality water, (b) ensure its supplies in terms of meters and pipes, (c) determine the price of water and connection fees, and (d) protect the springs, canals, wells and basins from pollution. As for sewage, they are to construct, manage and monitor sewage facilities.

Water Law No. 3 of 2002 was focused on further developing and better managing water resources and an Integrated Water Resources Management Plan was developed for the West Bank in 2003 (ARIJ 2015). In 2014, a new Strategic Water Resources and Transmission Plan and the Water Sector Policy and Strategy were issued, describing the sector's goals and needs, and dealing with multiple water-related aspects such as water quantities, groundwater, surface water, desalination, rainwater harvesting and wastewater reuse, wherein the latter was considered one of the main water resources for agriculture (ARIJ 2015).

The **natural resources law 1 of 1999** regulates major issues such as drilling and using underground water (e.g. for irrigation, water provision for domestic use etc.).

Other relevant laws include the **Public Health Law 20/2004** related to drinking water and public health.

Following the new 2014 Water Plan and Strategy, a new Water Law Titled **Decree No. 14 Water Law, 2014** was endorsed, establishing a new organizational structure for this sector. The Water Law of 2014 "aims to develop and manage the Water Resources in Palestine, to increase their capacity, to improve their quality, to preserve and protect them from pollution and depletion, and to improve the level of water services through the implementation of integrated and sustainable water resources management

For the needs of the current review at the strategic level, the following are the most important strategic documents reviewed:

The **National Water and Wastewater Policy and Strategy for Palestine 2012-2032,** which aims at:

- Reinforcing the Palestinian Authority's approach to sustainable water resources management by ensuring that all arms of government work together in the pursuit of shared water resources management goals; and
- Establishing a framework for the coordinated development, regulation and financial sustainability of water supply and wastewater services to ensure concerted efforts towards improved water systems management, rehabilitation and maintenance.

The National Water Policy and Strategy will also act as a platform for ensuring close collaboration and cooperation among all water-related agencies and stakeholders at the national, governorate, municipal and local levels.

The **Non-Revenue Water Reduction Strategy** (PWA, 2012), applies to both bulk and distribution water service providers. The objective of the strategy is to develop assess levels and type of existing NRW, set targets and then enable service providers to progressively achieve the. The strategic objective is not for purely economic benefits since it includes reducing NRW to increase available scarce resources where they are inadequate.

The **Strategies for Sustainable Financing of the Water Sector** (PWA, 2014b), aims at securing stable and sufficient long-term financial resources and to allocate them on time and in an appropriate form to cover full cost recovery.

The **Water Awareness Strategy** (PWA, 2016a) is a broad framework of what needs to be communicated and outlines the possible target audiences as well as communication tools. This strategy will be used as a basis for developing national specific implementation plans by Water Sector Organizations including but not limited to the PWA, the Water Sector Regulatory Council the West Bank Water Department (or National Water Company in later stages), the Regional Water Utilities and other service providers in the West Bank and Gaza.

The **Water Demand Management Policy Elements and Principles** report (PWA, 2016b) refers to all the measures aiming at increasing technical, social, economic, environmental and institutional efficiencies in all sectoral uses and is one of the 4 main chapters constituting the 2010 Strategy for Water in the Mediterranean, developed under the Union for the Mediterranean framework.

The **National Agriculture Sector Strategy "Resilience and Development" 2014-2016** directly contributes to the achievement of the national objectives, which aim at enhancing resilience in its different dimensions. At the same time, it moves economic and social development forward through experience and appropriate response to our national objectives.

Other important documents revised for the needs of the SESA include:

- Current Situation of the Water Sector in Palestine, Palestinian Water Authority, 2008
- Comprehensive Plan for Water and Wastewater for Tulkarem Governorate, Palestinian Water Authority, 2010
- Comprehensive Plan for Water and Wastewater for Tubas Governorate, Palestinian Water Authority, 2009
- Comprehensive Plan for Water for Jericho City, Palestinian Water Authority, 2011

- Comprehensive Plan for Water and Wastewater for the City of Qalqiliya, Palestinian Water Authority, 2012
- Comprehensive Plan for the Lower Basin of the Jordan Valley, 2014
- Comprehensive Plan for Water and Wastewater for South West Bank, 2012
- Comprehensive Plan for Water and Wastewater for North West Bank, 2014
- Comprehensive Plan for Water and Wastewater for Jerusalem Water, 2014.

3.4.5.2 Sectoral legislation: Wastewater management

The major law governing water and wastewater is **Water Law (2014)**. Several standards exist but no bylaws or regulations. Other relevant laws include the:

- The Environmental Law number 7 of 1999
- Public Health Law 20 of 2004
- COM Decision No 16 for the year 2013 on the House and Facilities' Connection System to the Public Sewage Network
- Local Government Law 1 of 1997

To regulate and guide treated wastewater in a way of protecting public health and safety, Palestine Standard Institute issued a **reuse standard (PSI 742-2003) in 2003**[27]. PSI 742-2003 standard covers the requirements that should be met in treated wastewater coming from wastewater treatment plants that will be discharged or reused in accordance to criteria shown in the standard itself. The standard presents a general classification for treated wastewater quality and several barriers approach to utilize treated wastewater in the reuse of different. Therefore, depending on the quality of treated wastewater coming out from the proposed treatment plant, the farmer will need to select several barriers for each type of crop that will be irrigated. The number of barriers will reduce to zero for all crops presented in the standard when high quality treated wastewater will be reused. According to PSI 742-2003, the high quality treated wastewater is expected to have BOD less than 20 mg/l, TSS less than 30 mg/l and fecal coliforms less than 200 per 100 ml. The barriers include actions such as positioning the emitters at a distance far from crop canopy, utilizing sub-surface irrigation, utilizing filters for irrigation water, storing irrigation water, cutting off irrigation before harvesting and other possible actions that the farmer could utilize in the farm to reduce the possibility of contamination of the fruit with wastewater. The crops presented in those specifications include fodder crops, fruits, ornamentals and others that could be utilized in reuse. The standards do not allow utilizing treated wastewater reuse in irrigating vegetables (Palestine Technical University-Kadoorie, 2012).

The institute issued obligatory technical guidelines for **treated wastewater reuse (PSI 34-2012**)[28]. This Technical specification divides the quality of treated wastewater into 4 categories, high quality (A), Good quality (B), Moderate quality (C) and Poor quality (D). Also, this specification regulates that the effluent quality of the treated wastewater for irrigation has to be approved by the Ministry of Irrigation and Ministry of Agriculture to use of the treated wastewater for irrigation in accordance to their standards and specification.

The **Obligatory Technical Guidelines for treated wastewater reuse (PSI 34-2012)** require that all reuse activities should be only in accordance of uses specified by authorized authorities. The Palestinian Ministry of Agriculture which participated in developing these standards and regulations is responsible for issuing annual reuse permits for treated wastewater. These permits require that reuse

[27] *Palestine Standards Institute (2003). Treated wastewater, Palestine standard no.742-2003.*
[28] *Palestine Standards Institute (2012). Technical Obligatory Guidelines for Treated Wastewater Reuse (PSI 34-2012).*

is implemented in accordance to the Palestinian Standards for reuse as given by **standard PSI 742-2003**. In addition to that, it requires color codes for irrigation pipes carrying treated wastewater to distinguish them from freshwater (this requirement is also specified in PSI 34-2012). It also requires fencing lands irrigated with treated wastewater and putting signs on those lands indicating treated wastewater reuse. To protect the safety of agricultural workers, the Ministry of Agriculture requires that workers at fields irrigated with treated wastewater should wear special clothes and have special protection in addition to the utilization of shower rooms to allow workers to improve the hygiene situation at such farms and thus minimize health risks associated with treated wastewater reuse. However, it is not very clear who is supposed to monitor wastewater treatment plants to guarantee that treated wastewater quality is according to the permit issued.

According to the report from the Palestine Technical University-Kadoorie, (2012), Palestinian standards and regulation for treated wastewater reuse in agriculture are sufficient for regulation purposes. Moreover, the standards and regulations are more stringent than international and Israeli standards. The Palestinian farmers are generally educated and could implement these standards and regulations. However, due to the limitations that the standards and regulations put and the extra cost required in implementing them many farmers might not abide with them or reject treated wastewater reuse. The implementation mechanisms for these regulations are still not clear. Therefore, there will be a possibility that farmers might violate the standards and regulations to try to achieve more economic returns from the reuse while others might decide not to reuse treated wastewater. **Therefore, it will be required from the various Palestinian ministries and institutions to re-consider relaxing the regulations and evaluate options and procedures for monitoring their implementation**.

In terms of strategic documents concerning water management, the most important were presented in the previous sector. The major strategy documents are the Environmental strategy and the **Water strategy of 2013**.

3.4.5.3 Identification of sectoral legislation Gaps - water management

From the previous analysis, the main gaps in the water legislation include:

- The lack of a regulatory framework for the monitoring of drinking water. Currently, this responsibility is divided into many actors (including MoH, PWA, LGUs, and Water Utilities according to the ORGUT report 2017).
- As a result of the absence of a clear regulatory framework for monitoring of drinking water, a water quality database does not exist and information is provided by academic studies, donor reports and strategic documents.
- Furthermore, the overlapping of duties is apparent in the existing laws. According to the Local Authorities Law 1 of 1997 (as mentioned before), local governments are responsible for water infrastructure (e.g. sewage) which contradicts the water law 3 of 2002 that provided the basis for "national water utilities" as well as the Water Law of 2014, which states that PWA fully responsible for managing and protecting the water resources in Palestine.
- The only guidelines for the drinking water quality come from PWA. These guidelines differ from international guidelines and standards, with most of them being higher (Aish, 2013). Therefore, an update in these guidelines-standards is required.
- There is no regulatory framework for the formation of regional (or other levels like municipal) water utilities companies that would support a more decentralized and flexible system of monitoring and regulating.

- In terms of regulation for the cost of water provision (tariff regulation), appropriate bylaws should be developed to reflect the real costs for the price-setting policy. From this direction, a single, widely accepted cost-setting mechanism should be in place for all areas.

Moreover, there is a need for a more integrated regulatory framework for an integrated water management scheme, based on water resources management. This type of regulatory framework would be based on "underground water zones" or "water basins" for water management and protection.

Regarding standards of drinking water, there is a need for updates, especially given the deteriorated quality from the groundwater sources. In the table presented here, a comparison of Palestinian against WHO standards is provided:

Table 3.4.5-1: WHO and PWA guidelines for drinking water

Parameter	WHO	PWA
Chloride (mg/l)	250	600
Nitrates (mg/l)	50	70
Total Coliform (colony /100 ml)	0	5 per 5% of samples
Fecal Coliform (colony /100 ml)	0	0
Total Dissolved Solids (mg/l)	1,000	1,500

The same applies for drinking water from desalination plans, as presented here:

Table 3.4.5-2: Comparison of physicochemical water quality of desalination plants between WHO and PWA drinking water guidelines

Parameter	WHO	PWA
pH	6.5 – 8.5	6.5 – 8.5
TDS (mg/l)	1000	1500
Mg^{2+} (mg/l)	60	150
Ca^{2+} (mg/l)	100	100
Na^{+} (mg/l)	200	200
K^{+} (mg/l)	5	12
HCO3− (mg/l)	200	200
Cl− (mg/l)	250	600
NO3− (mg/l)	45	70
SO42− (mg/l)	250	250

3.4.5.4 Identification of sectoral legislation Gaps - Wastewater management

Main gaps in the existing legislation framework include:

- **Urban wastewater legislation needs to be updated to deal adequately with new concerns**, (for example, the pollution of underground and surface water bodies by pharmaceutical residues and micro-plastics in the wastewater system need to be integrated into future law formulation).
- Moreover, **urban wastewater legislation needs to integrate stormwater overflow management** as an increasingly important source of pollution.
- The need for a **regulatory framework for small settlements and communities that cannot be served by major wastewater facilities** (non-connected dwellings). At the moment there is no legislation suggesting alternative ways of water treatment for small communities, villages, settlements etc.

- Necessary **regulations to encourage the farmers to use the treated wastewater in agriculture**, while assuring the quality of the water and the health of the population.
- **Development of standards for the reuse of sludge** produced by wastewater treatment facilities.
- Industrial wastewater management:
    - Currently, **there are no approved by laws or regulations for controlling industrial pollution**. Given the fact that industrial settlements are located mainly close to cities and communities (not many industries are placed in area C for security reasons), strict regulation for waste and wastewater discharges should apply.
    - **Hazardous waste bylaws or regulations, especially for these cases, should be developed and ratified**.
    - Monitoring and reporting by laws or regulations should also be in place separating the adding roles for relevant authorities (EQA, PWA etc.), additional to self-monitoring guidelines.
- Finally, **regulatory requirements on reporting and public information** are needed. Digital technology can offer efficient means of communication, while experience proves that informed citizens make better choices in environmental management.

3.4.5.5 Sectoral institutional framework: Water

According to UNEP (2020) regarding the institutional framework for the water sector within the Palestinian Authority, the following institutions have major responsibilities in the water and sanitation sector:

Table 3.4.5-3: Main institutional stakeholders for water sector and their responsibilities

Authority	Responsibility
Palestinian Water Authority	• The main regulatory body for water resources management, development and infrastructure planning in Palestine, as well as executing water policy
Water Sector Regulatory Council	• Set up under the 2014 Water Law, is mandated to regulate the sector, approve tariffs, issue licenses, regulate service providers and protect consumers
Ministry of Local Governent	• Supports, monitors and regulates local government units, which are responsible for the provision of water supply and sanitation services
Ministry of Finance and Planning	• Financial management an planning according to water data (availability, quality etc)
Ministry of Agriculture	• Responsible for agricultural wells
EQA	• Monitoring water quality
Ministry of health	• Regulates issues related to Public Health. Issues legislation and guidelines and also about the use of water and finally has also a monitoring role relates to water issues
Palestinian Standards Institute	• Establishes and adopts the national standards, as well as implements adopted international standards, among which the ones related to water management
Coastal Municipalities Water Utility (CMWU)	• It is the main Gaza Service Provider under the MoLG in Gaza, as it is established as a JSC. Support to almost all Gaza municipalities is given by the CMWU to maintain and upgrade their water and wastewater systems without real responsibility on operation and maintenance, revenue collection, and tariff implementation except in Rafah. In practice, the CMWU serves also as a project management unit that is implementing some donor projects.

At the national level

The water sector's central public authority, the **Palestinian Water Authority (PWA),** was established under the Presidential Resolution No. 90 of 1995. Its responsibility is to act as the main regulatory body for water resources management, development and infrastructure planning in Palestine, as well as executing water policy. Law No. 2 (1996) concerning the establishment of the PWA indicated that it shall be established and subsequently enjoy independent legal status and independent budget, and

be placed under the direct supervision of the President of the Palestinian National Authority. Moreover, according to the new Water Law (2014), PWA is also responsible for managing and regulating water resources including abstraction quotas and the allocation of resources for different sectors, preparing policies, strategies and plans, and ensuring their implementation.

When the Interim Agreement was signed in September 1995 between Israel and the Palestine Liberation Organization, the main mechanism to implement its Article 40 related to Water was an **Israeli-Palestinian Joint Water Committee**. The JWC was originally meant as a temporary body to last only five years. However, it met regularly from 1995 until 2008 but ceased to function between 2010 and 2017. A new deal to revive the JWC was signed between the two sides in January 2017, according to which both parties would be able to promote some water projects without the need for a Joint Water Committee approval by consensus (UNEP, 2020).

In terms of implementing entities, the **Coastal Municipalities Water Utility** in Gaza and the **West Bank Water Departmen**t operate and maintain the regional bulk water distribution systems. The West Bank Water Department was created in 1966 during the Jordanian administration and came under Israeli control after 1967. In 1996, the control of the West Bank Water Department was transferred from the Israeli Civil Administration to the Palestinian National Authority, according to Article 40 of the Oslo II Accord. The Coastal Municipalities Water Utility was formed in 2005 to unify a fragmented system of municipal and local water utilities in the Gaza Strip. The provision of water for the 25 municipalities is undertaken by the regional Coastal Municipalities Water Utility.

In the West Bank, the delivery of water services including water extraction is carried out by the Palestinian Water Authority and the West Bank Water Department. The sources of delivered water are Palestinian Water Authority and West Bank Water Department wells, municipal wells and springs, privately-owned wells and water purchased from Mekorot. There are two regional utilities in the West Bank: the Jerusalem Water Undertaking providing water services to East Jerusalem, much of Ramallah and the Al Bireh governorate, and the Water Supply and Sanitation Authority for the Bethlehem area. The remaining West Bank and all Gaza households are serviced by providers under the aegis of the Ministry of Local Government. The larger towns have municipal water departments, 76 in the West Bank and 25 in Gaza, providing water and/ or sanitation services. In the West Bank, many municipalities and villages have joined together to form Joint Service Councils (13 to date), which provide water and/or wastewater services. Some 162 village councils also deliver water and wastewater services. These regional, municipal and local water utilities operate and maintain the water network infrastructure and set and collect payments for water services. The Palestinian water sector in the West Bank is typified by a fragmented and heterogeneous make-up (UNEP 2020).

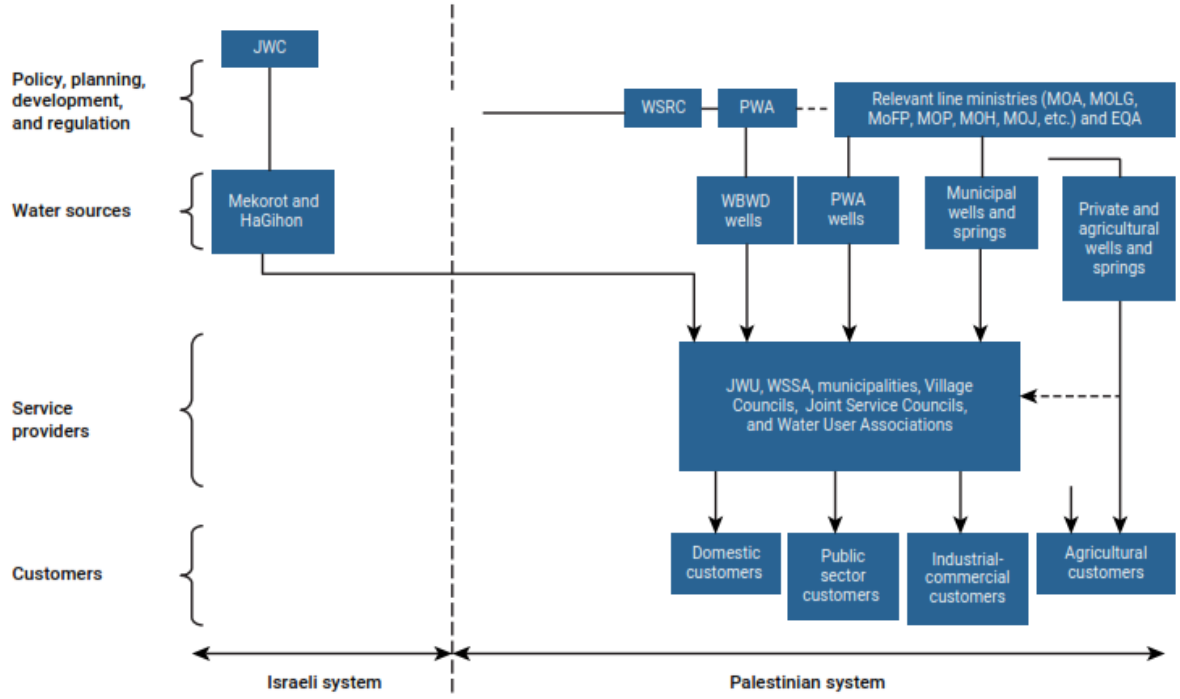


Figure 3.4.5-1: Institutional arrangements for water delivery in the West Bank
Source: World Bank, 2018b

Donor interventions in the water sector are co-ordinated by the **Water and Sanitation Sector Working Group** under the **Local Aid Co-ordination Structure (LACS)** and aligned with the PWA's Strategic Development Plan. The Water Sector Working Group is chaired by the PWA, with the Netherlands as deputy chair.

The **Ministry of Planning and International Development (MoPIC)** had the role of developing the national development plans (taking into account the availability of water resources into account, to be assessed by the MoPW) in coordination with relevant Stakeholders, the PWA and the EQA as well as the relevant Ministries.

The **Ministry of Local Government (MoLG)** has the role of implementing and supporting Joint Service Councils (JSCs).

The **Palestinian Ministry of Health (MoH)** sets the regulating health standards and guidelines in Palestine including standards and guidelines for drinking water and other uses of water. The **Ministry of Health** is responsible for monitoring the quality of water reaching the users. The **Central Public Health Laboratory (CPHL)** is related to the Ministry of Health. The role the CPHL is to deal with agents that affecting human health and provide laboratory analysis of water.

The **United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA)** provides assistance, protection and advocacy for Palestinian refugees and assists in issues of water provision and safety in refugee camps.

EQA has been assigned the role of determining the quality standards and characteristics of drinking water and indirectly through the responsibility to monitor water pollutants. EQA is also giving environmental approvals for drinking water installations and extraction infrastructure. EQA participates in the Committee for Bottled Water and in other committees led by PWA.

The **Ministry of Agriculture (MoA)** performs major duties in the regulation and management of the agricultural sector and agricultural well serving water provision for agricultural customers in addition to the oversight, supervision and delivery of certain basic services tasks.

At the operational level

The Water law" Decree No.14 relating to the Water law" divided responsibility of water quality regulations and quality monitoring and inspection between PWA and **Water Sector Regulatory Council (WSRC)** where protection of resources and monitoring of quality is given to PWA as a responsibility while WSRC mandated to monitor service provision and applying the bylaws and enforcement. Article 24 of the mentioned law, have stated the responsibilities of the council related to wastewater as follows:

- Paragraph 7: "Monitoring operation processes related to the production, transport, and distribution of water and operational processes of wastewater management", for wastewater, that includes all the phases from the customer's side until it is treated or discharged.
- Paragraph 9: "Ensuring that production, transport, distribution and wastewater treatment costs takes into consideration the interests of all concerned parties", the council must ensure that the treatment process is cost effective and can be accessed by possible customers such as farmers or others at an affordable price.
- Paragraph 10: "Setting Quality assurance standards for the provision of technical and administrative services by service providers to consumers, in line with relevant laws and regulations, and their dissemination to the public".
- Paragraph 11: "Monitoring the compliance of the National Water Company and Service Providers with the adopted standards for the provision of water and Sanitation services".
- Paragraph 12: "The establishment of a database for technical, financial and statistical information and the publication of this information periodically", which is one of the main objectives of this report, to establish a baseline database for wastewater service providers.

As stated before, the **Coastal Municipalities Water Utility** was formed in 2005 to unify a fragmented system of municipal and local water utilities in the Gaza Strip. The provision of water for the 25 municipalities is undertaken by the regional Coastal Municipalities Water Utility. According to the CMWU annual report[29], it manages and implements various repair, refurbishment and overhauling works related to more than 286 water wells, 55 water Storage tanks, 48 small scale brackish water desalination plants, 3 Sea water desalination plants, 30 water Booster stations, 67 wastewater pumping stations, 5 waste water treatment plants, water networks, storm water networks, sewage collection networks and basins with all associated equipment and systems upgrading and monitoring requirements.

Moreover, according to PWA (National Report 2015), there are four models for the provision of services in domestic water supplies, otherwise called **Service Providers**, in the form of (1) a Regional Utility, (2) a Joint Service Council, (3) a Municipal Water Department, or (4) a Village Council; covering the entire geography of the West Bank (all three zones A, B and C) and Gaza.

Water services in the West Bank continue to be provided by municipalities, two multi-municipal utilities (Regional Utilities), joint water councils and village councils. The establishment of **Regional Utilities** mostly at the Governorate level has produced the following bodies: The Jerusalem Water

[29] http://cmwu.ps/Report/1e2d8a5a-cf5d-4fe7-adbb-4ae5ddfda3ff.pdf

undertaking (JWU) is the largest and oldest service provider serving the two cities of Ramallah and Al-Bireh, 10 smaller towns, and more than 45 villages and 5 refugee camps. In cities such as Tulkarem, Qalqilya, Nablus, Jenin, Jericho, Tubas and Salfit as well as in small towns, municipalities provide the water and sewer services, if existing. In the North-Eastern Jenin area, two Joint Service Councils (JSC) one formed by six villages, and the other by eleven villages provide the water. These Councils were established according to the Joint Council for Services, Planning and Development (JCSPD) Bylaw, enacted in 2006, further to Article 15 (C) of the Local Authorities Law No. (1) of 1997. However, no regional utility to service the Northern part has been formed. The Water Supply and Sewage Authority (WSSA), a much smaller utility than JWU, serves Bethlehem and the neighboring towns of Beit Jala and Beit Sahour (PWA, 2015).

LGus play an important role in managing resources and environmental management. In the water sector, LGUs manage water services as part of the local government's allocated responsibilities

The **Palestinian Standards Institute** (**PSI)** has the role of standardization of rules for water facilities, sewerage and on-site sanitation.

3.4.5.6 Sectoral institutional framework: Wastewater management

In terms of the institutional synthesis, the following authorities are involved in issues of Wastewater management:

Table 3.4.5-4: Authorities involved in issues of wastewater management and their responsibilities

Authority	Responsibility
PWA	• Main institutional stakeholder related to water and wastewater management. Other line ministries and agencies have leadership on specific issues • Regulating and monitoring wastewater management • Design and implementation of wastewater treatment facilities • Law enforcement in case of violations
Ministry of Agriculture	• Regulates water re-use as well as re-use for irrigation purposes
EQA	• Defining environmental regulations including standards for the discharge of treated wastewater into natural watercourses, carbon footprint and water footprint regulations. • Approval-permitting of wastewater treatment facilities • Environmental audits
Ministry of Health	• Responsible for health issues caused by wastewater discharges • Conducting research and the appropriate studies for identifying possible links between these two
Ministry of Local Government	• Supporting JSCs, LGUs and Municipalities. Providing know-how and training
Ministry of Finance and Planning	• Charged with national development planning, which in turn needs to take into account wastewater management.
Ministry of National Economy	• It can issue licenses for industry, responsible for industrial wastewater discharges to be located in an area.
Palestinian Standards Institute	• Standardization of rules for water facilities, sewerage, and onsite sanitation.

3.4.5.7 Identification of sectoral Institutional gaps: Water sector

As there are several major institutional stakeholders involved in the water management sector, there is a need for clear roles, and established communication channels between them that would lead to an efficient system of data exchange. This will assist in better strategy, policy and eventually law formulation for all issues related to water governance. The establishment and signing of MoUs between the participating institutions, where roles and responsibilities will be clarified may be a step

forward. For example, EQA is responsible for national strategy and policy for water resources. According to the new Water Law (2014) PWA also has the same responsibility. This depicts a clear overlapping of duties and responsibilities between the two leading institutions.

The Water Law provides for sector governance, including the separation of resource management and regulation from resource use. However, this vision is not reflected in the present organizational arrangements. More specifically, according to the PWAs action plan and the Decree No. 14 Water Law, 2014, the West Bank Water Department charged with the provision and supply of water in bulk at the Governorates level would transform into the **National Water Company (NWC)** (Article 64.2). The Law further specifies that all assets currently managed by the West Bank Water Department will be transferred to the NWC along with all rights and liabilities (Article 64.3). Therefore, the establishment of the NWC is part of the key institutional reforms in the sector (*but this body has not yet been activated)*. The **National Water Council** has never functioned as intended. Therefore, PWA operates both as a regulator and implementer, and water supply service remains in the hands of several hundred separate municipal water departments and local councils.

Moreover, according to the institutional structure foreseen by the New Water Law 2014, four regional water utilities are supposed to be supplied by a national water company that does not exist to this day. Domestic and industrial users are supposed to pay **regional utilities** for the water they receive from them. The performance of these utilities is supposed to be reported twice a year to the Cabinet of ministers by the Water Sector Regulatory Council. In reality, however, municipalities and village councils mostly supply domestic and industrial users. Therefore, the creation of regional units for water management is needed for the decentralization of the institutional regime.

LGUs may manage utilities and service producers, which in turn provides revenues. However, since neither the PWA nor the WSRC has technical or administrative control over LGUs, there is a governance gap in the sector. The MoLG exercises administrative supervision of LGUs, but water service delivery is loosely supervised (World Bank, 2018). Therefore, the development of further cooperation between PWA and WSRC, with clear agreements on tariffs, use of revenues and other major issues is needed.

The division between the Palestinian Authority and the de facto authorities in Gaza is another source of pressure on the water service. PWA has a branch in Gaza, but its effectiveness has been constrained by a parallel Palestinian Water Authority set up in Gaza by the *de facto* Hamas administration (World Bank, 2018a).

Furthermore, according to Trottier (2019), another gap in protecting water resources and improving water management and re-use, is **the lack of the need for a "common water resources management scheme" with the participation of all relevant stakeholders, including grassroots and civic groups**. More recently, several states have tried to recognize grassroots, local institutions managing water, and to find a way to integrate them into the national law.

3.4.5.8 Identification of sectoral Institutional gaps: Wastewater

Because of the amount of stakeholders and the responsibilities the abovementioned institutions share, **clear roles and identified responsibilities are necessary conditions for improving wastewater management**. Therefore, most of the gaps identified in the water sector analysis, apply here as well.

Another important issue regarding the monitoring of wastewater treatment plants is the fact that, while EQA issues the permits for wastewater treatment plants, it does not have regular plans to monitor the quality of treated wastewater. Treatment plants have established self-monitoring systems, but due to the absence of EQA monitoring and inspection, the functionality of the system is not followed up. Moreover, treatment plants in Area C are monitored by Israeli authorities. Access to Area C is more difficult for EQA, but some activities take place, in particular for environmental approvals. (ORGUT report, 2017). On the one hand, the role of the EQA for monitoring and regulating on issues of environmental protection is not fulfilled, while, on the other hand, data collected is not sufficient.

Adding to the abovementioned, the lack of a legislative framework related to the produced sludge from wastewater treatment plants and its management **creates a confusion between EQA and the Municipalities in terms of sludge handling, disposal, reuse and monitoring**. According to PSI standards, the sludge from the wastewater management facilities is defined as "Hazardous Waste" and therefore, cannot be disposed to sanitary landfills. There is a need for better communication and clear roles on the issue of sludge reuse, involving the Ministry of Agriculture in issues related to reuse in agriculture.

Continuing on the issue of industrial monitoring and reporting, new industrial establishments need Environmental Approvals from EQA in order to obtain a license from Ministry of National Economy (in some cases MoH or MoLG/LGUs). Licenses must be renewed yearly by Ministry of National Economy, but the renewal is in practice not linked to the compliance with conditions in the environmental approvals. In addition, the Ministry can choose to accept environmental approval from either EQA or MoH. MoNE is the institution responsible to inform industries about the need for approval and refer them to EQA. The licensing is decentralized to Governorates, only formal signature is at central level. The weak physical presence of EQA in the Governorates, detaches EQA from much of the process, and makes it more difficult to coordinate. This licensing approval process by MoNE is not according to the Environmental law (article 48). It results in only a small portion (the mission could not estimate the percentage) of new establishments receiving environmental approvals from EQA. In addition, there are also unlicensed industries, which are harder to locate and identify. (ORGUT 2017).

3.4.6 Solid waste management

3.4.6.1 Sectoral legislation: Solid waste management

The major law governing the management of solid waste is the **Environmental Law No. 7 (1999)** (new water law). Other relevant laws include the:

- 1997 Local Government Law 1
- Public Health Law 20/2004
- Solid Waste Management Bylaw 2018
- Solid Waste Management Bylaw was approved in in March 2019
- Medical Waste Management Bylaw of 2020

Solid waste management in the West Bank and Gaza Strip is regulated by several laws, reflecting the national strategy and waste management policy of the Palestinian Authority. The main legislation related to solid waste management is:

- The Municipal and Local Government **Law of Local Authorities Law No. 1 (1997)** defines the roles and responsibilities of the local authorities (Local Government Units and Joint Service Councils – LGU and JSC), supervised by the MoLG. According to article 15, local authorities are responsible for the waste management in their jurisdiction, the collection of SW in public spaces, its transportation and disposal, the management of a landfill facility, as well as the option to provide services through a private contractor or to join with other municipalities.
- **Environmental Law No. 7 (1999)** establishes the general legal framework for solid waste management in Palestine, including also hazardous waste management. It aims to reduce the negative effects of waste, to protect the environment and public health, to promote sustainable development, to develop inter-ministerial cooperation and standards, and to increase information and awareness. Furthermore, article 15 mentions the need to take precautionary measures in public health in order to prevent any future pollution or epidemic outbreaks.
- According to Thöni and Matar (2019), the **Public Health Law No. 20 (2004)** defines the Ministry of Health as the institution responsible for licensing solid waste management facilities (article 2.12). The MoH is also in charge of taking all the "necessary and precautionary measures" to confiscate and destroy all contaminated or potentially contaminating materials (article 10). In cooperation with other competent bodies, it is responsible for the determination of the work conditions for people in craft and industries that might affect their health (article 34). Finally, the Ministry of Health is in charge of regulating, in coordination with other institutions, the collection, storage, transport and disposal of hazardous wastes (article 42).
- The **Medical Waste Management Bylaw (2012)** gives a definition of medical waste and a classification of its different types (articles 9 and 10), as well as instructions for its identification (art.12). The Bylaw also describes the procedures related to medical waste's separation and collection (by waste types in chapter 3); the conditions for storage inside the health institution and for transportation outside (chapters 4 and 5). In its chapters 6 and 7, the Bylaw presents the treatment measures to be applied and specifies the locations' requirements for treatment within and outside the institution, as well as the conditions for disposal of solid medical waste and wastewater. The document furthermore describes the responsibilities of the Ministry of Health, the EQA, the local authorities and the licensee (chapter 8) and mentions the duties to exchange information between the stakeholders and to prepare an emergency/contingency plan (Thöni and Matar, 2019). The **Medical Waste Management Bylaw** has been updated (**2020**) addressing the alarming technical, environmental, social and financial challenges that have led to the lack of proper onsite and offsite management; threatening further deterioration to the environment and wellbeing, due to medical waste mismanagement (MoLG-JICA, 2019).
- The basic regulation on the Joint Service Councils of the year 1996 (updated in 2006): defines the role and responsibilities of Joint Service Councils. According to its official Statute, it is in charge of the followings:
    - Planning for and supervising the sound implementation of solid waste collection and disposal
    - Founding and operating a sanitary landfill with provision of the necessary facilitations to ensure smooth daily operations;
    - Provision of waste containers in the served governorates and maintaining regular maintenance;
    - Organizing and implementing public awareness activities to raise the environmental sense of the public community;
    - Organizing cleaning campaigns regularly;
    - Guidance of the member local government units in whatever related to solid waste management in the fields of technical, legal, public health, environmental or social issues;

  - Representation the member local government units in any events related to solid wastes;
  - Planning for and implementing the methodologies of solid waste pollution reduction, proactive prevention, and waste recovery and recycling (GIZ-SWEEPNET, 2014).
- The **Solid Waste Management Bylaw** was drafted in 2018 and adopted in March 2019. This regulation describes the rights and obligations of the following actors:
  - "Competent authorities" are responsible for developing a comprehensive plan for Solid Waste Management, standards, procedures and strategies;
  - Waste producers' obligations (art.6) and polluter pays principle (art. 36);
  - Service providers take safety and health measures (art. 7), collection and transportation processes (art. 8, 9), build/operate transfer stations (art. 10), treat and dispose of the waste (art.11, 30), and keep records (art. 30);
  - The landfill owner (art. 13,14);
  - The Ministry of Health, in monitoring the separation, collection and transportation of medical waste (art. 25)'
  - EQA, in terms of hazardous waste treatment approval (art. 26);
  - The MoLG, regarding the establishment of a national waste registry compiling all information about waste management (art. 29);
  - Special conditions are required for landfills regarding the operation, closing and rehabilitation (art. 12, 15, 16, 17) and for automated burning (articles 19, 20 and 21), whereas random burning is forbidden (art. 18). Reuse and recycling shall be encouraged (art. 27). Waste management fees shall be proposed by service providers and approved by the MoLG (art. 35);
  - Hazardous waste should not be mixed (art. 33) and its import submitted to the approval of competent authorities (art. 34);
  - Municipalities and Joint Service Councils submit waste management fees to the Minister for approval (art. 35);
  - The Ministry of Local Government is entitled to give fines (art. 36) (PNA, 2018).
- In the matter of **Construction and Demolition Waste**, the MoLG, with the support of the "Japan International Cooperation Agency" (JICA), finalized the draft of a new **Bylaw in 2018**, as well as a Guideline Manual on Construction and Demolition Waste (C&D) in the West Bank. The purpose is to ensure the proper regulation and reduction of any new C&D waste. The Bylaw and the Manual describe the conditions for a C&D permit, the requirements for waste disposal and recycling services plan, a hazardous material report about monitoring, collection, transportation and disposal, as well as the obligation to keep record and to report during and after any construction and demolition activities (MoLG-JICA, 2017).
- In reference to data about solid waste management, MoLG with JICA has published a new SWM report with a Data book in summer of 2019, with updated figures from both JSCs and local municipalities (MoLG-JICA, 2019). According to the same report (MoLG-JICA, 2019), the **Solid Waste Management Bylaw** was approved in in March 2019.
- According to the Oslo agreement**, hazardous waste** shall be transported to Israel for disposal.

At the strategic level, the main legislative framework is The National Strategy for Solid Waste Management in Palestine (2017-22).

As stated before, according to the Oslo agreement, **hazardous waste** shall be transported to Israel for disposal. In practice, hazardous waste is today mixed with other solid waste, and apart from the medical waste, there is no separation done and a rather complete lack of equipment for treatment. There is comprehensive documentation made for UNEP and EQA in 2010 on types and quantities of hazardous waste. The same consultancy assignment drafted a plan for hazardous waste. Hazardous waste includes waste that is poisonous, explosive, infectious, sharp, medical, radioactive, contain

heavy metals or others as specified in international agreements or through EQA decisions (not done yet). In addition to the same regulations for solid waste, there is a National Hazardous waste committee, which has developed draft by-laws.

Complementary to the above, the **Public Health Law** also regulates medical waste more specifically and the **agricultural law** mentions waste from veterinary services and animal diseases.

Regarding **hazardous waste**, the drafted hazardous waste inventory and plan has not been implemented. There are some local and scattered initiatives to remedy the situation, with JSC and municipalities having hazardous waste plans and inventories made, but no national leadership. EQA has no expertise in hazardous waste management (ORGUT, 2017).

3.4.6.2 Identification of sectoral legislation Gaps – Waste management

Although there is progress in the current legislation governing the SWM sector, they are still limited in several aspects. Currently, solid waste management is governed by several standalone articles in more than one law. Essential solid waste management requirements are not addressed adequately in any of the existing legislation. These articles are incomplete and at a relatively high level of generality. In the case of e-waste, for example, the actual legislation would need more flexibility, as mentioned above. There is a need for a comprehensive and more inclusive waste management legislation that would regulate, in an integrated manner, the management of all waste categories (Thöni and Matar, 2019).

Moreover, implementation and enforcement of solid waste-related measures are deficient, due to the insufficiency of the legislation itself, weak enforcement of laws and loopholes in the current laws that result in ambiguity in institutional frameworks, and the overlap and conflict in the solid waste management duties of several institutions. Regulations, instructions, specifications and norms for waste management are within the scope of the EQA and could be developed in collaboration with relevant institutes such as the Ministry of Health and the Palestinian Standards Institute. Additionally, the overlap and conflict in the solid waste management duties of several institutions may also hamper efforts in developing an effective and organizational framework for solid waste management (UNEP, 2020).

Adding to the above, weak legislation enforcement is directly connected to the lack of "standards" for solid waste management. A good example is the lack of Palestinian standards for the siting, design, or operation of sanitary landfills. Consequently, these landfills follow the standards of the donor agency that funds them, thereby applying international best practice.

Similarly, there are no Palestinian standards for dealing with special and hazardous waste, or for transfer stations, recycling operations, etc. Making these standards available is vital for achieving effectiveness and safety in dealing with SW and for protecting the environment (Thöni and Matar, 2019). As for waste collection, the two pieces of legislation mostly known to, and applied by, the municipalities are the "Waste Collection Legislation (city ordinance)" and the "Public Health Offenses legislation". In the case of a limited number of municipalities, the former is relatively detailed and inclusive and accordingly, it is recommended, as a first step, to adopt it for all other municipalities. This is not expected to be a time-consuming process, as it only requires the endorsement of the Minister of Local Government (Thöni and Matar, 2019).

Furthermore, specific bylaws that regulate special streams of solid waste is needed. The recent adoption of the C&D Waste Bylaw and Guidance Manual is a big progress, but other materials would need also to be covered. In this direction, a legislative framework for the recycling, re-using through the delivery to Accredited Compliance Bodies and legal industries that can reuse them is needed. Such types of solid waste include:

- **Waste from Electronic and Electrical Equipment (WEEE or E-waste)** is a major issue for Palestine. Although mentioned in the Environmental Law of 1999 as a component of hazardous waste, there is no strategy, no specific law or article, nor technical specification for E-waste management.
- **Oils, lubricants** and fabrics related to machinery maintenance seem are also considered as hazardous wastes but there are no specific regulations for their management. As a result, data on their production as well as management is unknown.
- **Used tires**, are usually disposed in landfills or reused in several ways. However, there is no specific regulations for their final disposal.
- **Scrap metal** and its management needs to be integrated in the legislative framework. A distinction should be made between scrap (those materials that can be recycled at a profit) and other types of solid wastes. Moreover, given the fact that there are no recycling factories for scrap metal (and exports are not allowed), new models of circular economy need to be reviewed and implemented.
- **Organic waste** from domestic use or other sources are not included in any type of regulation, while at the moment there is no official strategy on the future goals or suggested types of treatment.
- **Veterinary waste** is partly regulated through agricultural law. However, no specific regulation for the management and no official standards exist.

In addition, as the bylaws do not get approved, the draft National Master Plan for hazardous waste management prepared by EQA (2010) has not been approved yet, leaving an important gap in hazardous waste legislation, databases and further information.

Another issue that is not regulated at the moment is the **transportation of solid waste**. In this direction, there is no regulatory framework for special licenses for trucks or other vehicles that carry waste from settlements and cities, industries, farms and slaughterhouses etc.

Considering all the above, there is no established system to monitor and collect data on the chain of players in the field of solid waste management including production, transportation and final delivery for disposal or further use. As a result, there is no established "**solid waste registry**", in which all stakeholders in this chain would need to be reporting.

On a policy level, the need for a new model of circular economy needs to be integrated in existing legislation. Therefore, the lack of key drivers to improve waste management, stimulate innovation in recycling, limit the use of landfilling, and create incentives to change consumer behavior does not appear in the legislative agenda at the moment. In certain cases, and if designed correctly, circular economy can also be an economic driver, offering motives to citizens to organize social enterprises and other form of community action around this concept.

Finally, there is no work done, in an institutional or legislative level, regarding the **Green House Gases (GHGs) emissions associated to solid waste** from landfills and other disposal areas. There is a need for cross-sectoral legislation that connects solid waste management and atmospheric emissions to air pollution and climate change.

3.4.6.3 Sectoral institutional framework: Solid waste management

According to Thoni & Matar (2019), solid waste management in Palestine is characterized by its diversity of actors and the complexity of different roles assigned to the different groups. In addition to public institutions like ministries, local municipalities, private sector or civil society, there are other actors, such as the UNRWA (who is supporting solid waste management in refugee camps and other areas), external donors (who support the PNA in the implementation of some SW projects) and Israeli settlements (who produce also waste and have an impact on the environment of the West Bank). The most important institutions involved are:

Table 3.4.6-1: Main institutional stakeholders for the solid waste sector and their responsibilities

Authority	Responsibility
Ministry of Local Government	• Sets general policies about solid waste management. • Coordinates the activities of the LGUs and JSCs. It provides them with financial and technical support. • Involved in several awareness projects with other ministries. • Chairing the National Team responsible for the implementation of the adopted NSSWM. • Monitors the execution of infrastructure projects including solid waste projects.
EQA	• Oversees solid waste management at the strategic level; • Develops and suggests the standards, procedures and guidelines for sustainable solid waste management (including hazardous waste management) • Determines the SW sites specificities, and promotes the reduction, recycling and reuse of solid waste. • It has also a monitoring and inspection role in the application of adopted laws and standards. • Responsible for the approval of EIA and for promoting environmental awareness among the Palestinian public. • Provides expertise and ensures the implementation of the environmental protection. • Finally, the EQA has also an international role, as the institution responsible for the application of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal in the OPT (Palestine is a member since 2015).
Ministry of Health	• Responsible for licensing and monitoring health institutions in general, and facilities responsible for medical waste management (article 2; Public Health Law-PHL, 2004). • Issues the conditions related to "transport, store, treatment, and dispose of the hazardous waste" (article 42, PHL, 2004) (a role, which appear to be overlapping with the EQA's responsibility. • Its Environmental Health department carries out research and data collection on water, air, hazardous waste and pollution.
Palestinian Standards Institute	• Establishes and adopts the national standards, as well as implements adopted international standards, among which the ones related to solid waste management. • Chairs also a national committee which is responsible for developing the directives or the technical regulations.
Palestinian Central Bureau of Statistics	• Collects and disseminates the national data about SWM, through its website and regular surveys like the household, environmental, economic and medical environmental surveys
MDLF	• Manages the Southern component of the Gaza Solid Waste Management project (GSWMP) since 2012 covering 3 of 5 governorates in Gaza Strip, namely the Middle Area, Khan Younis, and Rafah Governorates comprising approximately 64% of Gaza Strip's total geographic area inhabited by 46% of the total Gaza Strip's population, or approximately 800,000 people according to the 2014 Palestinian Central Bureau of Statistics (PCBS) projections. • Ensures the provision of funds for different projects (among which SW activities) to the local authorities and occasionally to the joint service councils.
LGUs (including the municipalities, village councils and 18 project committees)	• Responsible for the collection, transportation and disposal of municipal waste. In 2018 there were 427 LGUs in the WB and 20 in GS

Authority	Responsibility
JSCs	• Thy form an association of several LGUs to provide one or more services to all member municipalities to reduce costs and to efficiently coordinate services. There are currently 13 JSCs responsible for SWM in the West Bank (including one Higher Council): 12 are in charge of SW collection, 9 are responsible also for transferring SW. JSC Jenin, JSC Jericho and the Higher Council of Bethlehem and Hebron supervise the management of the three main landfills. Two JSCs operate in the Gaza Strip
United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA)	• Assists and sometimes supervises the waste management in refugee camps in the West Bank and the 8 camps in Gaza, in coordination with municipalities and JSCs. • Assists municipalities in the Gaza Strip by being the channel through which equipment, provided by bilateral donors, has been provided to the municipalities. • Under its area of jurisdiction, the UNRWA support's role is to provide services and manage the camps. The organization is responsible for collecting waste from the refugee camps, which will be disposed of at sites run by municipalities against monthly payment to the dumpsite operating organization.
Private sector	• Contracted by municipalities/JSCs for the collection, transportation or/and disposal of waste or the management of certain facilities (like transfer stations) and private companies own and directly manage recycling/recovering activities.
Informal sector	• Include unlicensed individuals, family-run businesses, industries and public institutions dealing in general with the reuse and recycling of specific waste (including E-waste for example), although the Palestinian legal and policy framework doesn't provide any specific regulations regarding it.
Waste pickers	• Waste pickers are people who illegally collect some types of wastes such as plastics and sell it to sub-contractors/waste recovery factories. They don't have any right, are not vaccinated against the disease, nor use any Personal Protective Equipment (PPE). They are usually very organized, but persons are always changing, so that no studies defined their numbers and conditions. They can be noticed in dumpsites and near street waste containers. There are two types of waste pickers: o Waste pickers in landfills/random dumpsites: Mostly they are prevented to access to the landfill sites as ordered in Al-Minya, Deir Al-Balah, and Al-Fukhary landfills, but it is difficult to prevent them to access to random dumpsites as they are open areas. Their presence in landfill sites is considered not safe, not only due to collecting waste without protective tools, but also due to the heavy machinery activities in landfill sites. o Waste pickers in streets: they are found in Gaza Governorates and in the West Bank, they are noticed collecting some materials such as plastics, metals and sometimes food waste
External donors (like government agencies, international organizations and NGOs)	• Provide the financial and technical resources and experts, in order to build facilities, upgrade the collection and disposal equipment, rehabilitate dumpsites, support recycling and composting activities and pilot projects, develop the institutional capacities and raise public awareness about waste management.
Civic initiatives (including start-ups)	• Deal with recycling and reusing raw materials

According to the same report, solid waste management in Palestine is characterized by its diversity of actors and the complexity of different roles assigned to the different groups. In addition to the public institutions presented before, the private sector and civil society there are other actors, such as the UNRWA (who is managing the solid waste in the 27 refugee camps of West Bank and Gaza), external donors (who support the PNA in the implementation of some SW projects) and Israeli settlements (who produce also waste and have an impact on the environment of the West Bank).

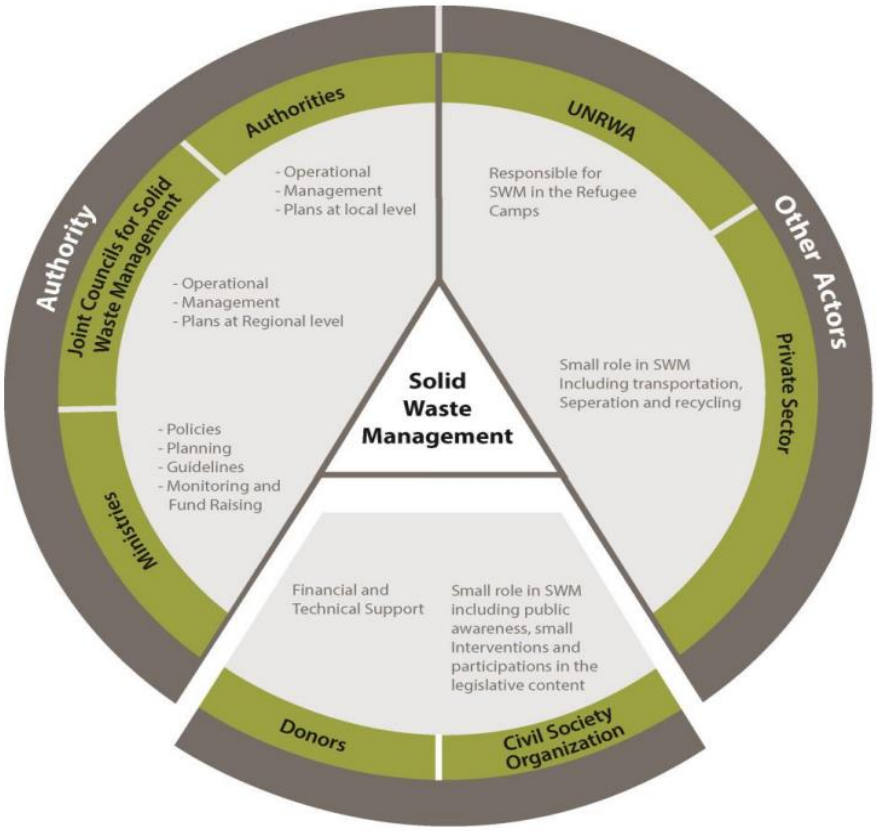


Figure 3.4.6-1: institutional framework and different partners responsible for solid waste management
Source: ARIJ, 2015

At the national level

The **Ministry of Local Government (MoLG)** sets general policies about solid waste management and coordinates the activities of the Local Government Units (LGUs) and Joint Service Councils (JSCs).

EQA elaborates SWM at the strategic level; it develops the standards, procedures and guidelines for sustainable SWM (including hazardous waste management), determines the SW sites specificities, and promotes the reduction, recycling and reuse of solid waste. It has also a monitoring and inspection role in the application of adopted laws and standards.

The **Ministry of Health (MoH)** is responsible for licensing and monitoring health institutions in general, and facilities responsible for medical waste management (article 2; Public Health Law-PHL, 2004). In addition, its Environmental Health department carries out research and data collection on water, air, hazardous waste and pollution.

The **Palestinian Standards Institute (PSI)**: establishes and adopts the national standards, as well as implements adopted international standards, among which the ones related to SWM.

The **Palestinian Central Bureau of Statistics (PCBS)** collects and disseminates the national data about SWM, through its website and regular surveys like the household, environmental, economic and medical environmental surveys.

Finally, the **Municipal Development and Lending Fund (MDLF)** ensures the provision of funds for different projects (among which SW activities) to the local authorities and occasionally to the joint service councils (GIZ, 2014). MDLF is managing the Southern component of the Gaza Solid Waste

Management project (GSWMP) since 2012 covering 3 of 5 governorates in Gaza Strip, namely the Middle Area, Khan Younis, and Rafah Governorates comprising approximately 64% of Gaza Strip's total geographic area inhabited by 46% of the total Gaza Strip's population, or approximately 800,000 people according the 2014 Palestinian Central Bureau of Statistics (PCBS) projections30. As well, MDLF is managing a grant for enhancing the primary solid waste collection and transport (secondary collection) through Municipal Development Program (MDP) since 2008.

At the operational level

The **Local Government Units (LGUs)**: they include the municipalities, village councils and project committees. LGUs are the main responsible local authorities for the collection, transportation and disposal of municipal waste. In 2018 there were 412 LGUs in the West Bank and 25 in Gaza Strip.

Joint Service Councils (JSC): an association of several LGUs to provide one or more services to all member municipalities with the aim to reduce costs and to efficiently coordinate services. There are currently 13 JSCs responsible for SWM in the West Bank (including one Higher Council): 12 are in charge of SW collection, 9 are responsible also for transferring SW. JSC Jenin, JSC Jericho and the Higher Council of Bethlehem and Hebron supervise the management of the three main landfills. Two JSCs operate in the Gaza Strip.

The **United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA)** supervises the waste management of the 19 refugee camps in the West Bank and the 8 camps in Gaza, in coordination with municipalities and JSCs. Under its area of jurisdiction, the UNRWA support's role is to provide services and manage the camps. The organisation is responsible for collecting waste from the refugee camps, which will be disposed of at sites run by municipalities against monthly payment to the dumpsite operating organization. UNRWA has also given assistance to municipalities in the Gaza Strip by being the channel through which equipment, provided by bilateral donors, has been provided to the municipalities.

The **private sector**: some companies can be contracted by municipalities/JSCs for the collection, transportation or/and disposal of waste or the management of certain facilities (like transfer stations) and private companies own and directly manage recycling/recovering activities.

Informal sector: unlicensed individuals, family-run businesses, industries and public institutions dealing in general with the reuse and recycling of specific waste (including E-waste for example), although the Palestinian legal and policy framework doesn't provide any specific regulations regarding it (Di Maria et al., 2017).

Waste pickers: Waste pickers are people who illegally collect some types of wastes such as plastics and sell it to sub-contractors/waste recovery factories. They don't have any right, are not vaccinated against disease, nor use any Personal Protective Equipment (PPE). They are usually very organized, but persons are always changing, so that no studies defined their numbers and conditions. They can be noticed in dumpsites and near street waste containers. There are two types of waste pickers:

- Waste pickers in landfills/random dump sites: Mostly they are prevented to access to the landfill sites as ordered in Al-Minya, Deir Al-Balah, and Al- Fukhary landfills, but it is difficult to prevent them to access to random dumpsites as they are open areas. Their presence in landfill sites is

[30] *MDLF Website: www.mdlf.org.ps*

considered not safe, not only due to collecting waste without protective tools, but also due to the heavy machinery activities in landfill sites.

- Waste pickers in streets: they are found in Gaza Governorates and in the West Bank, they are noticed collecting some materials such as plastics, and sometimes food waste. Mostly they are found in rich neighbourhoods. Some of them are children and women.

3.4.6.4 Identification of sectoral Institutional gaps: Solid waste management

Gaps in the institutional level related to solid waste management is mostly about the capacity of JSCs and especially the municipalities regarding their responsibilities linked to monitoring and reporting throughout the entire waste management chain. According to ORGUT report (2017) recycling and waste reduction is driven by some JSCs and LGUs, thereby lacking the national coordination and a central knowledge provider. The lack of private sector actors and markets for recycling and reuse remains a problem, where nobody is taking on the role of promoter or facilitator. There is also a knowledge gap in the sector regarding solid waste technicians, while there are many engineers available for the more theoretical parts of the processes.

The **EQA does not seem to have a clear role in monitoring, collecting data and reporting for this sector**, while these responsibilities seem to be overlapping with actions performed by the municipalities.

As a result, there is an **expanding and largely unregulated, informal industry that manages solid waste**, including hazardous wastes posing a threat to human health (uncontrolled working conditions and safety measures) as well as the environment (uncontrolled management, leaking etc).

3.4.7 Agriculture and Fisheries

3.4.7.1 Sectoral legislation: Agriculture

The major law governing the agriculture sector is the **Agriculture Law No. 2 of 2005**. Other relevant laws include the:

- Local Government bylaw in 2012 for central wholesale markets
- Decree Law No. 12 for the year 2013
- Decree Law No. 8 for the year 2015

The **Agriculture Law No. 2 of 2003** (as amended in 2005), constitutes the basic legal framework that regulates the work in the agricultural sector, in addition to many agricultural by laws that have been adopted, after the issuance of the Agriculture Law. The Agriculture Law regulates this process and guarantees the establishment of a group of regulatory bodies that aim at developing the agricultural sector and working directly with farmers especially on issues related to agricultural loans. In addition, the law includes specific articles on agricultural fertilizers and pesticides that are essential for the production of many agro products. These laws also contribute to the protection and development of agro products, and their absence might threaten and weaken agro production as is the case in the Palestinian market, where a group of traders is monopolizing the trade-in pesticides, leading to inflation in prices and increasing farmers' reluctance away from farming and agro production.

During the past period, various laws and by-laws have been issued:

- The Agricultural Pesticides by law,
- Plant Product Smuggling by-law,
- Fodder by-law,
- Animal Recording and Identification by-law,
- Veterinary by-law,
- Animal health Control and Veterinary Quarantine by-law,
- Risk Prevention and Agricultural Insurance law (Decree-Law No. (12) for the year 2013),
- The law of the Palestinian Agricultural Credit Institution (Decree-Law No. (8) for the year 2015).
- By-law for the National Center for Research related to research in the field.

Central wholesale markets are governed by an originally Jordanian bylaw that has modified by the Ministry of **Local Government bylaw in 2012 for central wholesale markets**. This bylaw outlines a framework for the operating mechanism of the central wholesale market and specifies the percentage of fees to be collected on sold products. Despite the availability of this bylaw, some local authorities collect lower fees than those stated by the bylaw.

In 2013, the Palestinian government established the Risk Prevention and Agricultural Insurance Fund based on the **Decree Law No. 12 for the year 2013** to be the governmental institution specialized in the management of risks that hinder agricultural development in Palestine. It also aims at reducing the impact of these risks by implementing various interventions, tools and methods to mitigate damages caused to the agricultural sector and to enable Palestinian farmers to cope with the negative effects of climatic and political changes. Despite the establishment of the Fund by a decision of the Palestinian government, it still needs to activate its work and funding mechanisms to be able to accomplish the tasks assigned to it by law.

In 2015, the Palestinian government established the Palestinian Agricultural Credit Institution, under the **Decree Law No. 8 for the year 2015**, to be a governmental mechanism that helps Palestinian farmers and agricultural companies to obtain loans for the establishment and development of agricultural projects, as well as for agricultural production and inputs projects that are in line with the agricultural sector development strategy.

Reuse of treated wastewater is regulated with the **Obligatory Technical Guidelines for treated wastewater reuse (PSI 34-2012).**

The main strategic document is the **National Agriculture Sector Strategy: "Resilience and Development" 2017 – 2022**, which relies largely on the outcomes and recommendations of the 2014 – 2016 revision of the Agriculture Sector Strategy. These outputs reference the lessons learned and policy recommendations of the report. The strategy is a part of the **National Development Plan 2017 – 2022**.

3.4.7.2 Sectoral legislation – Fisheries

Fisheries and aquaculture would, by any measure, rank among the leading industries in the effort of the Palestinian Authority (PA) and the Gaza Strip to develop a Blue Economy. According to World Bank (2020) the fisheries and aquaculture sector faces many challenges, including institutional structure, movement constraints of people and goods, degraded infrastructure, and deteriorating vessels. Despite various challenges, the sector has some promising characteristics.

Fisheries Law No. 6 of 1937, amended in 1954 and 1967, is one of the main laws governing the fisheries sector. The Law was enacted by the British High Commissioner during the British Mandate for Palestine, and it is considered to be the first law that regulated and organized fisheries in the Palestine territories. The Law included 13 articles. However, the Law is old and it does not correspond with the current fisheries and resources management challenges.

Palestinian Environmental Law No. 7 of 1999 touches on the fisheries sector. The Law provides a framework for the protection of the environment, public health, and biodiversity in West Bank and Gaza, including marine areas. It includes a stipulation that the Environment Quality Authority (EQA) of the Ministry of Environment shall, in coordination with specialized agencies, set standards for the quality of seawater and set rules and regulations for the prevention of marine environment pollution generated by the dumping of waste and wastewater.

The **Law on Agriculture No. 11 of 2005** is an amendment to the **Law on Agriculture No. 2 of 2003**. The Law on Agriculture No. 2 of 2003 was developed based on a review of different laws, including the Law on Fisheries No. 6 of 1937, which was made in force by the governorates in the GS. This law governs the fisheries and aquaculture organizations, including some aspects of resource management. Its purpose is

(i) Promoting the General Plan for the Protection of Fisheries and the Long-term Conservation, Sustainability, Development, Processing, and Utilization of Fishery Resources;
(ii) Organization and management of fishing and aquaculture;
(iii) Programs to protect the marine environment, reduce pollution of fishing waters, work to address the adverse environmental effects of fisheries resulting from human activities, avoid excess fishing capacity, and maintain the exploitation of fish stocks from an economic point of view in coordination with the competent authorities;
(iv) Development of investment in fisheries;
(v) Scientific research in the field of fisheries and aquaculture;
(vi) Setting standards of conduct for all those involved in fisheries and aquaculture and developing and rationalizing fishing methods; and
(vii) Enhancing the contribution of fisheries and aquaculture to food security.

Chapter 3 is related to fisheries, comprising Articles 73, 74, and 75. According to the Law, the Ministry of Agriculture (MOA) is responsible for developing rules on fisheries to be promulgated by the Council of Ministries, provided that it includes the following:

(i) regulation of the fishing profession as well as necessary licenses and fees;
(ii) regulation of the importing, exporting, and marketing of fish and other aquatic products;
(iii) definitions of the specifications and conditions involving aquaculture projects and fish farming;
(iv) specification of fishing nets, feeds, medicines, vaccines, and hormones for the control of fish diseases; and
(v) designated seasons and times of fishing in the sea.

Article 74 states that no solid or liquid waste or wastewater may be discharged into Palestinian fishing waters, no sand may be taken, no rocks may be removed from the coast, nor may the nature of the seabed be changed. Article 75 states that beach bulldozers may not be used nor fishing nets be set up at a distance less than 100 meters from the beach, except by permission of the Minister.

3.4.7.3 Identification of sectoral legislation Gaps – Agriculture

Gaps in the agricultural-related legislation are mainly presented in the previous chapters and relate to the lack of cross-sectoral legislation for the impacts of agriculture on:

- Regulating, licensing and monitoring of extraction from private wells
- Climate change and GHG emissions in the atmosphere
- Desertification, directly related to climate change
- Lack of specific bylaws and standards for veterinary waste and other types of wastes (coming from the use of fertilizers etc.). In cases where specific legislation exists (e.g. pesticides), law enforcement, monitoring and reporting is poor. As a result, a gap in data collection and is created, which in turn creates gaps in updating the existing legislation.
- Lack of specific bylaws and standards for further utilization of organic waste produced.
- Biodiversity monitoring related to agriculture activities

Food and nutrition security: The Palestinian legal system lacks explicit rules on the protection of the right to food. Moreover, there are no specific rules that guarantee food and nutrition security in Palestine. However, an indirect reference to this can be found in Article 10 of the Basic Law of 2003 on the protection of basic human rights and liberties that in principle includes also the right to food as a basic human right, linking it to ensuring human dignity[31]. Food and nutrition security is indeed a multidimensional concept and as such it is a cross-cutting issue. As a result, though there is no law that specifically focuses on it, many other laws reference this concept. For instance, Article 2/9 of the Palestinian Agriculture Law of 2003 obliges the MoA to work on promoting food security to implement the objectives of this Law[32].

According to FAO[33], there is no reference to food security in the Law-by-decree on Water No. 14 of 2014, which has an important indirect relevance to the agricultural and food production strategies, as well as public health considerations. This law codifies all people's right to receive an appropriate quality of water according to need and with a fixed and uniform price. The legal framework for food safety is fundamentally composed of: Public Health Law No. 20 of 2004, Agriculture Law No. 2 of 2003, the Palestinian Standards and Measurements Law No. 6 of 2000, the Decree on the Law of Industry No. 10 of 2011, and the Consumer Protection Law No. 21 of 2005. There is no **umbrella food safety law**, although several proposals have been discussed in recent years.

There are several regulatory weaknesses related to the regulatory framework for food and nutrition security, including food safety. These include the fragmentation of the regulatory framework, which is based on several pieces of legislation rather than an umbrella food safety law. The legal framework is thus not harmonized, uncoordinated and results in functional overlap between authorities thereby compromising the effectiveness of monitoring, control and enforcement of food and nutrition security measures.

Finally, an important gap in legislation is related to the regulation of Genetic Modified Organisms (GMOs). This gap is cross-sectoral, directly linked with agriculture, biodiversity, food safety as well as other sectors. The need for regulation aims at minimizing the potential threats of GMOs for biodiversity

[31] http://www.fao.org/3/ca0627en/CA0627EN.pdf
[32] *The Agricultural Law addresses various matters related to food security including: Agricultural wealth, water sources, desertification, plants, natural resources, agricultural and animal biodiversity, sustainable use of resources and fisheries etc.*
[33] http://www.fao.org/3/ca0627en/CA0627EN.pdf

More specifically, Palestine ratified the CBD and the Cartagena Protocol on Biosafety in 2014, but has not ratified the Nagoya Protocol on Access and Benefits Sharing of Genetic Resources, and is committed to the implementation of the provisions of the CBD. The Environmental law didn't include any article related to Cartagena protocol on biosafety, biotechnology or Nagoya protocol on access and benefit-sharing of the genetic resources. Also, it has no additional national legislations or administrative mechanisms pertaining to biosafety and access to genetic resources and associated traditional knowledge and benefit-sharing from their utilization. This is considered a key constraint towards achieving more meaningful benefit sharing.

In terms of more specific regulation, several laws, by-laws and regulations have been drafted but have not been ratified at the moment, despite their importance in terms of environmental and social management and public health, including (National Agricultural Sector Strategy 2017-2022):

- Revision of the Agricultural Law
- Follow up the endorsement of the Agricultural Councils Law
- Regulation for Cattle and Poultry Markets
- Phytosanitary law
- Agricultural fertilizer regulations
- The Biosafety regulation
- Slaughterhouses regulation
- The poultry farming regulation.

3.4.7.4 Identification of sectoral legislation Gaps - fisheries

The Fisheries Law of 1936 (as amended 1954 and 1967), is antiquated and does not reflect the current situation.

Therefore, **a need for a common fisheries legal framework**, which would ensure that fishing and aquaculture are environmentally, economically and socially sustainable and that they provide a source of healthy food for all fishermen in Palestine is needed.

This common framework should also **determine appropriate catch levels or access rules** for various types of fishing vessels each year, which at the moment is not regulated resulting in phenomena of moderate to high overexploitation of marine capture fisheries (World Bank, 2020).

Moreover, the Decision of the Council of Ministers No. 243 of 2005 concerning the Protection of Fish regulates the fishing profession, including licenses as well as the import, export and marketing of fish, so as to enhance its contribution of fisheries and fish farming in food security (article 2/8). The Public Health Law No. 20 of 2004 does not tackle the issue of food security explicitly; rather it deals, to some extent, with food safety issues[34].

3.4.7.5 Sectoral institutional framework: Agriculture

According to the National Agriculture Sector Strategy: "Resilience and Development" 2017 – 2022, which is a part of the National Development Plan (2017-2022), besides the Ministry of Agriculture,

[34] http://www.fao.org/3/ca0627en/CA0627EN.pdf

there are several ministries and public institutions that play major role in the development, regulation and delivery of services to the agricultural sector.

Table 3.4.7-1: Authorities involved in issues of the agriculture sector and their responsibilities

Authority	Responsibility
PWA	• Regulates the management of the water sector and sanitation in Palestine and achieves an equitable distribution among different sectors • Optimizes the use of water resources to ensure water and food security and economic • development of the Palestinian State • Manages wastewater treatment
EQA	• Ensures the protection of the environment, biodiversity and natural vegetation • Conducts environmental assessments, licensing in cooperation, and coordination with the competent authorities • Conducts awareness and environmental education activities • Participates in the development of specifications and standards related to the environment • Proposes and develops instructions and technical requirements for environment protection • Attracts funding for environmental projects
Ministry of National Economy	• Regulates the trade of agricultural inputs and products, and promotes local products • Supervises and holds commercial conventions and protocols • Registers companies and related activities • Promotes exports • Prepares specifications and standards
Ministry of Local Government and local government units	• Plans regional, municipal and rural schemes • Oversees the wholesale markets and slaughterhouses
Ministry of Labour	• Registers agricultural cooperatives and develops strategies and laws for cooperative work
Specialized agricultural councils	• Bring together the various stakeholders in the agricultural/commodity fields, 10 agricultural boards were established, and are currently working on the preparation of a special law for General Union of Agricultural Councils.
Palestine National Agricultural Research Center (NARC)	• Responsible for conducting agricultural research, through its five research units and seven agricultural experiment stations, of which five are located in the West Bank and two in the Gaza Strip. In addition, five faculties of agriculture in AnNajah University, Hebron University, Al-Azhar University, Palestine Technical College (Khadoury) and Al-Quds Open universities, offer agricultural bachelors and masters' degrees in some disciplines. There are two agricultural secondary schools; one is Beit Hanoun Agricultural School in Gaza and AlAroub Agricultural School in the West Bank. In addition to these educational institutions there are some NGOs that conduct agricultural research, such as the Jerusalem Institute for Applied Research (ARIJ) and the Land Research Center

Other stakeholders include:

The annual demand for agricultural loans is estimated at about USD 200 million. Only 30 percent of this amount is available from formal sources (MoA, 2016), with the remaining share being provided by traders, brokers and borrowing from relatives. Generally, farmers feel that access to credit is unsatisfactory. In response to this, the Palestinian Government established the **Palestinian Agricultural Credit Institution (PACI)**, under the Decree Law No. 8 in 2015 to help farmers and agricultural companies obtain loans for both investment and working capital. This institution is in the process of developing its administrative and financial systems to ensure the implementation of its tasks.

Agriculture is an activity where risk is pervasive. In acknowledging this, the Palestinian Government issued the Decree Law No. 12 of 2013 establishing the **Palestinian Agricultural Disaster Risk Reduction and Insurance Fund (PADRRIF)**. This governmental institution specializes in managing the risks, both environmental and man-made, faced by agricultural farmers. However, it is not yet fully operational.

Non-governmental and civil society organizations: Non-governmental and civil society organizations, amounting to 35 organizations, have historically played key roles in agricultural development before and after the establishment of the Palestinian National Authority. They are characterized by their long expertise enabling them to cope with changes. Civil society and non-governmental organizations working in the agricultural sector play a complimentary integral role with the Ministry of Agriculture, including the harmonization of their projects with the Ministry's strategies and policies, as well as the provision of specific technical services for the Ministry in the implementation of some development projects, such as land reclamation, agricultural roads and water harvesting interventions.

Private initiatives: The private sector and farmers' organizations also play a key role in the agricultural production value chain, as well as in investing in the agricultural sector and providing various business services needed by farmers in the production and post-harvest processes. The private sector is the only player in the food processing sector, as well as in the local and external marketing. Thus, coordination with and involvement of the private sector and farmers' organizations, as well as their encouragement to invest in the agricultural sector are key pillars in the Palestinian agricultural development efforts. Private sector organizations that are directly involved in the agricultural sector include the following: Chambers of Commerce, Industry and Agriculture scattered in all provinces as well as their public union, based in the city of Ramallah, the Palestinian Food Industry Union, the Palestinian Trade Center (Pal Trade), the Private Sector Coordinating Council, Union of Agricultural Cooperative Associations, agricultural marketing and export companies, the Palestinian Shippers Council, and companies of agricultural inputs, including nurseries. The private sector organizations also include farmers' organizations and unions, and the ten agricultural commodity councils that have been formed based on the first article of the amended **Agriculture Law No. (11) for the year 2005** and under special regulations they are classified as semi-government institutions. These councils provide a framework for all stakeholders involved in the aforementioned commodities. The preparation of the draft law of the General Union of Agricultural Councils is under progress, with the aim of regulating the work of these councils to ensure sustainability and organization of work.

Other stakeholders-actors and their roles: In addition to the MoA, there are several ministries and public institutions that play major roles in the development, regulation and delivery of services to the agricultural sector. These include:

- the Ministry of National Economy (MoNE), which is responsible for Palestinian trade policy (including trade of agricultural inputs and products), promotes local products, supervises and holds commercial conventions and protocols, registers companies and related activities, and prepares specifications and standards;
- the Ministry of Local Government (MoLG), which is responsible for territorial planning (at regional, municipal and rural level) and oversees the wholesale markets and slaughterhouses;
- the Ministry of Labour (MoL), which supervises the functioning of the labour market, is responsible for the registration of agricultural cooperatives and develops strategies and laws for cooperatives;
- the Ministry of Health (MoH), which is responsible for ensuring public health and, with specific reference to agriculture and food, plays a key role in food safety inspection and zoonotic disease control;
- the Ministry of Social Development (MoSD), which is responsible for social protection interventions. In partnership with other ministries, CSOs, the private sector and international organizations, it

seeks to provide social protection for the Palestinian people, through programs in areas of protection, care and prevention, empowerment and an awareness-based approach;

- the Palestinian Water Authority (PWA) whose mandate is to regulate the management of water sector and sanitation in Palestine. It aims to achieve an optimal and equitable use of water resources among different sectors to ensure water and food security and economic development;
- the Environment Quality Authority (EQA) whose mandate is to ensure the protection of the environment, biodiversity and natural resources. Its activities include carrying out environmental assessments as well as awareness and environmental education campaigns. It also contributes to the development of specifications and standards related to the environment and acts as focal point for climate change;
- the Palestine Standards Institution (PSI), which is responsible for technical regulations and quality standards for agriculture inputs and outputs as well as for food and feed.

Pursuant to Article 1 under the Amended Law on Agriculture No. 11 of 2005, some Agricultural Commodity Councils were established as quasi-governmental bodies. The current status of these Councils is quite heterogeneous (Table 3.1). Acting under special regulations, these Councils set up frameworks that regulate the working relationships of respective stakeholders, but not all are functioning. So far, there is no legal basis for these Councils and their internal regulations are also not officially endorsed. The updated Agricultural Law that will specify the tasks and functions of the Councils will address this issue[35].

3.4.7.6 Sectoral institutional framework: Fisheries

According to World Bank (2020) the fisheries sector includes many stakeholders with different mandates, interests, roles, responsibilities, and followed actions. The main institutional stakeholders involve:

Table 3.4.7-2: Authorities involved in issues of the fisheries' sector and their responsibilities

Authority	Responsibility
General Directorate of Fisheries of the Ministry of Agriculture	• Main administrator • Responsible for the management of fishery resources • Development of fishing activities in the freshwater resources • Management of fishery resources West Bank and in the marine and fish farming activities in the Gaza Strip • Licensing of fishermen and vessels • Oversees the sustainability of fishing activities • Introduces new species for farming • Administers, local associations • Responsible for monitoring and regulating agriculturally used fertilizers and pesticides that pollute the coastal environment
Ministry of National Economy	• Responsible for the economic sectors in the West Bank and Gaza, including the fisheries and aquaculture sector • The Department of Consumer Protection within MONE monitors the health condition and quality of fish at the marketplace • Facilitates the importation of tools and equipment for the fisheries sector • Coordinates with the marketing and export department at MOA to facilitate and monitor both the import and export of fish.
Ministry of Transport	• Responsible for the registration of fishing vessels.
Ministry of Labor	• register agricultural cooperatives, including fisheries cooperatives • Supports capacity-building in fisheries in the areas of labor rights, health, and safety

[35] http://www.fao.org/3/ca0627en/CA0627EN.pdf

Authority	Responsibility
	• acts as a mediator in disputes involving fishers and their employers
Palestine Coastal Police (PCP)	• Monitors fishing activities in the fishing zone. • Monitoring of port security • Issuance of entry permits to the ports • Coordination with the Israeli government to solve problems involving fishers • Surveillance to combat illegal drug and arms trafficking. • Acts as the coast guard in the event of shipping accidents, providing ambulance services. monitoring activities and enforcing the law
EQA	• Chairs the Coastal and Marine Environmental Protection Committee (MEPC). • Drafts the environmental strategies, which deal with the challenges of coastal and marine deterioration through a series of urgent actions, including wastewater and solid waste management, marine ecological protection, institutional strengthening, and a coastal and marine environmental information system
PWA	• Responsible for the operation of wastewater treatment plants and the regulation of pollution phenomena in near-shore, polluted by releases of untreated urban wastewater.
Palestinian Land Authority (PLA)	• In charge of zoning and land management, including aquaculture zone.
Municipalities	• Responsible for the organization and management of auction markets and selling of fish in cities, according to the Law of Municipalities of 1934 No. 1, the Law of Village Management in 1944, the Law of Market System in 1966 and 1973, the Law of Local Government Units in 1997, and the Foundation Law in 2003.

The fisheries sector is mainly administered by the **General Directorate of Fisheries of the Ministry of Agriculture** in the Palestinian National Authority located in Ramallah. Since 2007, however, the DOF's role has diminished because of political and financial difficulties (World Bank, 2020).

Other fishers' related groups, including **cooperatives** and **syndicates** depending on the area are usually formed by owners of vessels and registered fishers.

3.4.7.7 Identification of sectoral Institutional gaps: Agriculture

The institutional gaps related to the sector of agriculture mainly concern gaps also identified in other sectors and are mainly linked to lack of **institutional capacity in collecting data, monitoring and reporting**.

3.4.7.8 Identification of sectoral Institutional gaps: Fisheries

There is a diverse network of stakeholders working in the management and development of the fisheries sector. According to the World Bank (2020) there is **no fish resource management plan**. It would be beneficial if both government and fish groups analyzed the existing data and jointly developed a management structure.

Moreover, The Ministry of Transport is responsible for issuing fishing license to fishers, but **there is no systematical information on fishing vessels**. Some vessels are non-operational due to physical disrepair, and some due to financial constraints. It would be ideal to have data on operational vessels, not only a past record of the registered vessels.

The Ministry of Labor is in charge of registering different cooperatives, unions, and groups. Once registered, the different groups are to begin working towards achieving their mission and objectives. However, **there is a gap in follow-up after a group registers, as well as an overlap in activities**, owing to the lack of coordination among different groups.

There are **no available data on fish disease, pathogens, natural disasters, or pollution shocks**. When an issue is observed, several ministries and institutions take the necessary follow-up actions such as raising awareness of fish disease and control at the landing sites. However, such occasions rarely happen and are not systematized.

Finally, according to Feidi (2018), the fisheries authorities and public institutions should make long-term arrangements to strengthen and up-grade the capacity of the fishermen and fish farmers in the West Bank and Gaza Strip and the related fishing support activities to improve the management and the governance of the sector. As well as raise the level of experience in the modern methods of running fisheries and understand better the needs of the sector.

3.4.8 Urban Development

3.4.8.1 Sectoral legislation: Urban Development

Historically, the legislation for urban planning in Palestine started towards the end of the Ottoman era (the Ottoman Period is 1850-1917) with the promulgation of the **Provincial Municipalities Law of 1877**. Under this law, 22 municipal councils were established.

Land under the Ottoman Empire was classified into five categories (National Report on Housing and Sustainable Urban Development, 2014), which remains the current system of land classification that informs land planning and development:

1. Cultivated land, termed "Miri", in which the State had the ultimate ownership but was used by private individuals in a lease system.
2. Uncultivated land, termed "Mewat", was not used and comprised of the areas around localities. This later reverted to become "miri" or state land
3. Land in public use such as roads or common pastures termed "Metruka".
4. Land dedicated to the Islamic religion charitable trust termed "Waqf".
5. Privately owned land termed "Mulk."

The history of first urban plan in Palestine was set up by the British Mandate in 1922, which was conducted for cities only. In 1936, it was modified to include the regional level as the main statutory planning system or law to construct the planning system, with the **Law 31/1955** that managed the urban planning process in the West Bank.

The **Jordanian planning law or the "Cities, Villages and Building Law No. 79, 1966"**, in addition to defining the planning structure and the functional relationships between the local, district, and national planning levels, provided for the participation and input from non-official organizations (such as the Engineering Association) and from the local communities whose interests are directly or indirectly affected by the plans. It also stipulated that village councils could act as local planning committees with powers similar to those exercised by the municipal councils.

The **local council law issued in 1997**[36] has replaced the old law and is currently the prevailing council law (the local council law has replaced the Municipalities Law No. 29 of 1955 in for the provinces of the West Bank, the Municipalities Law No. 1 of 1934 for the Gaza Strip, the Law on Management of villages No. 5 of 1954 for the provinces of the West Bank and the Law on Management of villages No.

[36] http://www.fao.org/faolex/results/details/en/c/LEX-FAOC150034/

23 of 1944, for the Gaza Strip). According to the new law, the following are stated in regards to the responsibilities of Municipalities:

- Provision of potable water and other types of water. Addressing specification of water equipment i.e. pipes and water meter. Arrange for the distribution of water, the tariff and prevention of pollution to the wells, basins and springs
- Planning the town and roads including, road development planning and closing of roads, modification, set the length and width, paving, construction and resurfaced, cleaning, lighting, maintenance, naming or numbering and numbering its buildings, beautification, plantation and monitoring of street conditions.
- Protection measures for safe public health shall also be taken by the council; this includes the implementation of an efficient waste collection system. The law provides for municipalities the possibility to form JSCs through which they can join forces and collaborate for the delivery of municipal services including water tariff. Regulations to give effect to this law were adopted the following year.

The **local council law** was amended by the **2008 Law by Decree No. 9**.

The **Local Authorities Law** stipulates 27 areas that are under the LGUs' responsibility, namely[37]:

- Town planning;
- Building licensing and construction control;
- Water supply;
- Electricity supply;
- Sewage management;
- Public markets management;
- Licensing of trades and businesses;
- Public health monitoring;
- Collection and disposal of solid waste;
- Public storage control;
- Public parks;
- Cultural and sports activities;
- Public transport (land and sea);
- Control of peddlers and open markets;
- Weights and measures control;
- Advertisement control;
- Building demolition;
- Disposal of remnants of roads;
- Social services for the poor;
- Cemeteries;
- Precautions against floods, fires and natural disasters;
- Hotel operation control;
- Regulation of pack animals;
- Canine control;
- Budget approval and management;
- Management of the local government's assets and funds

[37] https://portal.cor.europa.eu/divisionpowers/Pages/Palestine-Introduction.aspx

The **Joint Service Council (JSC) Regulations, 2006** regulations were issued by the MoLG in 2006; they set the managerial system and authorities for the **JSCs.** The work of the JSC shall be organized by the Minister of Local Government in coordination with the councils of concern.

In 2011, the Council of Ministers issued the Council of **Ministers' Decision No. 6 on Buildings and Regulation of Local Authorities (2011),** which included new regulations, which amended the Building and Zoning bylaw that was based on the Jordanian law of 1966. This regulation has updated the licensing regulations, land registration and fees in the West Bank, However, due to the Israeli occupation, this law does not apply to Area C and East Jerusalem and remains applicable in Areas A and B of the West Bank, and Gaza only.

Land Ownership Law 3, 2011 addresses ownership, acquisition and compensations. This law amended **Law 2 the Year 1953**. The law stipulates all the regulations and procedures related to the acquisition of private land for public interest projects. It defines the meaning of public interest projects and presents the entitlement requirements including land registries and ownership documents needed to prove the affected person entitled to compensation. It also regulates the cases where disputes over ownership may occur.

Land Expropriation Law 2/1953: According to **Law No.24 of year 1943** modified by **Law No. 2 of the year 1953 on "Land Expropriation for Public Projects"** and its articles (3) and (21), the Government can expropriate up to 25% of any privately-owned land for public interest reasons -without compensating the owners for the value of the land being expropriated. Exceptions are made to owners who prove to be largely damaged by this land expropriation. However, owners are entitled to compensation for all crops and trees, buildings and fixed structures on the expropriated 25% area of the land. In case an entire plot of land is required, the promoter has to submit an official request to the Secretariat of the council of ministers with land limits, coordinates and lot numbers. A dedicated evaluation inter-ministerial committee will assess the land value and will submit the evaluation results report to the secretariat of the council of ministers for approval. A presidential decree is issued accordingly and the budget for compensation is made available at the ministry of finance. No one (owner or user) can financially benefit from the acquired land after the date of the presidential decree (cut out date).

In case the Government needs the whole plot of land, negotiations are made to reach an agreement with owners. However, in case of pressing time demands to expropriate land to a specific project serving public interest, the Government is entitled to seize the land immediately and then to initiate compensation negotiations with owners/users (Law 2/1953, Article (12)).

The most important articles related to this law are as follow:

- Article 3: Initiation of the expropriation
    - The beneficiary should publish an advertisement in the Official Gazette for a period of fifteen days after declaring his intention to proceed to the Cabinet a request for the expropriation of the land described for Public Benefit
    - The transactions related to Secretion that takes place after the publication of the notice mentioned in paragraph (1) above, shall not affect the right of the government or the municipal council or the local council to expropriate 25% of an area of land before secretion without compensation, which is similar to the provisions of Article (21) of this law.
- Article 4 presents the types of expropriation including 1) permanent 2) temporarily 3) Not allowing full use of land 4) forcing certain use of land

- Article 5 is related to the disclosure of expropriation activities and inventory for the affected groups.
- Article 6 is about the informing of landowners.
- Article 8; after the declaration of land expropriation. The land registration officer should ban any action or activities to be applied by putting a reference number. The Ref. No of the land should be attained from Land Authority to stop any action on this land if it is registered
- Article 9 is about the negotiations with the affected persons
- The articles from 10-21 discuss the entitlement of compensation and strategies to pay it. As well, the different cases that enable the affected people to stop the expropriation actions and retain their lands
- Article 22 discussed the taxes needed due to any change in the value of land due to the implementation of the project

Waqf land is the type of land classified under the Ottoman Land Code of 1858 as religious endowment land that cannot be inherited sold or transferred either by legal transaction or acquisition through long-term usage and can only be used for charitable reasons. Waqf lands are the lands owned by the Ministry of Endowment and Religious Affairs.

Finally, Israel applies its own legal frameworks, military orders and what they define as security rules and regulations to any urban development or planning for industrial, commercial or residential activities located in Area C.

According to the World Bank's report titled "The Economic Effects to Restricted Access to Land in the West Bank" (2008) the main legislation framework for planning in the West Bank is briefly described in the following table:

Table 3.4.8-1: The legislation framework for planning in the West Bank (World Bank, 2008)

Legal and regulatory framework and authorities	Palestinian Authority administered areas (areas A & B)	Area C – Palestinian localities	Area C – Israeli settlements
Applicable Laws, Regulations, and Amending Military Orders	• Jordanian City, Village, and Buildings Planning Law of 1966 • Building and Planning Regulations for Local Councils, Draft Regulation No. 3 (1996) • Building and Planning Regulations outside the Planned Areas Draft Regulation, 1996 Agriculture Law • Registration Law	• Jordanian City, Village, and Buildings Planning Law No. 79 of 1966 • Military order 418 – Planning of Cities and Villages, 1971 and subsequent amendments	• Jordanian City, Village, and Buildings Planning Law No. 79 of 1966 • Military Order 418 • Military Order 604 • Military Order 783 • Military Order 895 • Military Order 860 • Military Order 1043 • Military Order 848 • Israeli Planning and Building Law, 1965
Applicable Plans	No regional plan. (PA Regional Plan for West Bank was never approved)	British Mandate Regional Plan for Jerusalem (RJ5), 1942 and British Mandate Regional Plan for Samaria (S15), 1946 – of undetermined legal status	• British Mandate Regional Plan for Jerusalem (RJ5), 1942 and British Mandate Regional Plan for Samaria (S15), 1946 – of undetermined legal status • Partial Regional Plan No. 1/82, 1982 • Road Plan 50, 1984
	Master Plans available for all municipalities and most localities (originally	Special Partial Outline Plans available for a few localities, usually prepared by the	Master Plans usually prepared by the Israeli Ministry of Housing and Construction or the

Legal and regulatory framework and authorities	Palestinian Authority administered areas (areas A & B)	Area C – Palestinian localities	Area C – Israeli settlements
	developed by Civil Administration), currently being updated, 120 of about 500 plans already 35 revised by MOLG	Central Planning Department, most localities have no master plans	Settlement Division of the World Zionist Organization and submitted to the Supreme Planning Council

In terms of spatial planning, there are three levels of spatial planning, namely the national, regional, and local levels. They are mandated by the MoLG and represented by the higher planning council, district planning committees, and local planning committees. This does not apply to area C. At the National Level, the **Ministry of Finance and Planning** is responsible for the National Development Plan and Strategic Development Plans. The **Directorate of Urban Planning of the MoLG** works closely with the **Ministry of Finance and Planning, MDLF** and other stakeholders in order to develop a framework for "Strategic Planning" at the local government level, the Strategic Development and Investment Planning for Palestinian cities and Towns (SDIP). Planning levels in Palestine are presented in the following figure:

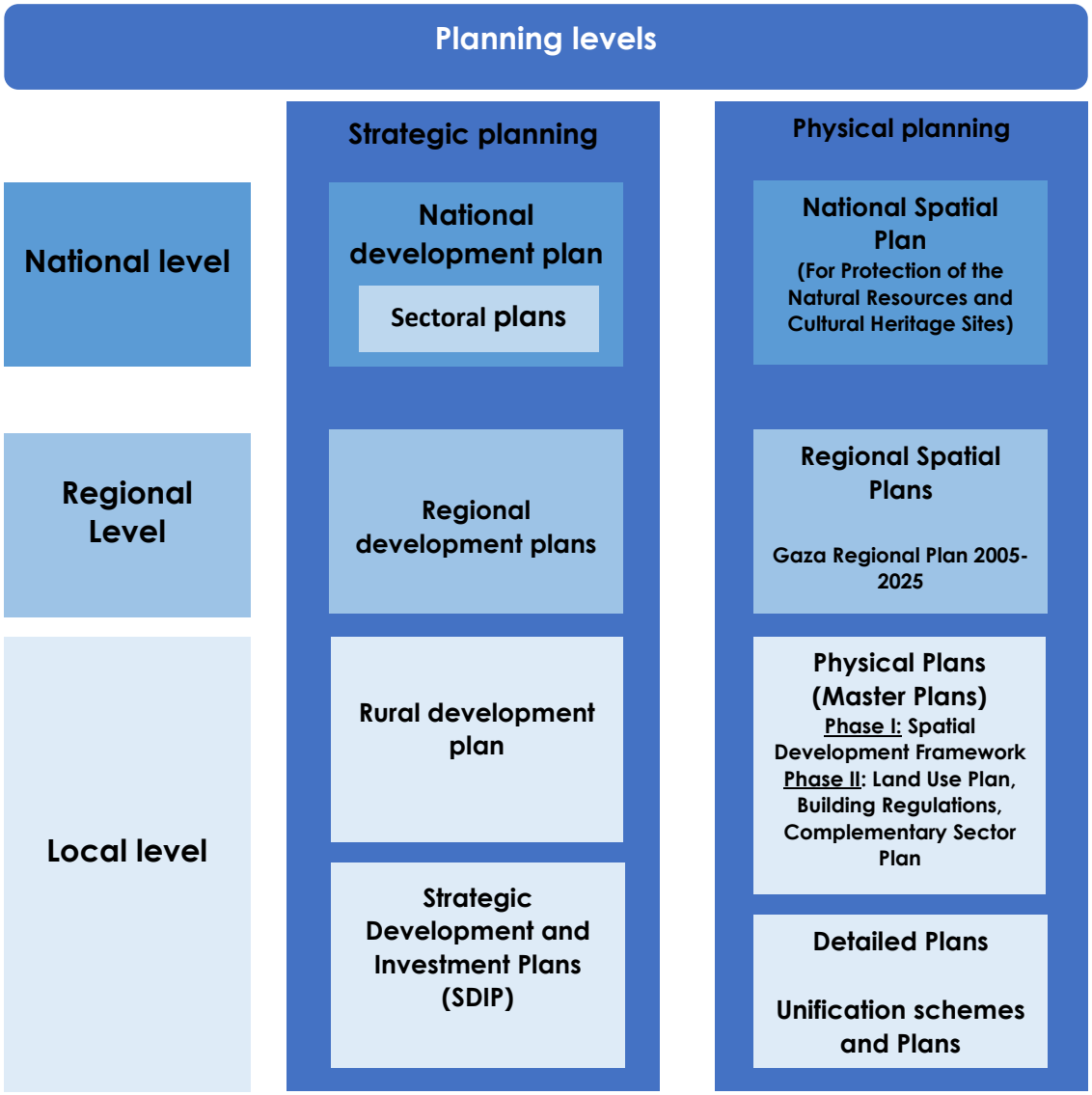


Figure 3.4.8-1: Levels of strategic and physical planning in Palestine

Source: MoLG, 2016

The **transport sector** is governed by the Palestinian **Traffic Law No. (5) of 2000** as well as the relevant bylaw. As part of the policy on effective regulation, rationalization and monitoring of government-owned vehicles, the **Government Transport Law** has also been developed. In addition, the Maritime Regulation, Regulation on the Ownership of Leased Public Vehicle Registration Numbers, Regulation on Traffic Violations, and Regulation on the Higher Council of Traffic were also devised. To keep pace with accelerating developments, MoPWH is developing a Draft Law on Roads. Meantime, MoT is finalizing the new Draft Traffic Law and the respective bylaw.

On a strategic level, in 2006, a **Transportation Sectoral Study** was prepared for the MoLG. The study identified major traffic and transportation issues in the Ramallah-Al-Bireh-Beitunia Metropolitan Area. This led to the creation of the Joint Cooperation Unit, which was a result of the strategic planning undergone as part of the City Development Strategies. A proposal for an integrated Traffic and Transportation Plan was developed, in conjunction with other integrated infrastructural plans, as a pilot project for metropolitan areas.

Building on this, the "**Transport Sector Strategy 2011-13**"[38] was developed, which established the vision for a safe, developed transportation network that connects all governorates.

Moreover, the State of Palestine has endorsed the **2030 Agenda for Sustainable Development** in September 2015, including **Sustainable Development Goal 11 of making cities and human settlements inclusive, safe, resilient and sustainable**. In doing so, the State of Palestine voluntarily recognized urbanization and city growth as a transformative force for development. The Palestinian government is committed to working with local and international partners to realize the Sustainable Development Goals (UNEP, 2020).

Moreover, it is noteworthy, that the city of Ramallah has joined the "100 resilient cities" movement, releasing its first-ever urban resilience strategy identifying major challenges and opportunities related to urban development, identifying 36 actions over 11 main goals towards urban resilience.

3.4.8.2 Identification of sectoral legislation Gaps – Urban development

Urban challenges for Palestine include rapid urbanization and high population rates coupled with the scarcity of land, aging infrastructure and several other issues. The urban area level is not clearly institutionalized and this affects the implementation of the recommendations and planning at this level. In particular, the rate of urbanization is not matched with suitable planning. As a result, local public administrations have issues handling the population growth, placing huge pressure on urban services.

Planning laws establish and regulate complex systems that not only govern spatial development but also directly influence land management and finance at local and national levels. As a consequence, they have an impact on many areas of life and economic activity in a country. Ensuring that planning laws fulfill their functions as effectively as possible means that they are frequently under scrutiny as contexts and needs change. Well-managed systems of performance review demand for an established system with clear steps for monitoring performance. Therefore, the need to "benchmark" the quality of existing laws and identify gaps and opportunities is a challenge, especially for urban planning and land use legislation.

[38] http://www.lacs.ps/documentsShow.aspx?ATT_ID=4812

The legal framework that governs the local government sector was issued in 1997 (referred to as the 1997 Law on Local Authorities) and includes articles highlighting the main responsibilities of the local government units (LGUs) and their relationship with the ministry of local government. A draft amending the law – focusing on decentralization and the restructuring of the LGUs as well as on election mechanisms, appointments, funding sources, and fiscal management, among other aspects – was issued in 2005. In early 2016, a second draft decree was issued by the government concerning the introduction of new clauses to further amend this law. **However, even though progress has been made on updating and reviewing the laws and regulations that are governing the local government sector in Palestine, a single coherent framework for the sector is still absent**. Instead, besides the Palestinian laws that are in place, regulations and legislations drawn from Ottoman Era rules, British Mandate laws, Jordanian law, Egyptian law, and Israeli military orders are still in place. In addition, the legal frameworks in use in the Gaza Strip and the West Bank differ from each other (MoLG, 2016). Identified gaps in this direction include the following:

- **Different legislation** applies between West Bank and Gaza. Even though the Planning and Building Act has tried to create a common legislative basis, this has not been achieved. Regulatory and legislative frameworks in construction and development remain complex, outdated and in some ways contradictory. This is mainly due to laws that were inherited from previous legal regimes, such as the Ottoman or British Empires that have not been sufficiently updated, in addition to some military orders that were issued by the Israeli occupation.
- **Systematic land registration** needs to be continued and an inventory of public lands in Areas A and B, which are under the Palestinian authority, should be developed to assist sound urban planning.
- **Poor enforcement of building regulations**, as well as the **inconsistent implementation of urban plans and zoning regulations**" (CAPSUS, 2019)
- Regarding **spatial planning**, SDIPs as well as local master plans (land use plans) need to be institutionalized and implemented. In this direction, integrated planning (all levels of local, regional and national) is significant, which in turn affects other issues such as transportation between urban centers, location of waste management facilities and other service providers. Finally, long term planning seems to be inhibited by restricting factors (including capacity and funding). Long term, sustainable planning will also allow for assessment and evaluation of plans and strategies. In this direction, appropriate legislation will be developed in the form of by-laws and other regulations will be developed.
- The **lack of coordination between spatial-planning models (land use policies) and transportation planning models** is an issue that needs to be managed. In 2016, the urban areas of Ramallah-Al Bireh, Nablus, and Bethlehem developed a Strategic Development Framework Plan, while Gaza prepared its Vision 2050. However, except for the Ramallah-Al Bireh area, those master plans are not integrated with the Transportation plans. In the absence of comprehensive master plans, **municipalities are working on an ad-hoc basis in which building licensing is allotted on a case by case basis** (CAPSUS, 2019).
- Regarding **green and other community spaces**, limited information is available on urban green spaces or parks. There are no planning policies that are currently mainstreamed within the Palestinian spatial planning systems that design, manage, implement and maintain public spaces in cities and towns (MoLG, 2016). As a result, current planning, zoning, and standards-based approaches do not fully meet people's needs for parks and common spaces in urban settings. In the future, planning incentives (in the form of a bonus for additional floor areas or other schemes) should be considered in exchange for public space, needed parking, or open, green spaces.

- The **lack of a public or green space strategy**, which can be integrated in the legislative system with the form of a bylaw prohibits urban planning frameworks with clear requirements for the adequate provision of sufficiently connected and well-designed public space.
- Outdated law and provision **cannot address modern challenges in urban development related to urban biodiversity issues**, green infrastructure and other environmental features designed and managed to deliver a wide range of ecosystem services such as water purification, air quality, space for recreation and climate mitigation and adaptation in urban settings.
- In the same direction, **building codes** that favor plants, signs, street furniture, cafes and/or other community engaging activities, and active building facades, which make the sidewalk a lively and safe place to be should be considered. In the opposite direction, streets with large setbacks, which usually leave room for parked cars and encourage automobile transit should be avoided if possible.
- In Palestinian cities, there are a lot of **vacant and ignored buildings and common spaces** (Najjar and Ghadban, 2015). However, there is no legal framework or strategy for their reuse. The possibility of reusing them for common spaces or other public services needs to be considered.
- **Sustainable urban mobility** guidelines need to be integrated in existing laws, motivating people to use public transport, bikes and walking. The issue of sustainable urban mobility is directly linked to green infrastructure.
- Urban planning must be inclusive and integrated. In this direction, **disabled people or people with movement impairments** face inaccessible transport and infrastructure. In this direction, cross-sectoral legislation for access in roads, buildings, schools, public transportation must be issued to regulate equal access for all citizens in urban centers.
- Regarding, **refugee camps**, there is, no zoning or planning regime to regulate and arrange the location of the installations. As a result, the location of refugee camps is dealt though "crisis management" mechanisms and no institutionalized, pre-determined, land-use scenario exists. Moreover, according to CAPSUS report (2019) Palestinian refugee camps are under UNRWA responsibility and are not included in the on-going municipal Master Plans.

3.4.8.3 Sectoral institutional framework: Urban development

The main institutional stakeholders in Urban Planning include:

Table 3.4.8-2: Main institutional stakeholders for urban development sector and their responsibilities

Authority	Responsibility
Ministry of Local Government	• Charged with preparing urban plans at the regional and local level. • Main policy-making body
MDLF	• It is the executive body of the ministry of local government with the mandate to design and implement local-government-support programs in close partnership with international donor agencies. • Assisting municipalities through a variety of support programs • The Directorate of Urban Planning at MoLG works closely with the Ministry of Planning, MDLF and other stakeholders to develop a framework for "Strategic Planning" at the local government level, the Strategic Development and Investment Planning for Palestinian cities and Towns (SDIP).
Ministry of Finance and Planning	• Responsible for developing the National Development Plan, spatial development strategies and urban development strategies and policies.
Higher Planning Council	• Responsible for approving the regional and local plans.
Association of Palestinian Local Authorities (APLA) (*not active at the moment)*	• Established in 1997 and officially recognized (per presidential decree) in December 2002 as an independent organization that represents the LGUs • Serving and supporting the interests of the LGUs in Palestine

For the West Bank, the institutional framework for the urban environment adopted three levels of Planning in accordance to the Jordanian Law No 76/1996 as mandated by the MoLG: the **higher planning council**, the **regional (or district) planning committees** and the **local planning committees**".

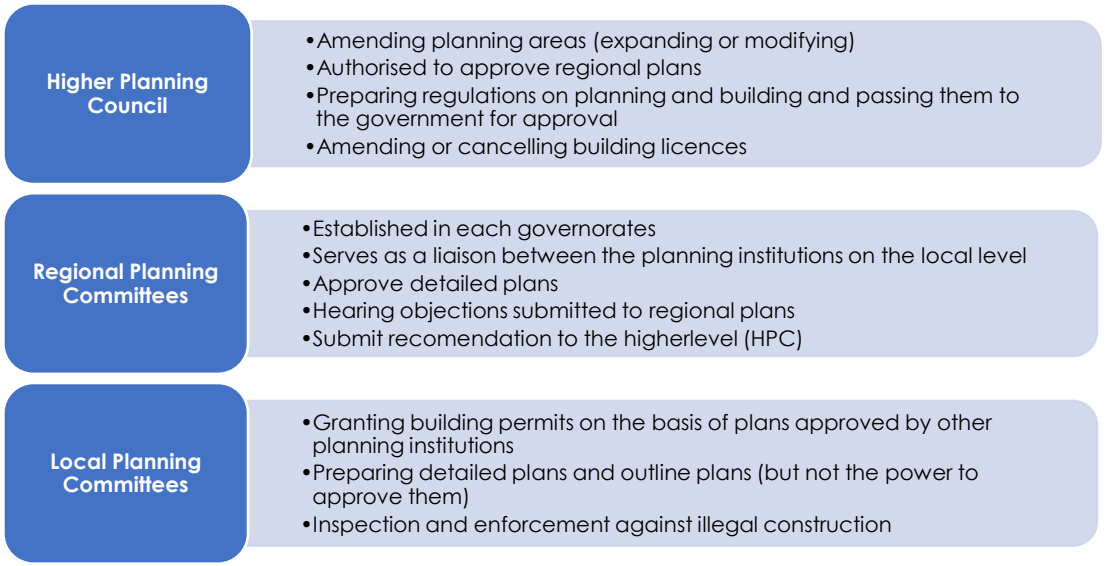


Figure 3.4.8-2: Levels of strategic and physical planning in Palestine

Source: MoLG, 2016

According to MolG (2016), the administrative setup of the governance sector encompasses multiple levels. At the national level, the Palestinian Authority and its various national institutions are responsible for national policy making, legislation, financial planning and management, and national program development as well as for the implementation, monitoring and evaluation, quality control, and technical assistance. At the regional level, 16 governorates (11 in the West Bank, including East Jerusalem, and 5 in the Gaza Strip) represent the national government and its institutions, each with a governor as its chief administrator. At the local level, there operate 142 municipalities and 275 village councils. In addition, there are established as well more than 86 joint-service councils, in which two or more local governmental units cooperate in exercising their council functions (e.g. planning and development) or in the provision of services (e.g. solid waste collection, and water distribution). However, only approximately 35 joint-service councils are indeed active, well organized, and operational.

A more specific description of the institutions involved in the country, is given here:

Established by the Presidential Decree No. 10 for the year 2002, the **APLA** was established as the official body responsible for surveying, registration, land valuation and state land administration in Palestine, Land registration has been a significant priority for the PNA in recent years, specifically in the West Bank where only approximately 40% of privately-owned land is registered.

Moreover, in 2010, as part of the larger PNA initiative to develop nation-building plans and strategies, **the office of National Spatial Planning**, was created with the support of the UNDP and UN-Habitat. The office is managed by a complex set of committees made up of government ministries and a board of advisors.

At the local level, there are 430 entities, or 146 municipalities and 284 village councils, designated as **LGUs** that play a key role in policy planning and implementation at the local level. There are also

more than 93 JSCs, in which two or more local governmental units cooperate in exercising their council functions (e.g. planning and development) or in the provision of services (e.g. solid waste collection and water distribution).

The Local Authorities Law of 1997 specifies the functions of the local government units, including "*town and street planning, building and construction permits*, provision and management of water, power, wastewater treatment, solid waste disposal solutions, as well as *organizing and monitoring public markets, industrial zones, public facilities and public spaces, emergency preparedness and response plans, road and traffic management*, and the management of local public health, among others".

According to the World Bank's report titled "The Economic Effects to Restricted Access to Land in the West Bank" (2008), the regulatory framework for planning in the West Bank includes:

Table 3.4.8-3: The regulatory framework for planning in the West Bank

Legal and regulatory authorities		Palestinian Authority administered areas (areas A & B)	Area C – Palestinian localities	Area C – Israeli settlements
Planning Authorities	Regional Plans	• Higher Planning Committee • (PA Ministries and service authorities.) • District Planning Committees	• Supreme Planning Council – • General Sub-committee and Central Planning Department • Israeli Civil Administration	• Supreme Planning Council • Settlement Sub-committee
	Municipal/ Local Master Plans	• Higher Planning Committee • District Planning Committees • Municipalities and local planning committees (village councils) may prepare plans	• Supreme Planning Council – • General Sub-committee and Central Planning Department • Israeli Civil Administration	
	Detailed Area Plans	• Higher Planning Committee • District Planning Committees • Municipalities and local planning committees (village councils) may prepare plans	• Supreme Planning Council and • Central Planning Department • Israeli Civil Administration	
Building Permit Authorities	Within the municipal master plan	• Municipal authorities	• Not applicable (no municipalities exist in Area C, only village councils)	• Jewish municipal or regional councils designated as "special • Planning committees", otherwise • Supreme Planning Council and the Central Planning Department • Israeli Civil Administration
	Within village master plan	• District planning committee	• Supreme Planning Council and • Central Planning Department • Israeli Civil Administration	
	The outside master plan area	• District planning committee	• Supreme Planning Council and • Central Planning Department • Israeli Civil Administration	• Supreme Planning Council and • Central Planning Department • Israeli Civil Administration

Authorities and entities are involved in the **land acquisition process**, include (the list is not exhaustive, since others may participate, depending on the project, its location and its special characteristics):

- Palestinian Land Authority (PLA)
- Ministry of Local Governance (MoLG)
- Municipalities
- The Central Committee
- The Cabinet
- Ministry of Endowment (Awqaf Ministry)
- Project affected persons (PAP)
- Others (e.g PWA in case it is the owner of the project)

Transportation in Palestine is mainly regulated by the **Ministry of Transport**, responsible for:

- Preparing laws and regulations to modernize, develop and organize the transportation sector and monitoring implementation;
- Developing road networks, railways, ports and airports lines;
- Creating public safety systems and safe traffic environment;
- Conducting research on requirements and modes of passenger traffic and road transport;
- Working to attract investments in the field of transport;
- Concluding international and regional agreements;
- Granting the necessary permits to work in the field of transport;
- Cooperating with institutions to develop transport sector;
- Managing the information system for the transport sector.

The **Ministry of Public Works and Housing** is in charge of maintaining the road infrastructure.

Overall, **LGUs** have full authority over local roads and are responsible for the planning, development, and maintenance of the network, with the **Ministry of Public Works and Housing** responsible for regional roads outside the municipal masterplans.

3.4.8.4 Identification of sectoral Institutional gaps: Urban development

Mostly, institutional gaps relate to the issues developed in the sectoral legislation gaps chapter. However, some important gaps include:

- **Overlaps**, especially at the national level, between different ministries, such as the Ministries of Education, Health, Transport and Communication, Finance and Planning, Economy, Tourism and Antiquities, and the Environment Quality Authority in terms of spatial planning mandates, functions and responsibilities for Palestinian cities (MoLG, 2016).
- **Different institutional structures regulating urban planning in areas C and Israeli settlements**.
- For the case of community and green spaces, municipalities often do not have the financial resources to properly manage them. Therefore, **community engagement and active participation is needed in all levels of management**.
- **Limited land registration and unclear property rights are significant challenges for urban and business development**. Only 30% of lands in the West Bank are registered with a clear title [7]. Urban areas are sprawling, and land consumption rates are unsustainable; as a result, this prevents sustainable and mixed-use development (CAPSUS, 2019).

3.4.9 Social Policy

3.4.9.1 Sectoral legislation: Social policy

Under the framework of the **Declaration of Principles Agreement**[39], the establishment of the Palestinian National Authority with its three pillars – the legislative, executive and judicial branches led to the establishment of the Palestinian Legislative Council, and the adoption of the **Basic Law** (constitutional framework)[40]. The Basic Law was the first step on the way to determining the distinguishing characteristics of civil society, while at the same time, it is a basic foundation upon which to enact unifying legislation and law for the Palestinian national homeland. Article 9 of the Basic Law provides that Palestinians shall be equal before the law and the judiciary, without distinction based upon race, sex, color, religion, political views, or disability.

The main sectoral strategy is the Social Development Sector Strategy (2017-2022) which emphasizes the importance of social capital as the basic source and decisive factor for social development.

According to UNDAF (2017) the national normative framework, following the international, is also defined by the obligations of the Palestinian Government to its people emergent from the seven core human rights treaties it has acceded to, its national development plan as elaborated in the NPA, and its commitment to achieving the SDGs at a national and regional level as enunciated in the 2030 Agenda. With the support provided by UN agencies during the planning process in 2015-2016, the Palestinian government took active steps to mainstream the SDGs into the PA. The seven core human rights treaties are the following:

1. The International Covenant on Civil and Political Rights (ICCPR)
2. The International Covenant on Economic, Social and Cultural Rights (ICESCR)
3. The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)
4. The Convention on the Rights of Persons with Disabilities (CRPD)
5. The International Convention on the Elimination of All Forms of Racial Discrimination (CERD)
6. The Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (CAT)
7. The Convention on the Rights of the Child (CRC), and the Optional Protocol to the Convention on the Rights of the Child on the Involvement of Children in armed conflict (CRC-OPAC)

Important legislation that regulates key social issues, identified in the framework of the SESA includes:

- British Mandate Criminal Code of 1936 in the Gaza Strip
- British Law No. 2 of 1937 in the Gaza Strip
- Crime Prevention Law No. 7 of 1954 in the Gaza Strip
- Law of Family Rights of 1954 in the Gaza Strip
- Penal Code No.16 of 1960 in the West Bank
- Personal Status Law of 1976 in the West Bank
- Law No. 13 of 1995 Concerning Elections
- Civil Service Law No.4 of 1998 Labour
- Law number (4) of 1999 regarding the **rights of the disabled** and the decision of the Council of Minister's number (40) of 2004, with bylaw (4) of 1999 concerning the rights of the disabled.
- Law No. 7 of 2000 Penal Procedure

[39] https://mfa.gov.il/mfa/foreignpolicy/peace/guide/pages/declaration%20of%20principles.aspx
[40] https://www.palestinianbasiclaw.org/basic-law/2003-amended-basic-law

- Civil society organizations: **Law (1) of 2000 on charity societies and civil entities**. These organizations have volunteer membership and are run with elected boards and general assemblies.
- Law No. 3 of 2001 Palestinian Basic Law (amended 2003)
- Child Law No. 7 of 2004
- Presidential Decree No. 3 of 2004 Concerning the Formation of the Higher Council of Care of the Disabled
- Law of Service in the Palestinian Security Forces No. 8 of 2005
- Local Elections Law of 2005 Alimony Fund Law No. 6 of 2005
- In Palestine, the right of the public to complain in Palestine is ensured by the **grievance bylaw** was approved by the Ministerial Cabinet on 9/3/2005 and updated on 8/3/2009. Citizens and beneficiaries related to an action or a project can raise their complaints anytime during the implementation and operation of the project and that their complaints must be settled.
- Decision No. 50 of 2006 Concerning the Establishment of the Disabled Fund for Lending and Employment at the Ministry of Social Affairs
- Law by Decree No. 1 of 2007 on the representation of women in general elections
- Law of Education of 2013 in the Gaza Strip
- Law by Decree No. 1 of 2013 on Amendment of Law No 19 of 2004 on Prisoners and Released Prisoners
- Decree-Law No. 4 of 2016 on Juvenile Protection in the West Bank
- Law by Decree of 2016 establishing Palestinian High Constitutional Court
- Law by Decree No. 19 of 2016 on Social Security
- Law by Decree No. 17 of 2016 on Shari'a Execution
- Law by Decree No. 4 of 2016 on Juvenile Protection.
- Social security:
    - Laws passed during the Jordanian mandate of the West Bank do remain relevant: the Jordanian Ministry of Social Affairs Law No. 14 of 1956, the Orphans Law No. 69 of 1953, the Social Services Tax Law No. 89 of 1953, the Juvenile Rehabilitation Law No. 7 of 1959, and the Law of Retribution No.16 of 1960. Also, the Juvenile Delinquents Law No. 2 of 1937, the Retribution Law No. 74 of 1936, the Exemption from Tax Returns Law No. 18 of 1938, and the Monitoring of Offenders Law No. 42 of 1944 remain applicable in the Gaza Strip, which date back to the period before the establishment of the PNA.
    - The **Palestinian civil service law,** which relates to workers in the public sector and the government. It ensures the employee's pension allocations and health insurance, based on the shared participation of the beneficiary and the state for financing these mandatory systems. The services are provided to beneficiaries through governmental health institutions, according to the government health insurance system, and through the Palestinian Pension Agency (PPA). This law ensures allocations for the dependents of the employee but in nominal amounts. It also assures employed females' access to paid maternity leave for a specified period of time and an hour break during work for feeding in the first year of birth.
    - The **Palestinian labour law 2009**, related to workers in the private sector. This provides the foundation for the relationship among the three parties in the production process namely: workers, employers, and the government. It defines workers' rights and duties, as well as setting rules for public safety and for work in hazardous conditions. The law holds the government responsible for its implementation. However, the Ministry of Labour reports reveal weaknesses in this regard, especially in the area of labour inspection, due to the limitations in the human capacity and the necessary equipment.
    - The **public health and health insurance law**, which defines the health services provided to citizens. Health insurance remains optional for those not working in the

public sector. Moreover, the services provided are poor, due to high demand and low levels of funding, especially after the implementation of President Arafat's decree regarding the Intifada and workers' insurance. The overall insurance system is continually undergoing revision in attempts to develop it.

- The **law for the rights of the disabled** (also mentioned before). However, no commitment occurred to the rights stipulated by the law.
- Pension rights have been institutionalized in the **Public Pension Law No. 7 of 2005**, the Insurance and Stipend of Palestinian Security Forces No. 16 of 2004, the Civil Retirement Law No. 34 of 1959 in the West Bank, the Insurance and Stipend Law No. 8 of 1964 in the Gaza Strip, the Presidential Decree No. 5 of 2007 amending the Law No. 7 of 2005. The latter decree, managed by the PPA, canceled the social insurance law (authorized by the Palestinian Legislative Council (PLC)), and amended the public retirement law to include all workers in the public and private sectors.
- The **Retirement Law No. 7 of 2005** and the Presidential Decree No. 5 of 2007 which is amending the law provide the legal basis for old-age insurance. It covers all workers under the civil service law (the public sector) and the Palestinian labour law (including the private sector, NGOs, professional union members, and local government), but the appliance of the law remains exclusive to the public sector only

- **Consumer protection law 21/2005**: This law discusses intensely the consumer rights which might be trigged during the implementation of the project. Chapter two, Consumer rights Article (3) states that "The consumer has the following rights: Maintain his health and safety when using any type of good or service in terms of quality".

Culture:

The Antiquities Law of 1966: Since the establishment of the Palestinian Ministry of Tourism and Antiquities in 1994, the Ministry, in cooperation with governmental and non-governmental institutions, academics and intellectuals, has drafted its own version of a National Antiquities Law. However, this draft has never been enacted as law, and therefore the Jordanian Antiquities Law of 1966 is still applicable in the Palestinian Territories today.

There is no unified legal regime in the Palestinian Territories. In fact, different laws are applicable in these territories. This is because Palestine was subject to different rulers since the end of the nineteenth century. The British Mandate, Jordan, Egypt, and the Israeli Occupation issued large amounts of legislation, some of which is still applicable in the West Bank and the Gaza Strip. The existing legal regime concerning cultural and natural heritage in the Palestinian Territories are the British Mandate Law of Antiquities of 1929 (applicable in Gaza Strip only), the Jordanian Law of Antiquities of1966 (applicable in the West Bank) and the Israeli laws of 1978 in East Jerusalem. The Palestinian Basic Law of 2003 contained a paragraph of relevance to heritage protection. Under this paragraph, the President swears, "…*to be faithful to the homeland and holy places, to the people and its national heritage*…" This is currently the only reference to "heritage", and it is limited, in the draft constitution. Since there is not yet an approved Palestinian constitution, the protection of cultural and natural heritage remains, until today, without a solid constitutional basis. As it stands today the Constitution is in its fourth reading.

The major **Deficit-Gap** of the **1966 Law of antiquities** is the Definition, which reads: "*Antiquities are any movable or immovable remains or any part of it that was constructed, or formulated, or decorated, or inscribed or built in any form or any addition by a human being before 1700 AD. Antiquities also include human or animal remains before the year 600 AD. It also includes any structure built after 1700 AD, which is declared by the Director of the Department of Antiquities to be ancient antiquities*".

The definition clearly excludes any archaeological sites (including historic buildings) and artifacts (movable objects), which postdate 1700 AD. The definition also excludes religious buildings, as well as natural heritage sites. Neither architecture (groups of buildings, monuments) nor movable objects are defined or included as separate categories in these two laws.

In 2018 the MoTA with technical and financial support from the United Nations Educational, Scientific and Cultural Organization (UNESCO) and Swedish Government proposed a new version of the Decree **Law no. 11/2018 on Tangible Cultural Heritage in Palestine**. The Law entered into force, after it was signed by President Mahmoud Abbas and published on the official gazette in April 2018. It provides a comprehensive set of provisions on the protection, management, and promotion of Palestinian tangible cultural heritage. The main provisions of the Decree law on tangible cultural heritage include the principle of public ownership of cultural heritage, a ban on the sale or transfer of such properties, and a mechanism enabling the local authorities to reclaim cultural properties illegally removed from occupied territory.

Education

Article (24\1) of the Palestinian Amended Basic Law stipulates that "Every citizen shall have the right to education. It shall be compulsory until at least the end of the basic level. Education shall be free in public schools, institutes, and institutions". Higher education is regulated through **Law on higher Education No 11 of 1198**. Basic education covering ten years of schooling is compulsory and free, according to the **Child Law of 2005**.

Education Cluster Strategy - Palestine 2020-202[41] (UNICEF, 2020) focusing in the occupied territories aims to provide a relevant and holistic education response by promoting and integrating all fundamental cross-cutting issues and principles. This will help ensure all interventions planned by partners are protective, inclusive and taking into consideration gender equity.

Tourism

On a strategic level, the main strategy for the tourism sector is the "**National Export Strategy of the State of Palestine 2014-2018**" developed based on the process, methodology and technical assistance of the International Trade Centre[42] (ITC, 2014).

On the legislative level, the tourism sector is currently regulated through a **main Tourism Law** and five regulations (on travel agents, tourist guides, hotels and restaurants, tourist shops and parks). As tourism regulations are perceived as broadly outdated (dating back to Jordanian rule), a new draft law is being discussed with different stakeholders (private sector, government and neighboring countries experts).

3.4.9.2 Identification of sectoral legislation Gaps – Social policy

Social policy legislation is very broad and deals with many sectors of social life. As a result, social legislation needs to be closely monitored, reviewed and evaluated against widely accepted criteria and indicators. Moreover, issues such as gender policy, rights of the people with disabilities, culture

[41] https://www.un.org/unispal/wp-content/uploads/2020/06/EDUCCLUSTSTRAt_090420.pdf
[42] https://www.intracen.org/

issues, access to education and others need cross-sectoral legislation that integrates them in all legal agendas.

According to UNDP (2018), a patchwork of presidential decrees applies in the West Bank. More than 174 decree laws have been issued related to the establishment of the Social Security System and amendment of the Alimony Fund Law, Penal Code, Civil Service Law, and Elections Law. Furthermore, the political fragmentation into three areas, each with distinct governance and administration status, makes access to justice highly fraught. Area A falls under the administration of the Palestinian Authority, which manages most internal civilian affairs and internal security; Area B is jointly administered by the Palestinian Authority and Israel; and Area C, which contains the Israeli settlements, is under Israeli administrative and military control. In addition, Palestinians in East Jerusalem, the H2 Zone in Hebron, the Seam Zone, Bedouin communities, and refugee camps are challenged by a web of laws, military orders, and policies. Due to the occupation, the Palestinian Authority is unable to enforce its laws in Area C, which the Israeli military controls, or in East Jerusalem.

Gender:

Gender issues are cross-sectoral and as such, special regulations need to be developed horizontally in the legislative system. In addition, all discriminatory provisions in existing or drafted legislation need to be reviewed and reformed after discussion with stakeholders. For example, the exclusion of domestic workers and individuals who work for relatives – a large proportion of whom are women – from the protections of the Labour Law seriously undermines its ability to advance gender justice for women in the workplace. Moreover, the lack of a minimum wage for women as well as other issues related to the law, undermine its effectiveness.

Culture:

Regarding the **antiquities Law**, at the moment there is no unified legal regime in the Palestinian Territories. In fact, different laws are applicable in these territories. The existing legal regime concerning cultural and natural heritage in the Palestinian Territories are the British Mandate Law of Antiquities of 1929 (applicable in Gaza Strip only), the Jordanian Law of Antiquities of1966 (applicable in the West Bank) and the Israeli laws of 1978 in East Jerusalem. The Palestinian Basic Law of 2003 contained a paragraph of relevance to heritage protection. Under this paragraph, the President swears, "…*to be faithful to the homeland and holy places, to the people and its national heritage*…" This is currently the only reference to "heritage", and it is limited, in the draft constitution. Since there is not yet an approved Palestinian constitution, the protection of cultural and natural heritage remains, until today, without a solid constitutional basis. As it stands today the Constitution is in its fourth reading.

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Moreover, there is a need to develop and approve a package of laws that empower and stimulate cultural and intellectual creativity (Law on the Protection of Cultural Heritage, Law on Intellectual Property Rights, and Law on the Free Access to Information).

People with disabilities

The key piece of legislation **outlining the rights of people with disabilities** in Gaza is the 1999 No. 4 Law on the Rights of Persons with Disabilities, however this is outdated and Palestinian legal provisions are not all aligned on disability rights. There is a need for cross-sectoral legislation that enhances the rights of disabled people, as mentioned in the urban planning sector.

Tourism:

The 2013 Diagnostic Study (Barreto *et al*., 2013) suggests that there is a lack of a clear national tourism development strategy (notwithstanding the strategy commissioned by the Palestinian Economic Council for Development and Reconstruction) and urban planning (tourism-supportive zoning). Government support in this sector is limited and seems not to be considered a priority for economic development.

Revenues generated by tourism and managed by the Ministry of Finance) are not reinvested in sites. MoTA is currently underfinanced, as reflected in its inability to attend the 2012 World Tourism Fair in London, unlike in previous years.

3.4.9.3 Sectoral institutional framework: Social policy

The **Ministry of Social Development** is responsible for:

- Leading social policy and the 2014-16 Social Protection Sector Strategy which emphasizes social cohesion and solidarity and seeks to develop a social protection system;
- Developing the legislative and institutional environment to achieve social protection;
- Providing cash assistance for impoverished families,
- Leading the national program for social protection;
- Providing care and relief services to vulnerable and marginalized groups including people affected by war, survivors and prisoners held in Israeli prisons.

The majority of **civil society organizations** in Palestine provide social services. These are intermediate organizations filling the gaps between services provided at the national and at the local level. These civil society organizations are recognized and supported by the MoLG.

On a regional level **Governorates** coordinate services in the region.

On the local level, **local municipalities** are legally entrusted with responsibility for social assistance and services for the poor. They operate according to local resources and capabilities. Municipalities are responsible for:

- Public markets management;
- Licensing of trades and businesses;
- Initiating plans to create employment opportunities for their communities.

Although municipalities are legally responsible for employment issues, they do not have the fiscal and professional capacities to implement independent programmes. It is severely affected by restrictions imposed by the Israeli government and the accompanying economic and political crisis. Low levels of compliance with local tax laws shrink local authorities' budgets, making it harder for them to deliver services and to plan ahead. However, they do promote locally oriented preconceived plans. For this purpose, some municipalities work with foreign development funds that offer technical experience and funding. For example, Agence Francaise de Development worked with municipalities such as Nablus to improve local infrastructure. International donors such as the EU, the World Bank and the Deutsche Gesellschaft für international. Other responsible ministries/bodies include:

The **Ministry of Women's Affairs (MoWA)** was established in 2003. It aims at ensuring that the specific needs of women are reflected in national policy and monitors government action on the development and implementation of national policies affecting women. A Charter of Women's Rights was issued in 2008 by MoWA and a coalition of civil society organizations (CSOs). The National Committee to Combat Violence against Women (NCCVAW) is led by MoWA. Established in 2008 by the Council of Ministers, the NCCVAW is the official body responsible for monitoring the implementation of the National Strategy on Combating Violence against Women.5 Members of the Committee include governmental and non-governmental institutions represented by the Al Muntada Coalition – NGO Forum to Combat Violence against Women. Two specialized committees have been formed at the Ministry of Justice: the Legal Harmonization Committee and the Gender Legislative Committee, a branch of the National Committee on Combating Violence against Women. The committees shape policies, laws, and regulations concerning women and human rights in Palestine. Their legislative harmonization plan for 2018 includes reviewing and amending the Penal Procedures Law, Penal Code, Personal Status Law, and Elections Law to ensure their compatibility with international standards.

Other key public players are the **Ministry of Health, Ministry of Agriculture and the Ministry of Waqf and Religious Affairs.** The **Ministry of Labour** is responsible for:

- Ensuring adherence to labour law;
- Overseeing the Palestinian Fund for Employment and Social Protection;
- Managing the labour market information system;
- Establishing and funding local education and training (LET) councils
- Overseeing the employment offices providing services to jobseekers and employers.

The **Palestinian Fund for Employment and Social Protection** is responsible for:

- Assisting in job placements;
- Supporting self-employment and micro-enterprise creation;
- Implementing self-employment and cooperative projects targeting people with disabilities, ex-detainees, settlement workers and graduates through cooperation with the Palestine Credit and Development Body.

Employment Offices provide services to job seekers. Some offices offer a package of career guidance, vocational training-related services, job search and application support and work permits.

The **Local Employment and Training Councils** are responsible for: Running entrepreneurship training and business start-up programmes and maintaining links and communication between employment stakeholders.

The **UNRWA** runs some employment programmes in Palestinian refugee camps.

Education

Responsible ministries/bodies include:

- Ministry of Education, and Higher Education The Ministry of Education and Higher Education is responsible for:
  - Drafting plans and regulations;
  - Developing and leading the education development strategic plan;
  - Managing public schools;
  - Overseeing UNRWA and private schools;
  - Monitoring education;
  - Improving teaching and learning quality and diversity;
  - Collaborating with national and international partners;
  - Providing infrastructure;
  - Establishing research centres in Palestinian universities.
- Ministry of Labour
- Palestinian Fund for Employment and Social Protection
- Employment Offices
- Local Employment and Training Councils
- Palestine Credit and Development Body

The **Commission for the Development of the Teaching Profession** is responsible for developing a comprehensive system and standards for the teaching profession in educational institutions and granting licenses for practicing the teaching profession.

UNRWA provides education and health services in Palestinian refugee camps.

Culture

Main Government and semi-government bodies include:

Ministry of Culture is the primary government operator in the culture sector. It is responsible for:

- Developing plans, programmes and coordinating implementation;
- Proposing legislation and regulations;
- Establishing local cultural centers, cultural institutions and centers of Palestinian communities abroad;
- Supporting cultural industries and encourage investment;
- Preserving collecting and classifying cultural industries and traditional folk craft;
- Facilitating the Culture Support Fund to sponsors individual and collective cultural activities

Additionally, the **Ministry of Tourism and Antiquities** responsible for museums and the cultural heritage sector, the **Ministry of Education and Higher Education**, the **Ministry of Youth and Sports**, the **Ministry of Women's Affairs**, the **Ministry of Foreign Affairs and the President's Office** play significant and influential roles in the cultural field. They all implement cultural activities, offer scholarships, manage cultural properties, and make respective policies.

Semi-government agencies include the National Committee on Education, **Culture and Science and Higher Council of Education and Culture of the Palestine Liberation Organization** (PLO). In cooperation with MoC, the PLO Council organized symposiums and published the Palestinian

National Culture Plan as well as a volume on Palestinian literary figures. In collaboration with UNESCO, the Council also sponsored projects, including the Education Project on Palestinian refugee camps in Lebanon. In addition to attending seminars and conferences, the National Committee on Education, Culture and Science plays a coordinating role between the Government and Arab, regional and international organizations.

On a regional level**, Governorates** can initiate independent plans to encourage tourism and cultural activities, and may do so in cooperation with international programmes.

On a **local level,** Municipalities are responsible for certain cultural activities while, they can initiate independent plans to encourage tourism and cultural activities, and may do so in cooperation with international programmes. Policies that are intended for implementation on the local level are usually coordinated by the **MoLG**.

Foreign organizations and donors: The majority of foreign organizations comprise cultural centers that work towards promoting cultural exchange and dialogue and dialogue, particularly between Palestinian native speakers of foreign languages and foreigners residing in Palestine and abroad. Also supporting other cultural events of local institutions, these organizations play a donor role in many cases.

Official and semi-official organizations: UNESCO, Arab League Educational, Cultural and Educational Organization (ALECSO), and Islamic Educational, Scientific and Cultural Organization (ISESCO) play an important role in the Palestinian cultural scene. They support government bodies and NGOs as well as support cultural policy-making processes.

Universities: Palestinian universities' role in the cultural landscape includes organizing academic programmes, offering culture-related courses on arts, cinema and television, carrying out cultural activities, and establishing museums.

Local government units (LGUs): LGUs assume an important role in managing local affairs of citizens as well as meet domestic, including cultural, needs. Accordingly, LGUS organize cultural events, establish public libraries, and operate cultural centers. However, LGUs role is limited and dependent on available funds. As a few municipalities are culturally active, cultural events are concentrated in certain cities, such as Bethlehem and Ramallah. Other communities, particularly small ones, lack such activities.

Civil society organizations: Presently, a large number of civil society actors play a role in the culture sector. Over their contemporary and modern history, these organizations have played a considerable role in the national struggle, promotion of the Palestinian identity components, preservation of culture, enriching and developing of the cultural heritage in consistence with concurrent political and economic conditions.

The private sector: A few private companies exercise activities in the areas of creative industries, cinema production, and publication. The private, including corporations and banks, plays a major role in promoting cultural production by funding several festivals and cultural events. Still, the private sector's participation in cultural production is unfamiliar in the Palestinian arena.

<u>Tourism</u>

Responsible ministries and bodies include the **Ministry of Culture** and the **Ministry of Tourism and Antiquities** as well as the **Ministry of Education and Higher Education**, the **Ministry of Youth and Sports,** the **Ministry of Women's Affairs**, the **Ministry of Foreign Affairs** and the **President's Office**.

3.4.9.4 Identification of sectoral Institutional gaps: Social policy

The multitude of stakeholders involved in the expanded sector of social policy creates a mosaic of institutions with overlapping responsibilities in all sectors. Within this, the different social and development actors must adopt a policy and conceptual framework that achieves complementarity between the political, environmental, cultural, social and economic dimensions.

In this direction, close work with all stakeholders is needed that will assure that all voices are represented. In this direction, the Ministry of Social Development needs to be the leader and other stakeholders need to work closely to provide data and report to its special departments to be able to review and evaluate social policies. According to the social development sector strategy 2017-2022, at the moment "*no national follow up and evaluation system, for social protection, has been developed, nor a mechanism or follow up and evaluation tools prepared for the evaluation of the national policy for social protection*".

3.5 SESA compliance with Policy Framework

This SESA study has been conducted under the governance of the World Bank Environmental and Social Safeguard Policies. The study has also taken account of local laws and regulations set by the Palestinian Authority, as well as international guidelines as necessary and relevant to the proposed project activities. This ensures that environmental and social factors and values are integrated into the decision making process.

3.5.1 World Bank Safeguards Policies

The mechanism for addressing environmental and social issues in World Bank project design, implementation and operation, and the framework for consultation with communities and for public disclosure is provided by the '**Safeguard Policies'**.

In August 2016, the World Bank adopted a new set of environment and social policies called the Environmental and Social Framework (ESF). As of October 1, 2018, the ESF applies to all new World Bank investment project financing. With existing projects continuing to apply the Safeguard Policies, the two systems will run in parallel for an estimated seven years. The list of Safeguard Policies[43] is presented below:

1. **OP 4.00** - Piloting the Use of Borrower Systems to Address Environmental and Social Safeguard Issues in Bank-supported Projects
2. **OP 4.01** - Environmental Assessment
3. **OP 4.02** - Environmental Action Plans
4. **OP 4.03** - Performance Standards for Private Sector Activities
5. **OP 4.04** - Natural Habitats

[43] *https://projects.worldbank.org/en/projects-operations/environmental-and-social-policies#safeguards*

6. **OP 4.09** - Pest Management
7. **OP 4.10** - Indigenous Peoples
8. **OP 4.11** - Physical Cultural Resources
9. **OP 4.12** - Involuntary Resettlement
10. **OP 4.36** - Forests
11. **OP 4.37** - Safety of Dams
12. **OP 7.50** - Projects on International Waterways
13. **OP 7.60** - Projects in Disputed Areas

The initial screening of applicable World Bank social and environmental safeguards policies indicated that, among these policies, the OP 4.01 'Environmental Assessment', OP 4.11 'Physical Cultural Resources' and OP 4.36 'Forests' are triggered for the justifications provided, as depicted in the following table.

Table 3.5.1-1: Screening of World Bank Environmental and Social Safeguard Policies in relation to the SESA

OP/BP	Safeguard Policy	Objectives	Summary	Relevance
4.01	Environmental Assessment	Help ensure the environmental and social soundness and sustainability of investment projects. Support integration of environmental and social aspects of projects in the decision-making process	Environmental assessment (EA) is a requirement for projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making.	***The SESA triggers this policy*** Environmental and Social Assessment: The SESA will evaluate the potential environmental risks and impacts in the urban areas of influence. It will examine development priorities to address environmental and social issues emerging from development goals and baseline. **E&S Impact Assessment** of proposed alternatives to address E&S issues emerging from development goals and baseline will be conducted. Alternatives will be assessed against selected strategic E&S goals and opportunities & constraints to their implementation will be identified. The SESA takes into account the natural and socio-economic environment in its baseline assessment. The SESA will consider natural and social aspects in an integrated way. It will also take into account the variations between the Urban areas. **Community consultation**: A detailed Stakeholder Engagement and Consultation Plan (SECP) will be prepared and implemented. Given the extensive geographical scope of the five urban areas and the populations residing in these areas, the engagement and consultation programmer will target key decision-makers and strategic stakeholders, as well as groups or committees deemed representative of the broader communities. Throughout the assessment, process attention will be paid to ensuring that community stakeholders considered to be vulnerable or disadvantaged are appropriately represented, engaged and consulted. Finally, all Stakeholder consultations will be conducted according to the principles of the environmental legislation and in close cooperation with the EQA. **Screening of projects**: All projects/subprojects following the SESA and the Environmental and Social Management Plan prepared in this framework, is expected to undergo an environmental impact assessment from design through to implementation, monitoring and evaluation in accordance with the National and WB Safeguard Policies. **Review – Approval**: The SESA is conducted in close cooperation with the EQA and a formal "Environmental Approval Request" has been delivered.
4.04	Natural habitats	Promote environmentally sustainable development by supporting the protection,	This policy prohibits Bank support for projects that would lead to the significant loss or degradation of any Critical Natural Habitats, whose definition includes those natural habitats that are: • Legally protected;	***The SESA triggers this policy*** The SESA report employs an integrated, cross-sectoral approach. In this direction, the protection of natural habitats and their functions is very critical. According to the current review, integration of principles such as biodiversity conservation, protection of urban biodiversity and others needs to be integrated with all levels of environmental permitting and urban planning.

OP/BP	Safeguard Policy	Objectives	Summary	Relevance
		conservation, maintenance, and rehabilitation of natural habitats and their functions.	• Officially proposed for protection; or • Unprotected but of known high conservation value. The policy is "triggered" if a subproject could result in any one or more of the following four events: • A loss of natural habitats • Construction of "linear features" (e.g., roads, transmission lines, pipelines) that might cut through • natural habitats • An effect on the water supply to or drainage from natural habitats • A direct or indirect result in resettlement or migration of people in a way that would adversely affect natural habitats	Therefore, the SESA needs to secure that all supported initiatives, under its framework, will not lead to conversion and/or degradation of critical or non-critical natural habitats and conversion of the habitat of the endangered species. By safeguarding such initiatives, the SESA aims to bring crucial attention to ecosystem and biodiversity conservation. It is also crucial at the same time to integrate conservation in development projects in sectors such as infrastructure and rural development, which can have negative effects on biodiversity without adequate mitigating actions.
4.09	Pest management	The objective of this policy is to minimize and manage the environmental and health risks associated with pesticide use and promote and support safe, effective, and environmentally sound pest management.		***The SESA does not trigger this policy***
4.11	Physical Cultural Resources (OP/BP)	The objective of this policy is to avoid, or mitigate, adverse impacts on cultural resources from development projects that the World Bank finances. The assumption is that cultural resources are important as sources of valuable historical and scientific information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. The loss of such resources is irreversible, but fortunately, it is often avoidable.		***The SESA triggers this policy*** As this program deals with urban development and it might be expected to occasionally interfere with any known and recognized historical or cultural resources (sacred stones or trees, graves, etc.). Therefore, in order to ensure that all precautions are taken to protect any physical cultural resources and particularly forests that fall under this category in the event of these being found in the project area this SESA must include measures for addressing potential negative impacts on cultural heritage, such as "chance find" procedures and other when justified.
4.12	Involuntary Resettlement	Avoid or minimize involuntary resettlement and, where this is not feasible, assist displaced persons in improving or at least restoring their livelihoods and	This policy covers direct economic and social impacts that both results from Bank-assisted investment projects and are caused by: The involuntary taking of land resulting in: • Relocation or loss of shelter; • Loss of assets or access to assets; or • Loss of income sources or means of livelihood, • whether or not the affected persons must	***The SESA does not trigger this policy*** The SESA is not expected to cause: • Unintended impacts of tenure conflict resolution • Exacerbate and affect existing disputes over land rights • Any kind of displacement of local communities The SESA applies extensive community engagement and establish participatory approaches where all the above would be explained.

OP/BP	Safeguard Policy	Objectives	Summary	Relevance
		standards of living in real terms relative to pre displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.	move to another location; or The involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons.	
4.20	Indigenous people	The objective of this policy is to design and implement projects in a way that fosters full respect for indigenous peoples' dignity, human rights, and cultural uniqueness and so that they receive culturally compatible social and economic benefits, and (2) do not suffer adverse effects during the development process.		***The SESA does not trigger this policy***
4.36	Forests	The objective of this policy is to realize the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests.		***The SESA triggers this policy*** According to resent data (Chapter 4.3.2.2), the proportion of forest area in Palestine is considered low with 111km² (108km² in West Bank and 3km² in Gaza Strip) or 1.77% of total land area. However, between 1970 and 2020, Palestine lost two-thirds of its forest area. Therefore, protection of the remaining forest land must be ensured through Investment projects (sub-projects) that create positive impacts on protected areas, protection forests, and production forests, national biodiversity conservation areas of cultural heritage and historical preservation areas, and other prohibited areas.
4.37	Safety of Dams	The objective of this policy is to ensure quality and safety in the design and construction of new dams and the rehabilitation of existing dams, and in carrying out activities that may be affected by an existing dam.		***The SESA does not trigger this policy***
7.50	Projects on International Waterways	The objective of this policy is to ensure that the international aspects of a project on an international waterway are dealt with at the earliest possible opportunity and that riparian are notified of the proposed project and its details.		***The SESA does not trigger this policy***
7.60	Projects in Disputed Areas	The objective of this policy is to ensure that other claimants to the disputed area have no objection to the project, or that the special circumstances of the case warrant the Bank's support of the project notwithstanding any objection or lack of approval by the other claimants.		***The SESA does not trigger this policy***

Due to the SESA's focus on urban development, it is expected to trigger the following:

- Operational Policy 4.01 on "Environmental Assessment"
- Operational Policy 4.04 on "Natural Habitats"
- Operational Policy 4.11 on "Physical Cultural Resources"
- Operational Policy 4.36 on "Forests"

3.5.1.1 O.P. 4.01 Environmental Assessment (OP/BP 4.01)

The World Bank's environmental assessment operational policy requires that all proposed Bank-funded programs/projects, be screened for potential environmental and social impacts. The policy is triggered if a project is likely to have adverse environmental and social risks and impacts in its area of influence. Similarly, each proposed subproject activity is required to undergo the same social and environmental screening process to qualify for funding. This is done through the systematic use of the Environmental and Social Screening Form (ESSF).

This policy requires the Environmental Assessment of projects proposed for World Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making. The Environmental Assessment is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of future proposed investments. The Environmental Assessment process takes into account the natural environment (air, water, and land); human health and safety; social aspects and transboundary and global environmental aspects.

The current SESA is more relevant to Technical Assistance projects and therefore, there are no adverse environmental and social impacts associated with this strategy. Thus, safeguards instruments are adequate to support this strategy. The risk is possibly more closely associated with management (time schedule) and administrative, rather than with environmental and social aspects. The risk consists of:

- Potential delay in conducting the SESA due to administrative reasons including the approval process, which in turn translates into potential delays in designing relevant projects for the 5 urban areas and assessing them through the EIA process.
- This policy shall be applied throughout the process of the Strategic Environmental and Social Assessment document, which will be used as a guide and tool for the identification and mitigation of potential environmental, social impacts of future investments to assist participating urban areas to enhance their capacity to plan for sustainable urban growth and to inform future decision-making.

In compliance with OP 4.01 policy and the World Bank policy on access to information, it is also required that the SESA report must be disclosed as a separate and standalone document to ensure that the interested stakeholders and affected people can easily access to as well as on the website of World Bank.

3.5.1.2 O.P. 4.04 Natural Habitats (OP/BP 4.04)

This policy recognises that the conservation of natural habitats is essential for long-term sustainable development. Therefore, the protection, maintenance, and rehabilitation of natural habitats in

project financing and implementation is necessary. Project developers are expected to apply a precautionary approach to natural resource management, in order to ensure opportunities for environmentally sustainable development.

Therefore, this OP requires that any activities funded under the SESA framework that adversely affects ecosystems, will be successfully mitigated so that the balance of the ecosystems are enhanced or maintained. This would require project development to design appropriate conservation and mitigation measures to remove or reduce adverse impacts on these ecosystems or their functions, keeping such impacts within socially defined limits of acceptable change.

Specific measures may depend on the ecological characteristics of the affected ecosystem. Such measures must include provision for monitoring and evaluation to provide feedback on conservation outcomes and to provide guidance for developing or refining ppropriate corrective actions.

Therefore, projects related to the SESA and urban planning and/or development (indicatively, rural and intra-rural transportation, watershed management, urban forestry management, driniking water management, wastewater management, rural expansion and development and others) need to be properly assessed, in order to:

- Identify potential threats to species populations and their habitats in particular, as well as those of other protected species and natural habitats more generally. In this direction, guidelines in order to collect and use adequate baseline data on sensitive species and habitats need to be established.

- Identify potential direct, indirect, and cumulative impacts and risks to natural habitats and protected species.

- Assess the extent, to which they will incorporate mitigation measures to protect protected species and natural habitats into project preparation and implementation

- Asess the effectiveness of mitigation measures suggested to be employed during project life cycle (design, construction, operation, end-of-project).

3.5.1.3 O.P. 4.11 Physical Cultural Resources (OP/BP 4.11)

This policy applies to subprojects where important physical cultural resources (i.e. archeological sites, special architecture, important cemeteries, forests or where unique immaterial cultural resources) exist or are affected.

In case none of these physical cultural resources exists in a subproject area, the bidding documents and the future contractors or developers need to include a "Chance Find Procedure". This procedure is suggested to specify that in case that during construction/installation an important arte-fact is found, construction should be stopped and the responsible Palestinian authorities be warned and involved in an investigation of the site.

Construction/installation can only resume after the green light has been given by the responsible Palestinian authorities. The SESA must provide provisions to ensure that adequate measures are considered to minimize the negative impacts that may occur. All measures must be aligned with the National Legislation and International guidelines on the protection of cultural heritage.

3.5.1.4 O.P. 4.36 Forests (OP/BP 4.36)

This policy is aimed at reducing deforestation, enhancing the environmental contribution of forested areas, promote afforestation, reduce poverty, and encourage economic development. These are at the heart of the SESA project. Of particular interest for this project should be the fact that no activities should be financed related to conversion or degradation of critical natural habitats, especially involving forests.

Success in establishing sustainable forest conservation and management practices is something that can only be achieved by a combination of interventions involving all critical stakeholders who need to change their attitudes and behavior but also on a wide range of partnerships. The SESA's forest strategy must take into consideration three interdependent pillars, which will guide future projects that might affect forest land, namely: (i) harnessing the potential of forests to reduce poverty; (ii) integrating forests in sustainable economic development; and (iii) protecting vital local and global environmental services and forest values. This policy also goes hand in hand with that of Natural Habitats OP/BP 4.04 (see above).

Sustainable urban planning and development must include rigid polices to avoid forest areas degradation. This must be supported by a clear "go" and "no-go" areas. The "go" areas were identified using satellite images or GIS data and does not contain significant forest cover (other criteria are: accessibility, proximity to forest fragments, and precipitation). The "no-go" areas are protected areas, or areas with significant forest cover.

Taking these into consideration, the SESA as well as any future urban development likely to cause negative impact on forest areas needs to be avoided, taking into account the following:

- Do not finance projects that involve significant conversion or degradation of critical forest areas
- Consult local people, the private sector, and interest groups in forest area, before planning.
- Ensure that any sub-projects developed in the Urban Areas do have any potential impacts on health and quality of forests.
- Ensure that any sub-projects developed in the Urban Areas do have any potential impacts rights and welfare of people who depend on or interact with forests or reduce in any way their level of dependence upon or interaction with forests.
- Implement management schemes, protection policies whether forests publicly, privately, or communally owned are identified.
- Ensure forest biodiversity through the introduction of non-native forest species
- Put in place Effective Forest management planning, integrating sustainable management programs and plans of forests, landscapes and agricultural resources, needs to be in place before urban development projects take place.

3.5.2 ICUD's Environmental and Social Management Framework

According to ICUDs Environmental and Social Management Framework (ESMF)[44] (chapter 3 of the report), environmental and social screening of the SESA indicated the following:

Table 3.5.2-1: Screening of ICUDs Environmental and Social Management Framework in relation to the SESA

Screening Criteria	Summary	Relevance
3.3.1 Screening of Subproject Categories	The ICUD project mainly includes activities that have positive environmental and social impacts	***Relevant*** The SESA is not expected to trigger s safeguard policies such as WB OP 4.12 (Involuntary Resettlement) and OP 4.09 (Pest Management), as explained before. As stated before, the current SESA is more relevant to Technical Assistance projects and therefore, there are no adverse environmental and social impacts associated with this strategy. Thus, safeguards instruments are adequate to support this strategy. The risk is possibly more closely associated with management (time schedule) and administrative, rather than with environmental and social aspects.
3.3.2 Cultural Heritage and Physical Cultural Resources	The definition of physical cultural resources includes any movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, and may be above or below ground, or under water. Their cultural significance may be at the local, provincial or national level, or within the international community.	***Relevant*** According to chapter 4.4.5, cultural heritage loss is one of the main risks, occurring, among other reasons, by urban expansion. In the event of the accidental discovery of any antiquities or physical cultural resources that might occur during the implementation of the subprojects, all sub-projects much include "chance finds" procedures that fulfill the requirements of both World Bank OP/BP 4.11 as well as Tangible Cultural Heritage Law 2018, other relevant legislation and international guidelines on cultural heritage protection,
3.3.3 Pest Management	Any project that could triggers OP/BP 4.09 (Pest Management), which supports integrated pest management and safe use of agricultural pesticides, will not be part of the ICUD project activities. In Palestine, the use of pesticides is not controlled and the capacity to control and manage pesticides and pests needs significant enhancement.	***Not relevant***
3.3.4 Involuntary Resettlement	Any potential future investments that could trigger the OP/BP 4.12 would be excluded as part of the list of ineligible grants. In other words, this project will not recommend, endorse, or facilitate future pipeline investments that result in direct economic and social impacts through the: (1) involuntary taking of land resulting in relocation or loss of shelter, loss of assets or access to assets, or loss of income sources or means of livelihood, whether or not the affected persons must move to another location; or (2) involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons.	***Not relevant***
3.3.5 Voluntary Land Donation	In cases there is a voluntary land donation, defined as when people or communities agree to voluntarily provide land in exchange for benefits or services related to the	***Not relevant***

[44] http://www.molg.pna.ps/Environment_and_Social_Management_Framework.pdf

Screening Criteria	Summary	Relevance
	project, the World Bank requirements must be met: • The act of donation is undertaken without coercion, manipulation, or any form of pressure on the part of public or traditional authorities; • The potential donor is aware that refusal or to say no is an option without any consequences, and that right of refusal is specified in the donation document the donor will sign. • Land to be donated must be identified by the municipalities or Village councils LGUs in coordination with the community for the project that has been selected; the impacts of proposed activities on donated land must be fully explained to the donor; • he donor may negotiate compensation (in full or in part) or alternative forms of benefits as a condition for donation • Donation of land cannot occur if it requires any household relocation; • For community or collective land, donation can only occur with the consent of the individuals' owners of the land. • Verification must be obtained from each person donating land (either through proper documentation or through confirmation by at least two witnesses); • The implementing agency establishes that the land to be donated is free of encumbrances or encroachment and registers the donated land in an official land registry; • Voluntary land donation will not be permitted in cases of site-specific infrastructure as community pressure could be too onerous for a person to refuse, thus removing the power of choice. • In case that the donated land was not used for it is agreed on purpose then the LGUs needs to have a written agreement from the land donor that they agree to use the land for the new purpose, otherwise the LGUs will return the land to the owner. • There should be no coercion, manipulation or pressure from the community or public or traditional authorities for individuals to voluntarily donate land. • The proportion of land that may be donated cannot exceed the area required to maintain the donor's livelihood or that of his/her household. Documentation for Voluntary Land Donation provided below should be sufficient to verify this. • The infrastructure must not be site-specific	
Social and Cultural Resource Screening of Subprojects	Will the project reduce other people's access to their economic resources, such as land, pasture, water, public services or other resources that they depend on?	***Not relevant*** The SESA Study is not expected to contribute in a negative manner to this criterion. On the contrary, positive effects are expected from the implementation. The project has ensured dialogue with local people and groups and close cooperation with partners and authorities in order to ensure this.
	Will the project result in the resettlement of individuals or families or require the acquisition of land (public or private, temporarily or permanently) for its development?	***Not relevant*** The SESA Study is not expected to contribute in a negative manner to this criterion. The project does not predict any actions that could lead to resettlement of individuals or families or require the acquisition of land. However, if this is needed, a culturally-appropriate communication and redress

Screening Criteria	Summary	Relevance
		mechanism will need to be established.
	Will the project result in the temporary or permanent loss of crops, fruit trees, etc.?	***Not relevant*** The SESA Study is not expected to contribute in a negative manner to this criterion. The project does not design or develop actions located in farmland or other productive soil. However, if this is needed, a mitigation hierarchy (anticipate, avoid; minimize, compensate or offset) needs to be established.
	Will the project result in the temporary or permanent loss of household infrastructure (such as granaries, outside toilets and kitchens, etc.)?	***Not relevant*** The SESA Study is not expected to contribute in a negative manner to this criterion. The project does not design or develop actions that intend to lead in permanent loss of household infrastructure. However, if this is needed, the projects need to ensure that regular dialogues, consultations, and effective engagement of affected stakeholders at the local level takes place that records all these impacts and takes necessary mitigation measures.

3.5.3 Compliance with the PEAP and the PEL

The SESA study is conducted according to the "Palestinian Environmental Assessment Policy" (PEAP), which was approved by the Ministerial Council in resolution No: 27-23/4/2000 on April 23, 2000. The objective of the SESA is to support the Palestinian local government sector in an advanced and territorially integrated way that addresses the diverse needs of key local authorities. It also aims to strengthen the capacity of the five targeted urban areas (Nablus, Ramallah and Al-Bireh, Bethlehem, Hebron, and Gaza City) to plan for sustainable urban growth, hence enabling them to create regional socio-spatial economic growth frameworks under which metropolitan level investments can be substantiated and funded. The SESA also aims to strengthen the institutional and technical capacity of the participating urban areas to plan for sustainable urban growth The project is supporting the Local Government Units (LGUs) of the participating urban areas to establish and maintain active LGU coordination mechanisms, where they do not already exist, to collectively deliver results; in this context, the project intends to respond to the needs of a growing population and the private sector for more sustainably and efficiently planned urban spaces and infrastructure.

To this end, implementation of the SESA acts as a tool that will assist to identify and mitigate potential environmental and social impacts of future investments thus informing future decision-making.

Moreover, by dealing with plans and programs, the SESA is designed to address the cumulative and synergistic impacts of many projects in the same area.

As stated in Chapter 3.1.5.2, in ANNEX 4 of the PEAP, in the initial scoping of EA requirements for plans and programs it is stated that: IEE and EIA procedures and reports are designed to deal with individual projects. By dealing with plans and programs, the Strategic Environmental and Social Assessment (SESA) is designed to address the cumulative and synergistic impacts of many projects in the same area. These types of impacts may be unavoidable at the project stage and are more easily anticipated and avoided or mitigated at the preceding plan or program stage. SEA is most often

used to guide public-sector decision-makers in the development of government plans and programs. SEA may be used for plans and programs such as":

a) Power generation and supply
b) Solid waste management
c) Transportation infrastructure development
d) Tourism infrastructure development
e) Parks and natural reserves development and management
f) Development and management of industrial policy and estates
g) Master plans
h) Agricultural development programs.

Therefore, the SESA with the title "Strategic Environmental and Social Assessment (SESA) for five Targeted Urban Areas in the West Bank & Gaza" is expected to "*provide technical support to the municipalities of the West Bank and Gaza Strip to assess and evaluate the environmental and social aspects of their urban development plans, through the preparation of a Strategic Environmental & Social Assessment (SESA)*". Unlike a typical Environmental and Social Impact Assessment (ESIA) which is focused on a physical project within a clearly determined Area of Interest (AoI), the SESA is a strategic tool that will be primarily used to inform further project planning across multiple sectors and impacted communities.

Under the PEAP, the proponent (MDLF) is required to submit an **Application for Environmental Approval** that informs the EQA and relevant approving authorities of the intended project activities. Following the Palestinian Environmental Law and in close cooperation with the EQA the Environmental Approval Request was delivered for the SESA, following the guidelines of the EQA and aiming at:

- Assisting the Proponent (MDLF) in planning the project;
- Providing the EQA with information that it needs to consider granting Environmental Approval.

The **PEAP is broadly consistent with the WB's OP 4.01**. in this direction, requirements for environmental management plans (including mitigation measures), public participation and disclosure exist. Following this, the steps to conduct the SESA include:

Step 1: Baseline Assessment
Step 2: Policy, Legal and Institutional Framework Assessment
Step 3: Strategic Environmental and Social Impact Assessment
Step 4: Priority setting
Step 5: Management Plan - Recommendations

According to the "Environmental Law (No 7, 1999)", which was given effect at the end of 1999, the analysis of **the SESA covers the following sectors**:

DEVELOPMENT

- Agriculture
- Energy
- Housing
- Industry

- Tourism
- Transportation
- Urban and Strategic Planning

ENVIRONMENT

- Biodiversity
- Climate Change
- Soil-Desertification
- Water & Wastewater
- Air quality
- Natural hazards
- Solid Waste

SOCIAL

- Cultural Heritage
- Education
- Employment/Economic development
- Demographics
- Gender
- Health
- Social Welfare

In terms of **public participation**, a Stakeholder Engagement and Consultation Plan (SECP) has been prepared with the aim to define a programme of engagement and consultation to support delivery of the Strategic Environmental and Social Assessment (SESA) for five targeted urban areas in the West Bank and Gaza. The SECP ensures that key stakeholders are engaged and consulted during the SESA process.

Given the strategic nature of the study, stakeholder engagement and consultation activities focused on providing:

- Timely and meaningful information that is technically and culturally appropriate to key stakeholders; this included information pertaining to the SESA process, its objectives, as well as strategic environmental and social considerations of relevance to existing and future urban planning that may be integrated into Government policies, plans and programmes.
- Identification of the environmental and social goals, issues and priorities of stakeholders to ensure that these are accounted for in the final strategic assessment outcomes. Given COVID-19 constraints, all efforts were made to ensure that consultation was undertaken appropriately and efficiently, providing stakeholders sufficient opportunity to voice their opinions and concerns.

Given the extensive geographical scope of the five urban areas and the populations residing in these areas, the engagement and consultation program targeted key decision-makers and strategic stakeholders, those likely to be involved in a future implementation, as well as groups or committees deemed representative of potentially impacted communities. Particular attention has been paid to those stakeholder groups considered disadvantaged or vulnerable.

Finally, in terms of **disclosure**, the SESA followed all guidelines provided by the EQA and mandated in the relevant legislation.

CHAPTER 4 BASELINE ASSESSMENT

4.1 Introduction

4.1.1 Project area

The ICUD Project area consists of 5 Urban Areas, which comprise Local Government Units (LGUs) and Refugee Camps; these are presented in detail in Figure 4.1.1-1 below.

More specifically, the ICUD project area consists of:

- **Nablus Urban Area:** includes 14 LGUs (1 city, 13 villages) and 4 Refugee Camps;
- **Ramallah & Al Bireh Urban Area:** includes 4 LGUs (3 cities, 1 town) and 2 Refugee Camps;
- **Bethlehem Urban Area:** includes 6 LGUs (3 cities, 2 towns, 1 village) and 3 Refugee Camps;
- **Hebron Urban Area:** includes 5 LGUs (3 cities and 2 towns);
- **Gaza Urban Area:** includes 1 LGU (1 city) and 1 Refugee Camp.

These five participating urban areas have been selected because of their strategic importance in terms of population and future economic growth. These five densely populated urban areas are major drivers of Palestine's national economy, as they collectively represent over a fourth of national population and continue to grow. Their agglomerate nature also presents key opportunities for shared visions among LGUs to create holistic strategies, plans, and projects for their greater urban areas.

For the purposes of this report in the presentation of Urban Areas and (LGUs), a standardized format has been used in all figures whereby a consistent numbering has been used for all LGUs as follows:

Urban Area	LGUs		Urban Area	LGUs	
Nablus	1	Beit Iba	Ramallah and Al Bireh	1	Surda Abu Qash
	2	Deir Sharaf		2	Beituniya
	3	Zawata		3	Ramallah
	4	Beit Wazan		4	Al Bireh
	5	Kafr Qallil	Bethlehem	1	Al Khader
	6	Qusin		2	Beit Sahur
	7	Rujeib		3	Artas
	8	Nablus		4	Ad Doha
	9	Salim		5	Beit Jala
	10	Deir al Hatab		6	Bethlehem
	11	Azmut	Hebron	1	Beit Kahil
	12	Tell		2	Halhul
	13	Sarra		3	Hebron
	14	Iraq Burin		4	Dura
Gaza	1	Gaza City		5	Taffuh

For reasons of map clarity, only the numbering of LGUs will be presented in this report's figures.

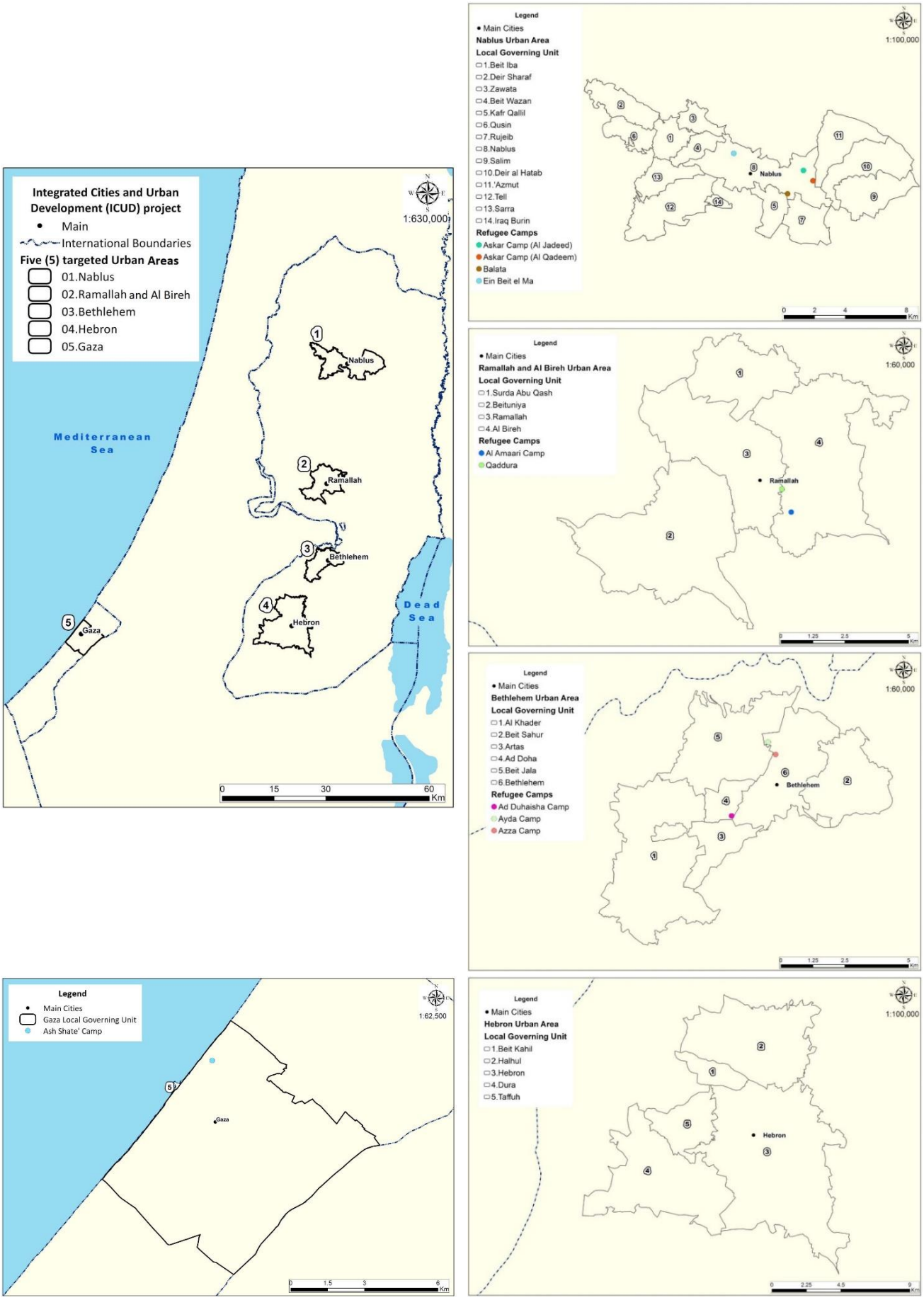


Figure 4.1.1-1: Five (5) targeted urban areas, LGUs and Refugee Camps

4.1.2 Geopolitical situation

4.1.2.1 West Bank

The 1995 Oslo II Accord partitioned the West Bank into three administrative divisions (Areas A, B and C). In Area A (18% of the West Bank), which included the major Palestinian cities (with the exception of part of Hebron city named H2, which is excluded from Area A), Palestinians have full civil and security control. In Area B (22% of the West Bank), which includes Palestinian rural settlements, Palestinians have civil and security responsibilities, with Israel retaining an "overriding responsibility" for the security of Israelis and counter-terrorism efforts. Area C (60% of the West Bank), which includes Israeli settlements and most vacant territory, remains under full Israeli control. [45]

Many are in the opinion that Israeli policies prevent **Area C communities** from exercising their rights to movement, adequate housing, health, education, employment, an adequate standard of living and access to justice[46].

Unrecognised land rights, lack of approved plans and an enforcement regime for development outside approved plans, provide a pretext for demolitions and displacement of residences within area C. There are 20 residential areas within Area C in the four (4) targeted urban areas in West Bank, most of which (16) are located in Hebron Urban Area.

Restricted access to water and electricity affects the livelihoods of those communities in Area C that are dependent on agriculture and herding. Merely on account of their location, residents of Area C are more vulnerable than many others. **Bedouin and herder communities** are among the most vulnerable communities in Area C. [47] There are 2 Bedouin and Herder communities within the 4 targeted urban areas in West Bank, one in Ramallah and Al Bireh Urban Area and one in Hebron Urban Area.

A protocol to the 1995 Israeli-Palestinian Interim Agreement, concluded between Israel and the PLO on 17 January 1997, concerned the redeployment of Israeli forces in Hebron, the only major West Bank city not to have been previously transferred to full Palestinian control. Hebron was divided into Area H1 (about 80 % of the city), to be transferred to Palestinian control, and Area H2, to remain under Israeli control.[48] As mentioned above, Hebron Area H2 is excluded from Area A.

Residents in Hebron H2 area have impaired access to education, health, cultural heritage and economic activity on account of settlement and related military activity in and around the Old City of Hebron[49]. In absence of formal governmental authority to safeguard their rights, women and men facing settler attacks have very little possibility for legal redress. There are over 120 physical obstacles, including 18 permanently staffed checkpoints deployed by the Israeli military, separating the restricted areas from the rest of the city. As a consequence, in the Old City and areas near

[45] *http://ecf.org.il/issues/issue/818*
[46] *United Nations Country Team Occupied Palestinian Territory, 2016, Common Country Analysis 2016, Leave No One Behind A Perspective on Vulnerability and Structural Disadvantage in Palestine*
[47] *ibid.*
[48] *http://ecf.org.il/issues/issue/220*
[49] *United Nations Country Team Occupied Palestinian Territory, 2016, Common Country Analysis 2016, Leave No One Behind A Perspective on Vulnerability and Structural Disadvantage in Palestine*

settlements, the majority of commercial activity has ceased and thousands of Palestinians have been displaced.[50]

Annexation of East Jerusalem[51]

Following the occupation of the West Bank in 1967, Israel unilaterally annexed East Jerusalem to its territory, in contravention of international law. Palestinians living in Jerusalem were given the status of 'permanent residents' of Israel, which typically provides them with greater freedom of movement than Palestinians from other parts of Palestine and allows them to pay into the social services system, to receive health and social security coverage. Other Israeli policies have negatively affected Palestinians' ability to plan and develop their communities and enjoy the services they are entitled to, further undermining their presence in the city. In addition, Israeli measures have increasingly cut off East Jerusalem, once the focus of political, commercial, religious and cultural life for the entire Palestinian population, from the rest of the West Bank and from the Gaza Strip.

4.1.2.2 Gaza Strip[52]

In the Six-Day War of June 1967, the **Gaza Strip** was occupied by Israel. In 1994 Israel began a phased transfer of governmental authority in the Gaza Strip to the Palestinian Authority (PA) under the terms of the Oslo Accords that were signed by Israel and the Palestine Liberation Organization (PLO).

The economic impact of the second intifadah, which started in late 2000, worsened after the creation of a 'buffer zone' in September 2001, that sealed the entry and exit points in Gaza Strip. Residents of Gaza Strip are prohibited from approaching this area, where much of Gaza's farmland is located. In addition to the loss of life, routine shootings in the "no-go zone" also impact Gaza's agriculture sector and limit economic development in the Strip.[53]

According to recent OCHA data[54], access restricted areas, on the landward side, comprised three zones:

- 'No-go zone', 100 m wide, which is cleared of all vegetation and all built structures;
- 'Restricted zone', 100-300 m wide, where access is permitted on foot and for farmers only;
- 'Risk zone', 300-1,000 m wide; restricted land use and an area of heightened security

In autumn 2007 Israel declared the Gaza Strip under Hamas a hostile entity and approved a series of sanctions that included power cuts, heavily restricted imports, and border closures.

After months of violence between Israel and Hamas in mid-2018, Israel began to ease restrictions on its blockade as a part of an effort to incentivize a more long-term cease-fire agreement between the two. In 2019 Israel allowed the flow of additional goods into and out of the territory, expanded the permitted fishing zone for Gazans to its largest extent in more than a decade, and began allowing thousands of Gazans to cross the border to work in Israel.

The two sides throughout 2019 and into 2020 continued to negotiate a long-term 'understanding' for the maintenance of peace and easing of the blockade. The discussions, though occasionally

[50] *United Nations Country Team Occupied Palestinian Territory, 2016, Common Country Analysis 2016, Leave No One Behind A Perspective on Vulnerability and Structural Disadvantage in Palestine*
[51] *https://www.ochaopt.org/location/east-jerusalem*
[52] *https://www.britannica.com/place/Gaza-Strip/Blockade*
[53] *https://gisha.org/updates/9115*
[54] *https://www.ochaopt.org/sites/default/files/gaza_access_and_movement_october_2020.pdf*

interrupted by brief outbreaks of tit-for-tat violence, were reinforced by halted border protests and a loosening of the restrictions on trade and travel through the Gaza border.

Table 4.1.2-1 below presents the percentages of West Bank project Urban Areas under areas A, B, C and Hebron H1, H2 as well as the percentage of Gaza Urban area under restriction.

Table 4.1.2-1: Areas within Area A, B, C, Hebron H1, H2 in four (4) targeted urban areas West Bank and Closed and restricted area in Gaza Urban Area

Urban Area		Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza
Total Area	**(km²)**	108.19	72.04	55.07	162.78	55.59
Area A	**(km²)**	33.85	23.18	18.37	45.01	-
	%	31.3%	32.2%	33.4%	27.6%	-
Area B	**(km²)**	28.59	14.00	1.48	42.65	-
	%	26.4%	19.4%	2.7%	26.2%	-
Area C	**(km²)**	45.75	34.86	35.21	52.70	-
	%	42.3%	48.4%	63.9%	32.4%	-
Hebron H1	**(km²)**	-	-	-	17.94	-
	%	-	-	-	11.0%	-
Hebron H2	**(km²)**	-	-	-	4.5	-
	%	-	-	-	2.8%	-
Unilaterally annexed areas (East Jerusalem)	**(km²)**	-	0.73	7.24	-	-
	%	-	1.0%	14.5%	-	-
Restricted area Gaza (300m)	**(km²)**	-	-	-	-	2.44
	%	-	-	-	-	4.4%

Source:
MoLG - ICUD GIS database, https://geomolg.ps/

The geopolitical situation of the five targeted urban areas is presented in Figure 4.1.2-1 below.

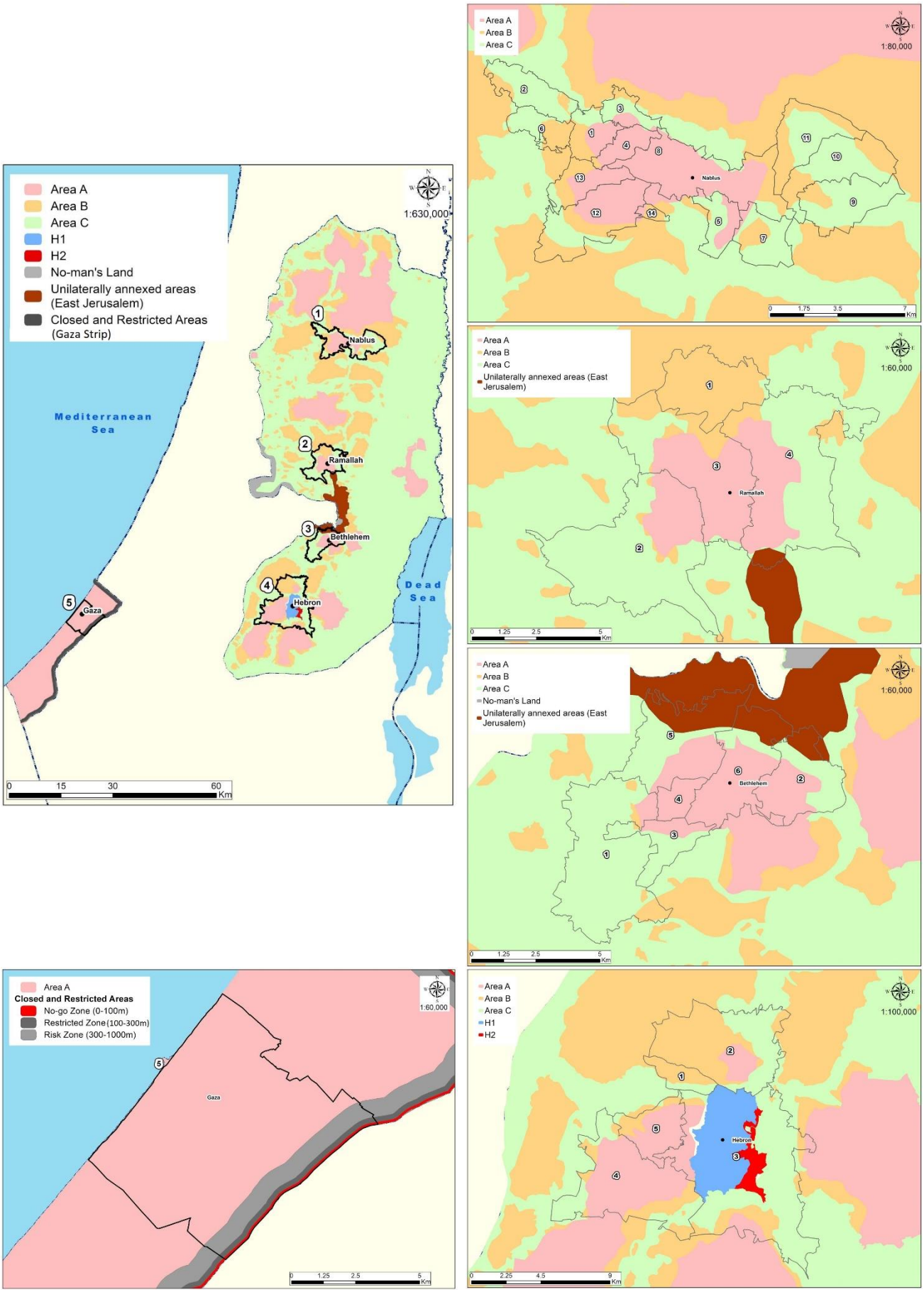


Figure 4.1.2-1: Areas A, B, C, Hebron H1, H2 in West Bank and Restricted zone in Gaza

Sources:
MoLG - ICUD GIS database, https://geomolg.ps/
Source: OCHA, 2020, https://www.ochaopt.org/sites/default/files/gaza_access_and_movement_october_2020.pdf

4.1.3 Data gaps

Information on fauna and soil **biodiversity** within the five targeted Urban Areas is limited.

There is no systematic recording of soil fertility parameters and accurate assessment of **land use** trends is also lacking.

Official data on transboundary **waste** movements of all types, including hazardous, solid waste and e-waste are not available.

There are also significant data gaps relating to **water**. Given the critical importance of the Mountain Aquifer, reliable data on withdrawal from all groundwater sources in the West Bank, along with water quality data (other than a limited number of wells), needs to be collected on a regular basis. Further scientific assessment would help to quantify the damage caused by over-abstraction and pollution in the Mountain Aquifer in the West Bank, and Coastal Aquifer in the Gaza Strip. Water losses in delivery systems, and locations of such losses, should be quantified accurately in order to minimize loss. An analysis of the impact of contamination from Wadi Gaza on groundwater pollution levels and marine organisms is not available. More precise estimates of the reduction in water availability due to the impact of climate change also need to be calculated.

The lack of legal obligations for **environmental information** and reporting means that data collection, and thus an understanding of the problems, remains weak. The lack of a national database of polluters and pollutants means that pollution risks remain unknown.

4.2 Environment

4.2.1 Climate

4.2.1.1 Climatic conditions

Palestine lies within the Mediterranean climatic zone. Gaza Strip, in particular, is part of the Mediterranean coast. The climate of Palestine is characterized by long, hot, dry summers and short, cool, wet winters. Only the southern part of the Jordan Valley has a different transitional climate between dry steppe and the extreme desert conditions of the Dead Sea region.[55]

The climatic conditions (rainfall, temperature) in Palestine vary per location, per season and with altitude. Especially the West Bank is, despite its relatively small size, very climate diverse. According to Figure 4.2.1-1, the four (4) targeted urban areas in West Bank are classified in the following climate categories.

- Nablus Urban area: Subhumid & Semi-arid
- Ramallah and Al Bireh urban area: Subhumid & Semi-arid
- Bethlehem urban area: Subhumid, Humid & Semi-arid
- Hebron urban area: Semi-arid, Subhumid & Arid

[55] *ARIJ, 2015, Status of the Environment in the State of Palestine – 2015, https://www.arij.org/files/arijadmin/2016/SOER_2015_final.pdf*

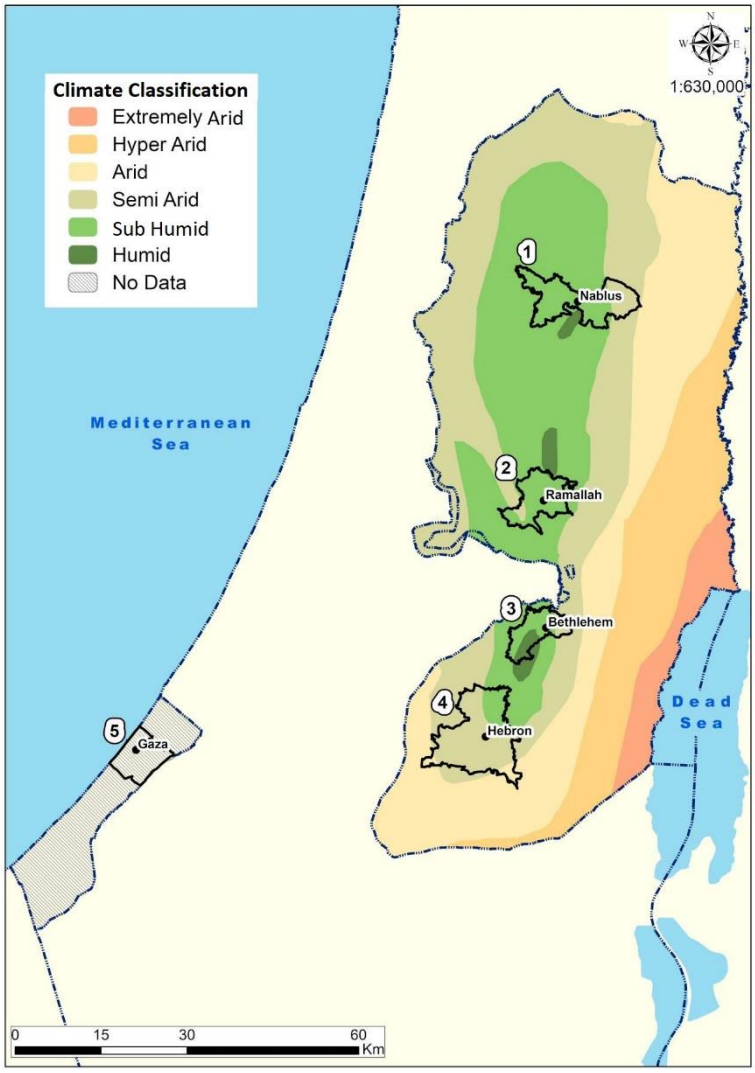


Figure 4.2.1-1: Climate classification

Source: State of Environment and Outlook Report for the occupied Palestinian territory 2020, UNEP 2020, https://reliefweb.int/sites/reliefweb.int/files/resources/SEORP.pdf

In the **West Bank**, 50% of the land has rainfall less than 500 mm/year, including a hyperarid area with rainfall less than 100 mm/year. The remaining land has conditions with rainfall ranging between 500-800 mm/year. From the north to the south (of the West Bank), the annual amount of rainfall decreases (from 700 mm around Jenin to 80-100 mm in the south), while the annual temperature increases. The area that suffers from greatest aridity is located at the south-eastern side of the West Bank. **Gaza strip**, a largely flat terrain, is characterized by a coastal climate and receives around 200 to 400 mm/year rainfall. In the north, the average seasonal rainfall is 522 mm (Beit Lahiya governorate) and in the south, 225 mm (Rafah governorate) (Figure 4.2.1-3).

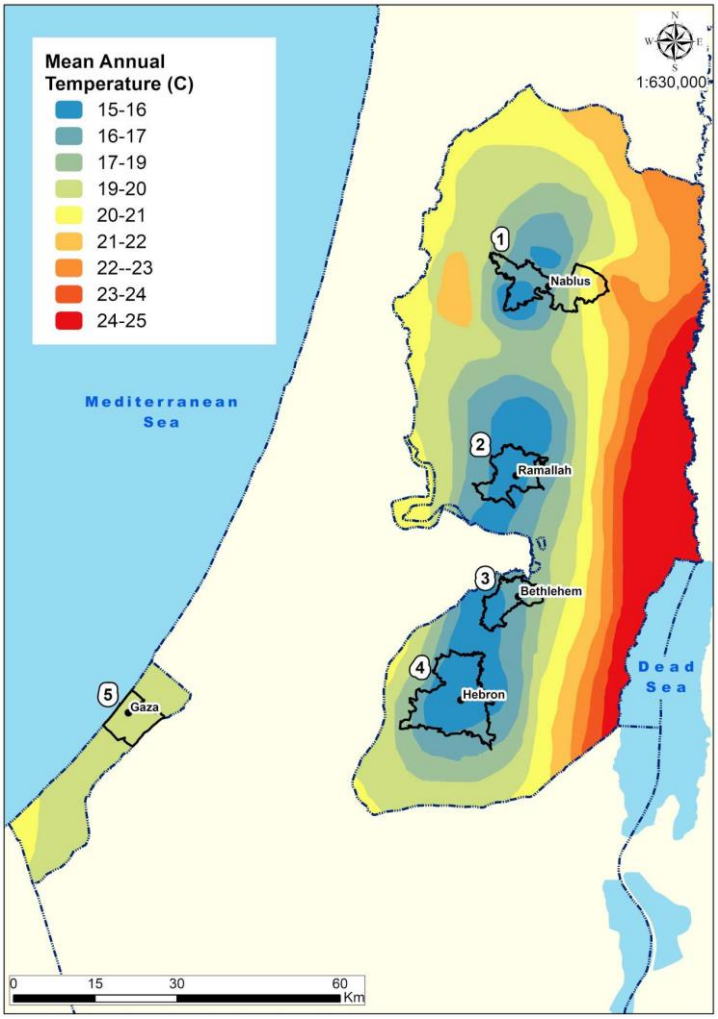


Figure 4.2.1-2: Mean annual temperature

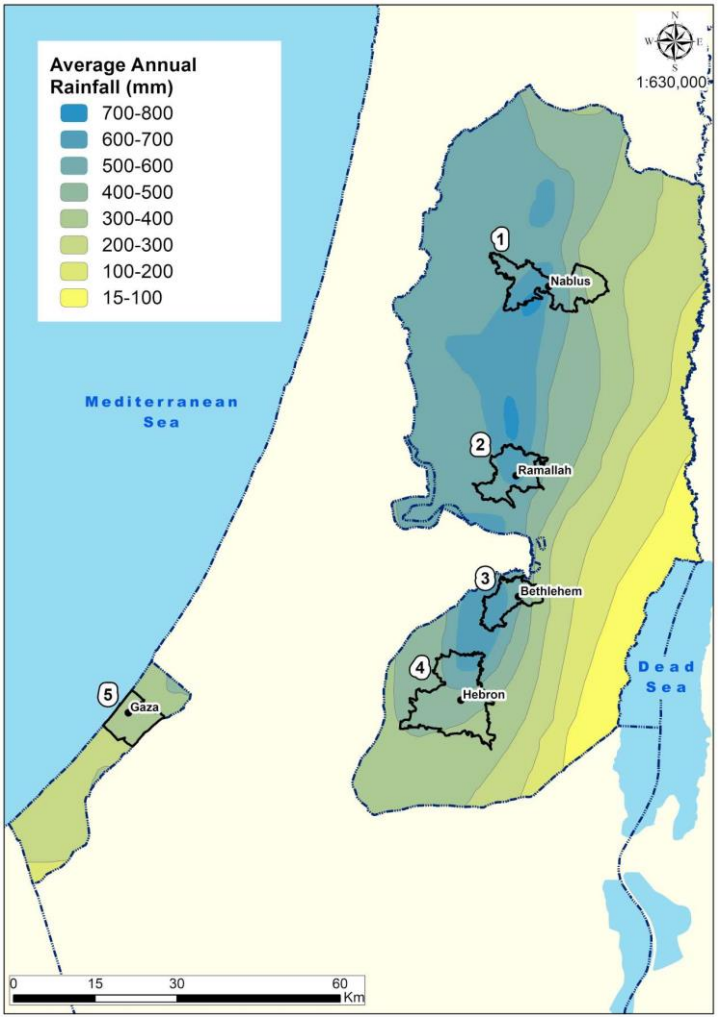


Figure 4.2.1-3: Average annual rainfall

Source: State of Environment and Outlook Report for the occupied Palestinian territory 2020, UNEP 2020, https://reliefweb.int/sites/reliefweb.int/files/resources/SEORP.pdf

Temperature: The average temperatures range between 25°C in summer to 13°C in winter. The highest temperatures are found in Jericho and the Jordan Valley, increasing from north to south and are inversely related to altitude, with the highest temperatures being found in the area of the Dead Sea (see Figure 4.2.1-2 above). The Gaza Strip is located in a transitional zone between the arid desert climate of the Sinai Peninsula and the temperate and semi-humid Mediterranean climate along the coast.

Precipitation: The rainy season occurs during the winter starting mid-October until May. Snow and hail have been known to occur in highland areas of the West Bank. Average annual rainfall in the West Bank and the Gaza Strip is recorded at 535 mm and 359 mm respectively.

Wind speed: The highest wind speeds are observed during the winter period and the prevailing wind direction is westerly for both Gaza and West Bank. In general, the wind speeds for Gaza are the highest closest to the sea, while more inland lower wind speeds are found. Over the elevated terrain of the central part of West Bank the highest wind speeds are recorded. [56]

[56] *https://www.sciencedirect.com/science/article/abs/pii/S1364032115013577X*

Sunshine duration: Solar radiation is highest in the summer months of June and July and shortest during the winter months of December to February. Cloud cover during the winter months results in a reduction in radiation.

Relative humidity: Humidity varies from 50 to 70%. The Gaza Strip has the highest annual mean relative humidity at 69 % and Jericho (Jordan Valley) has the lowest at 52 %, decreasing from winter to summer.

Evaporation: Evaporation is particularly high in the summer due to the rise in temperature, high incident solar radiation, and low humidity. Evaporation rates are highest in the Jordan Valley in the summer months with total annual evaporation reaching about 2,100 mm. Evaporation from the Dead Sea is particularly high due to intense solar radiation and low relative humidity. Towards the coastal plain, the rate of evaporation decreases due to continual exposure to the humid sea breeze. Evaporation rates are relatively low during the winter months when the solar radiation is lowest, with the lowest evaporation rates occurring in December. Evaporation in the Gaza Strip is the lowest anywhere in Palestine (1,580 mm per year), due to high relative humidity, lack of surface water, less intense solar radiation and fewer hours of sunlight.

According to National Adaptation Plan to Climate Change (2016), the historic climate trends are presented below.

Table 4.2.1-1: Historic trends in climate

Parameters	From the perspective of change
Average temperatures	Very high confidence that temperatures have risen over the past 100 years but less confidence in quantitative rates of change, due to spatial and temporal dependencies and data quality.
Temperature extremes	High confidence that warm days/nights and cold days/nights have increased/decreased respectively in frequency.
Rainfall totals	Very low confidence that annual and seasonal rainfall totals have changed in either direction over the past 50 years or so, but also very low confidence that there has been no change in annual and seasonal rainfall totals.
Rainfall extremes	Only very low confidence can be ascribed to changes in rainfall because of the limited evidence combined with the relative rarity of such events.
Oceanic parameters	There is high confidence that sea level has increased in general over recent decades, but low confidence in the magnitude of that increase or in the variability of that increase over time.

Source: Nationally Determined Contribution (NDC),United Nations Framework Convention on Climate Change (UNFCCC) 2016

4.2.1.2 Climate Change

Even though climate change is not the most pressing issue for the people in Palestine, the climate risks are significant and will compound current and future development challenges. Palestine is characterized by both a high biophysical and socioeconomic vulnerability to climate change, combined with limited capacity to respond to projected and current effects of climate change; climate change is one of a number of variables that are considered to contribute towards desertification.

Inhabitants of the West Bank and Gaza are living in areas facing serious challenges in water availability. Recent and projected climate trends indicate that temperatures in the area will rise, precipitation will decrease, and high precipitation events (HPE) will occur. This will result in increased water shortages, flooding and subsequent challenges in food security. The capacity of the

Palestinians to cope with and adapt to these challenges, is constrained due to limited control over and access to their natural resources, especially land and water, as a result of the restrictions imposed by Israel.[57]

Biophysical vulnerability [58]

Over the last 30 years, the mean temperature in Palestine significantly increased at a rate of 0.4 °C per decade; At the same time rainfall has decreased.

The main problem related to the current climate trend of rising temperatures and declining precipitation, is the availability of water. In the last 15 years, the region has seen reductions in the amount of rainfall. The Palestinian government reported negative impacts of rainfall reductions on agricultural production in the West Bank and problems of winter crops due to delayed rains in the Gaza strip. Besides experiencing region-wide reduced precipitation, access to water for the inhabitants of Palestine is also impacted by security and military activities of Israel.

Climate change projection models for the region indicate a strong increase in temperature and a decrease in total annual precipitation. For the end of this century, a warming ranging from 1.8 to 5.1°C is likely. Annual precipitation rates (average annual rainfall: 535 mm in West Bank and 359 mm Gaza Strip) are likely to decrease by 10% in 2020, by 20% by 2050, and may reach a decrease of 35% by 2100 with an increased risk of summer droughts. Further, a strong increase in the duration of heat waves, as well as a strong reduction of cold spells length is projected. Also, the number of yearly days of high temperatures (daily maximum temperatures above 30°C) is expected to rise. High Precipitation Events (HPEs) are likely to lead to flash floods. Sea level in the eastern Mediterranean region is expected to rise by 10 cm every decade, which is consistent with global estimates of a 0.6-1.6 m increase by the end of this century.

Socio-economic vulnerability [59]

Palestine is highly vulnerable and seriously affected by water scarcity and climate change. The socioeconomic and political conditions deeply affect how the Palestinian population can cope with climate impacts. Climate change further intensifies the existing food security and water-related problems.

Water scarcity and water quality are key environmental and economic challenges. The annual water share of Palestinians is less than 200 m³ per capita which is significantly below the water scarcity limit of 500 m³ set by the World Health Organization. The water situation is particularly acute in Gaza, where is it estimated that 26% of all diseases observed in the area are water-related. Constrained access to water for agriculture reduces yields and prospects for agricultural growth further. Looking to the future, projections suggest that Palestine (as well as neighboring countries) will face significant reductions in water availability because of climate change.

Climate change effects are already being noticed. Reflecting their recognition of the increased likelihood of drought and HPEs, IUCN reported that residents of the West Bank consider floods and

[57] *Ministry of Foreign Affairs of the Netherlands, 2018, Climate Change Profile: Palestinian Territories, https://reliefweb.int/report/occupied-palestinian-territory/climate-change-profile-palestinian-territories*
[58] *Ministry of Foreign Affairs of the Netherlands, 2018, Climate Change Profile: Palestinian Territories, https://reliefweb.int/report/occupied-palestinian-territory/climate-change-profile-palestinian-territories*
[59] *Ministry of Foreign Affairs of the Netherlands, 2018, Climate Change Profile: Palestinian Territories, https://reliefweb.int/report/occupied-palestinian-territory/climate-change-profile-palestinian-territories*

droughts as the main climate – related risks affecting their region. Continuing population growth and projections of regional climate change will intensify water stress for Palestinians. The challenge will be to increase food security (by domestic production and/or imports) in a context of increased water stress and with water allocation patterns determined by Israel.

Agricultural production in Palestine has already been affected by recent droughts which are projected to become more pronounced over time. The National Adaptation Plan to Climate Change (2016) (NAP) includes a vulnerability analysis from which agriculture, food and water are identified as the most vulnerable sectors (see Table 4.2.1-2 below).

Socio-economic vulnerability to climate change in the Palestine must be seen in the political and economic context. Studies suggest that restrictions and limitations that inhabitants of Palestine face (e.g. restrictions in importing goods, limitation to obtain work permits, limitations to mobility), impairs their capability to take appropriate mitigation and adaptation measures. Water resources are almost under complete control by Israel. The adaptation actions in the NAP comprise management and operational strategies, infrastructural changes, policy adjustments or capacity-building. Some actions involve adjusting (climate-proofing) current activities, while others are new, or require major transformations in operations. Some are ecosystem-based, i.e. helping people adapt to the impacts of climate change through the conservation, sustainable management, and restoration of ecosystems. The NAP also provides a multi-criteria analysis and ranking of the various adaptation options. [60]

Table 4.2.1-2 presents the highest-ranking adaptation actions for the highest vulnerable sectors. A full list of adaption actions for each sector, according to National Adaptation Plan (2016), is presented in Annex I "Climate Change".

Table 4.2.1-2: Highest ranking adaptation actions for the highest vulnerable sectors

Sector	Region	Highest-ranking adaptation actions
Agriculture	West Bank	Enhance sustainable community-level irrigation schemes and infrastructure
		Climate-smart agriculture
		Improve water-use efficiency and using alternatives water resources
		Land-use planning and management - greening, afforestation, and rangeland development
	Gaza Strip	Climate-smart agriculture: Management of crop production systems including soil and water resources for better environmental sustainability along with improved economic profitability for farmers
		Improve water-use efficiency and using alternatives water resources
		Establishment of farmers' support (subsidies, awareness training programs)
Food	West Bank and Gaza Strip	Enhancing agricultural value chain and improving infrastructure for livestock-production
		Greenhouse management
		Construction of large-scale cold storage
Water	West Bank	Rehabilitate water sources: wells, canals and springs
		Control of leakage from distribution systems
		Allocate transboundary water resources equitably and reasonably between Israel and the Palestine

[60] *ClimaSouth Technical Paper N.2 (2016). The Economics of Climate Change in the Palestine. February 2017. Prepared by: Tippmann, R. and Baroni, L., https://www.climamed.eu/wp-content/uploads/files/The-Economics-of-Climate-Change-in-Palestine.pdf*

Sector	Region	Highest-ranking adaptation actions
	Gaza Strip	Increase share of imported water
		Enhance the use of alternative water resources for non-domestic purposes
		Build a large desalination plant for Gaza

Sources:
Nationally Determined Contribution (NDC),United Nations Framework Convention on Climate Change (UNFCCC) 2016
ClimaSouth Technical Paper N.2 (2016). The Economics of Climate Change in the Palestine. February 2017. Prepared by: Tippmann, R. and Baroni, L., https://www.climamed.eu/wp-content/uploads/files/The-Economics-of-Climate-Change-in-Palestine.pdf

4.2.2 Air Quality - Noise

4.2.2.1 Air pollution

Air pollution is a major cause of disease and death globally, causing about 7 million premature deaths every year (World Health Organization). Particulate Matter (PM), Ozone (O_3), Nitrogen Dioxide (NO_2) and Sulphur Dioxide (SO_2) are some of the pollutants with the strongest evidence for public health concern. The health risks associated with PM_{10} and $PM_{2.5}$ are especially well-documented.

According to Ministry of Health [61], in 2018 3.7% of Palestinian population had respiratory diseases due to air pollution.

The possible air pollution sources affecting the West Bank include; industrial activities, transportation, open burning of solid waste and trans-boundary air pollutants. Also burning vegetation and the increased amounts of fossil fuels used as a source of energy, emit large amounts of carbon dioxide (CO_2) [62].

Industrial activities

According to ARCADIS data (2015)[63], Hebron Governorate has the highest percentage of air emissions out of the total annual air emissions from all surveyed industries for all calculated pollutants (TSP, PM_{10}, NO_X, SO_2, VOC). More specifically 21-28% of most calculated pollutants from 600 industries are emitted in Hebron Governorate; for VOCs this percentage reaches 38 %. Significant air pollution effects in Hebron are generated by the quarrying and stone cutting industries[64].

The Palestinian Ministry of Health in Hebron Governorate reports a significant increase in the number of deaths due to cancers of more than 35 types. Soil samples from Wadi Hebron/southern Dhahria contained more than six times the level of radioactive uranium-238 that might be expected to occur naturally. Radium-226 was also found at concentrations of up to nine times the World Health Organisation's allowable concentration, making it the highest level found globally. It is highly likely that Israel's Dimona reactor, which is approximately 52km from Hebron, is a key source. [65]

[61] *Ministry of Health, Palestinian Health Information Center (PHIC), July 2019, Health Annual Report Palestine 2018*
[62] *ARIJ, 2015, Status of the Environment in the State of Palestine – 2015, https://www.arij.org/files/arijadmin/2016/SOER_2015_final.pdf*
[63] *ARCADIS, 2015, Identification of Priority Pollution Hotspots and Sensitive Areas in Palestine, https://planbleu.org/sites/default/files/upload/files/Palestine_Hotspot_Analysis%281%29.pdf*
[64] *State of Environment and Outlook Report for the occupied Palestinian territory, UNEP 2020*
[65] *https://foeasiapacific.org/2020/09/02/palestine-poisoned-by-israels-nuclear-industry/*

Table 4.2.2-1 presents the emissions from selected industrial facilities within the four (4) targeted Urban Areas in West Bank for the following five air pollutants: TSP, PM_{10}, NOx, SO_2 and VOC. At the time of writing this report, there is no data for Gaza Urban Area.

Table 4.2.2-1: Air pollution emissions from facilities within the four (4) targeted Urban Areas in West Bank

Urban area	No of selected industrial facilities	Sum of Annual Air Emissions (tonnes/year)					Average of Annual Air Emissions (tonnes/year/facility)				
		TSP	PM10	NOx	SO2	VOC	TSP	PM10	NOx	SO2	VOC
Nablus	98	264.9	208.6	45.6	3.2	104.4	2.70	2.13	0.47	0.03	10.7
Ramallah and Al Bireh	42	224.7	174.7	21.2	1.4	58.1	5.35	4.16	0.50	0.03	1.38
Bethlehem	31	503	291.8	14.2	0.9	35	16.23	9.41	0.46	0.03	1.13
Hebron	80	777.4	488	43.9	5.1	358.4	9.72	6.1	0.55	0.06	4.48

Source: ARCADIS, 2015, Identification of Priority Pollution Hotspots and Sensitive Areas in Palestine, https://planbleu.org/sites/default/files/upload/files/Palestine_Hotspot_Analysis%281%29.pdf

The most significant sources of those pollutants are various chemical industries and other manufacturing facilities such as charcoal kilns. An estimated 1,600 tonnes of charcoal are produced every month in the West Bank[66]. Charcoal processing releases considerable amounts of particulate, Carbon Monoxide and Dioxide, Nitrogen Oxides and Volatile Organic Compounds (VOC) into the atmosphere. For the case of the West Bank, the impact of industrial air emissions is increased due to the location of industrial facilities near residential areas.

Transportation

There are significant air pollution problems associated with vehicles especially since their total number is increasing every year. The increased use of vehicles (especially old ones) in Palestine emits tons of hazardous gases, such as Carbon Monoxide (CO), Nitrogen Oxides (NO_x), Sulfur Oxides (SO_x), and Hydrocarbons (HC) [67]. The total emissions from the transportation sector make up more than 50% of the total national emissions[68].

Energy, Agriculture and Solid waste

According to the **Greenhouse Gas Inventory** for 2017 by sector, the energy sector contributes 71% – the largest share to the total CO_2 emissions – followed by waste (19%) and then agriculture, forestry

[66] *https://www.thenationalnews.com/business/charcoal-production-in-the-west-bank-in-pictures-1.331907*
[67] *ARIJ, 2015, Status of the Environment in the State of Palestine – 2015, https://www.arij.org/files/arijadmin/2016/SOER_2015_final.pdf*
[68] *State of Environment and Outlook Report for the occupied Palestinian territory, UNEP 2020*

and other land use sectors (10%).

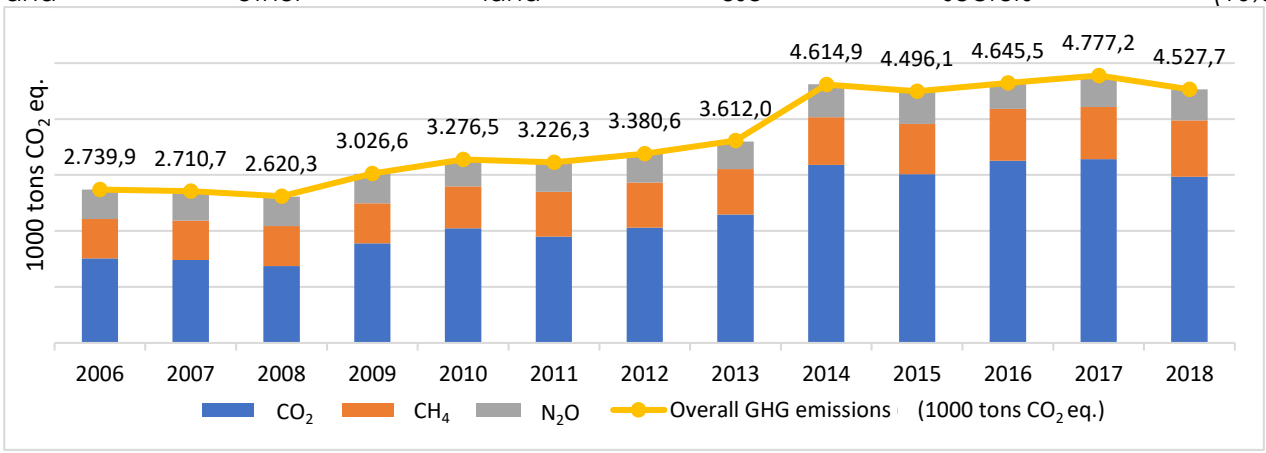


Figure 4.2.2-1 shows the overall emission trends from 2006-2018 in Palestine. There has been a steady increase in GHG emissions between 2006 and 2018 and a 65% increase in total over this time period. There was a 28% jump in GHG emissions between 2013 and 2014 due to the employment of certain high-tech weaponry during hostilities in Gaza Strip in 2014, which contribute to increased CO_2 emissions. [69]

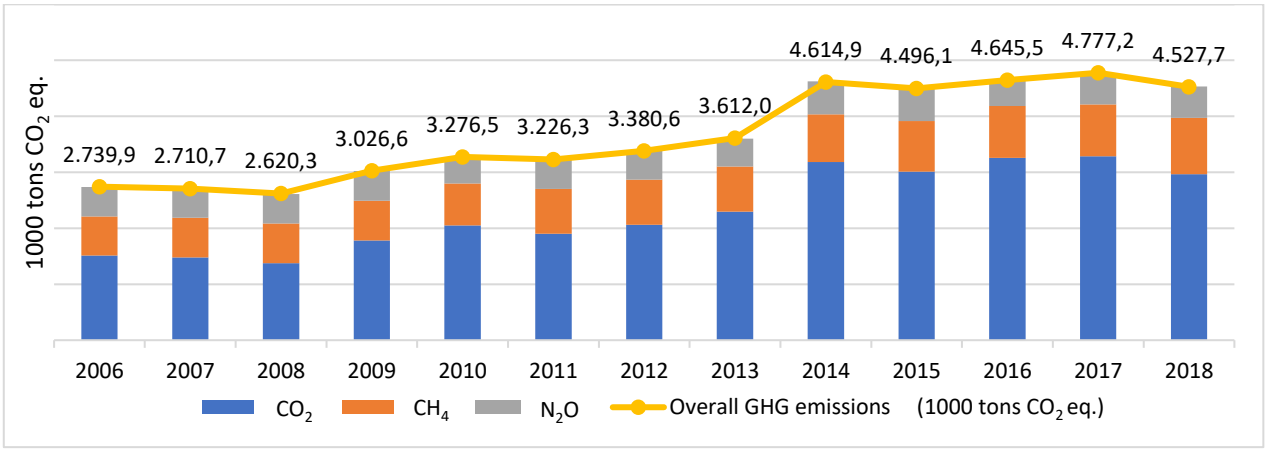


Figure 4.2.2-1: Overall GHG emissions by Year (1000 tons CO_2 eq.)

Sources:
Palestinian Central Bureau of Statistics, 2016. Emissions to Air, 2014. Ramallah - Palestine.
PCBS (2018), http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/Emission-2018-E.html

According to PCBS data (2017)[70], the energy and waste sectors are the main drivers of that increase as the emissions from the Agriculture, Forestry and Other Land Use (AFOLU) sector decrease over time. The use of fuel for road transportation in the energy sector is responsible for driving the increase of CO_2 while activity in the waste sector (including waste disposal and wastewater treatment) is responsible for driving the increase of CH_4.

[69] *http://www.alhaq.org/publications/6416.html*
[70] *PCBS, Overall GHG Emissions from Agriculture Sector in Palestine* by Year (1000 ton CO2 eq.), 2006-2018, http://www.pcbs.gov.ps/statisticsIndicatorsTables.aspx?lang=en&table_id=99*
PCBS, Overall GHG Emissions from Waste Sector in Palestine by Year (1000 ton CO2 eq.), 2006-2018, http://www.pcbs.gov.ps/statisticsIndicatorsTables.aspx?lang=en&table_id=101*
PCBS, Overall GHG Emissions from Energy Sector in Palestine by Year (1000 ton CO2 eq.), 2006-2018, http://www.pcbs.gov.ps/statisticsIndicatorsTables.aspx?lang=en&table_id=97*

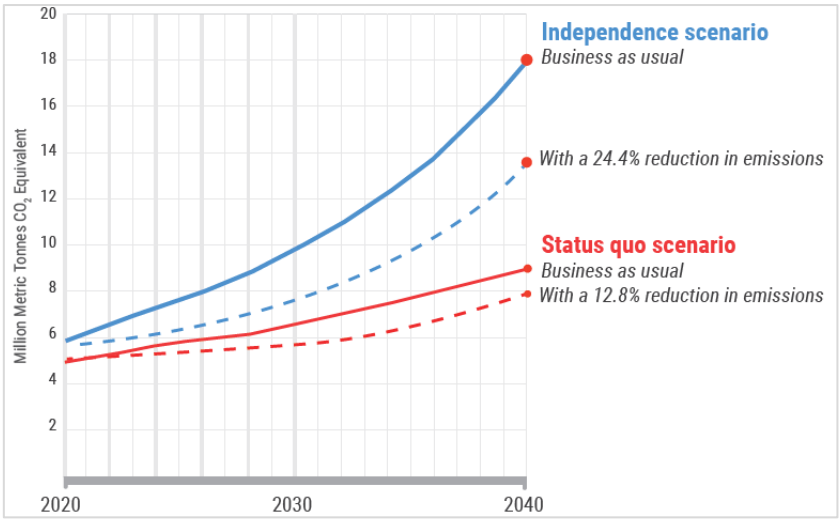


Figure 4.2.2-2: CO_2 equivalent emissions mitigation plans

Source: Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf

Palestine plans to reduce its CO_2 equivalent emissions based on two scenarios: an independence scenario, under which Palestine is able to exercise full control over its resources, and the status quo scenario reflecting a continuation of the Israeli occupation and a resulting lack of access to its natural resources. Under the independence scenario emissions of GHGs in Palestine are projected to grow to 10,020 Gg CO_2 eq. and 18,060 Gg CO_2 eq. by 2030 and 2040 respectively; in rough terms, this is equivalent to a three-fold increase between 2018 and 2040. Under the status quo scenario, GHG emissions are forecast to be 6,860 Gg CO_2 eq. and 9,130 Gg CO_2 eq. by 2030 and 2040 respectively. GHG emissions are projected to have the highest and fastest growth rates in the energy (electricity generation), transport and industrial sectors. [71] Under each scenario, a set of tools are defined to achieve a reduction of 24.4 % under the first scenario and 12.8 % under the second.[72] More specifically, the key interventions that would be implemented in order to achieve the above-mentioned emissions reductions include the following:

- Solar photovoltaic systems
- Energy efficiency in buildings
- Use of waste for cement production
- Use of waste for electricity generation
- Reduction of methane from landfill
- Energy-efficient lighting
- Hybrid electric vehicles
- Compressed natural gas-powered vehicles
- Modal shift programmes
- Afforestation

[71] *http://documents1.worldbank.org/curated/en/768691563887563059/pdf/West-Bank-and-Gaza-Environment-Priorities-Note.pdf*

[72] *Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf*

4.2.2.2 Dust, Smoke and Smell

According to PCBS data (2018)[73], Table 4.2.2-2 presents the households that were exposed to dust, smoke and smell within the Governorates relevant to the project in 2018.

Table 4.2.2-2: Percentage of households exposed to dust, smoke and smell by Region and Governorate relevant to the project, 2018 [74]

Percentage of Households Exposed to	Region / Governorate							
	Palestine	West Bank	Nablus	Ramallah and Al Bireh	Bethlehem	Hebron	Gaza Strip	Gaza
Dust	13.5 %	12.7 %	14.1 %	17.9 %	11.5 %	7.2 %	15.0 %	15.3 %
Smoke	8.4 %	8.3 %	10.6 %	5.6 %	10.0 %	2.3 %	8.4 %	12.5 %
Smell	20.5 %	17.5 %	19.8 %	20.5 %	16.1 %	13.9 %	25.6 %	27.8 %

Note: Dust: Particles light enough to be suspended in the air.
Source: Palestinian Central Bureau of Statistics, April 2019, Socio-Economic Conditions Survey, 2018 - Main Findings, http://www.pcbs.gov.ps/Downloads/book2431.pdf

According to recent data[75] during 2015, households exposed to dust, smoke and smell sometimes or very often considered the following as the most important sources ;

- 66.8% of households considered unpaved roads as the main source of dust;
- 55.9% of households considered waste-burning in lanfills or dumpsites (see section 4.2.7.4 below) as the main source of smoke;
- 44.5% of households considered wastewater as the main source of smells, while 35.8% considered agricultural waste as the most important source of smells.

4.2.2.3 Noise

According to PCBS data (2018)[76], Table 4.2.2-3 presents households exposed to excessive noise within the Governorates relevant to the project in 2018.

Table 4.2.2-3: Percentage of households exposed to excessive noise by Region and Governorate relevant to the project, 2018 [77]

Region/ Governorate	Palestine	West Bank	Nablus	Ramallah and Al Bireh	Bethlehem	Hebron	Gaza Strip	Gaza
Households Exposed to Noise	28.6%	25.1%	30.0%	28.2%	25.5%	20.8%	34.9%	41.2%

Source: Palestinian Central Bureau of Statistics, April 2019, Socio-Economic Conditions Survey, 2018 - Main Findings, http://www.pcbs.gov.ps/Downloads/book2431.pdf

[73] *Palestinian Central Bureau of Statistics, April 2019, Socio-Economic Conditions Survey, 2018 - Main Findings*
[74] *Field surveys was implemented during the period July 2018 to October 2018, using tablet devices to link them to geographic information systems. The survey sample is a cluster systematic random sample of households residing in Palestine; and comprised 11,008 households at the total level, of which 9,926 households responded.*
[75] Palestinian Central Bureau of Statistics, 2015. Household Environmental Survey - 2015: Main Findings . Ramallah - Palestine. http://www.pcbs.gov.ps/Downloads/book2431.pdf
[76] *Palestinian Central Bureau of Statistics, April 2019, Socio-Economic Conditions Survey, 2018 - Main Findings, http://www.pcbs.gov.ps/Downloads/book2431.pdf*
[77] *Field surveys was implemented during the period July 2018 to October 2018, using tablet devices to link them to geographic information systems. The survey sample is a cluster systematic random sample of households residing in Palestine; and comprised 11,008 households at the total level, of which 9,926 households responded.*

According to the same data, 55.6% of households in Palestine exposed to noise sometimes or very often considered traffic to be the main source of noise and 20.6% of households blamed other sources such as overcrowding.

4.2.3 Morphology - Topography, Geology, Soil

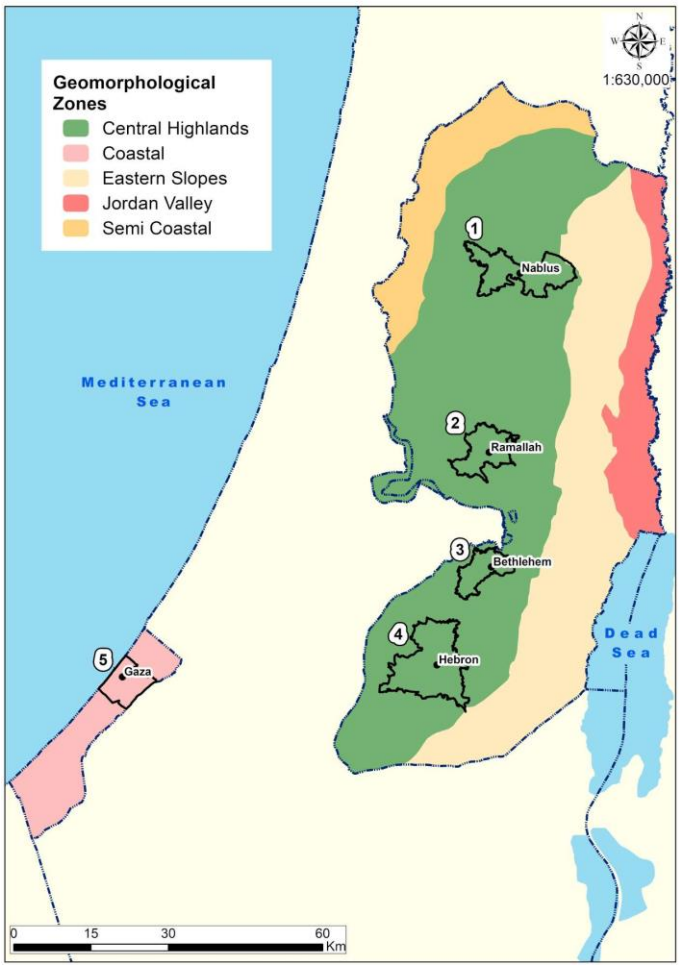
4.2.3.1 Morphology - Topography [78]

Despite its small geographical area, Palestine is characterized by a great variation in topography and altitude, especially in the West Bank where the variation ranges between 1,020 m above sea level to 420 m below sea level.

The West Bank is divided into four major geomorphological areas; Central Highlands, Semi-coastal region, Eastern Slopes region, and the Jordan Valley; the four (4) targeted Urban areas of West Bank are located within the Central Highlands (Figure 4.2.3-1). The mountainous area of the West Bank serves as the main rainfall collection and replenishment zone for the groundwater aquifers. Many drainage and valley systems are spread in and amongst these aforementioned areas.

The Gaza Strip is essentially a foreshore plain gradually sloping westward.

[78] *ARIJ, 2015, Status of the Environment in the State of Palestine – 2015, https://www.arij.org/files/arijadmin/2016/SOER_2015_final.pdf*

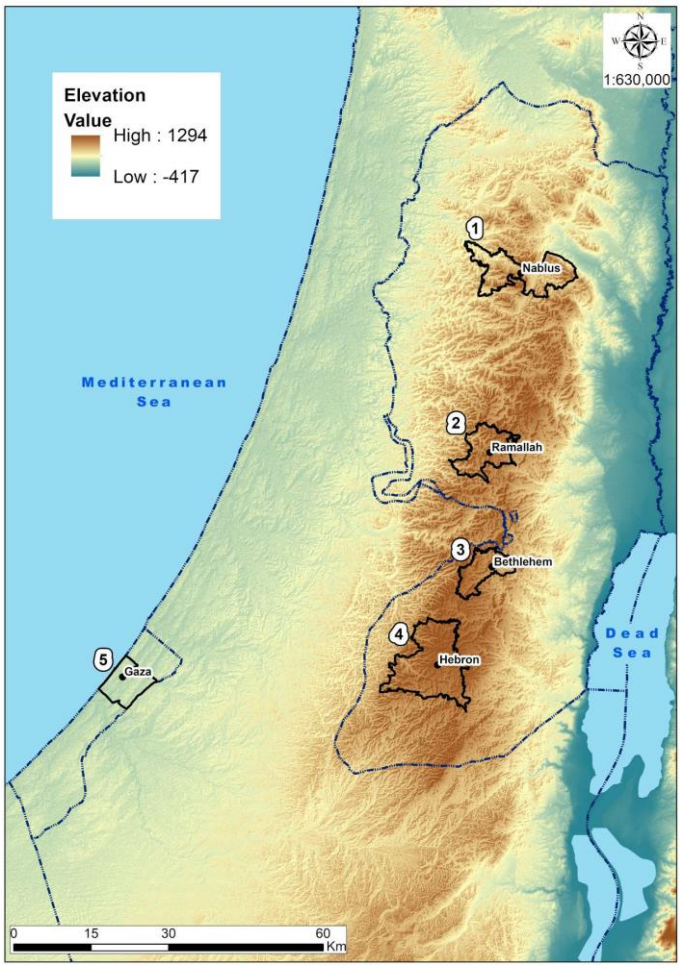


- *Central highlands: This is the mountainous portion of the West Bank including East Jerusalem. Mediterranean climate on the western slope facing the Mediterranean Sea. Arid on the eastern slope facing the Jordan Valley. Agricultural activities: Rainfed crops (olive, stone fruits, field crops, vegetables, and fodder).*
- *Eastern slopes: This area runs from Jenin in the north to Hebron in the south. It is often referred to as the "Jerusalem wilderness". Semi-arid climate (semihumid in some areas) and elevation range from 200 to 1,000m. Agricultural activities: Small parts for agriculture (irrigated) with spring water; main activity is grazing livestock.*
- *Jordan Valley: This is a unique area that lies east of the West Bank highlands, between the eastern slopes and the mountains of Moab in Jordan. Arid and semi-arid climate, high temperatures and a low average annual rainfall of 100 to 200 mm, with mild to warm winters and hot, dry summers; it is a continuation of the African Rift Valley. Agricultural activities: Intensive production (citrus and banana, date palm, grapes, herbs and vegetables).*
- *Semi-coastal zone: This area, located in the Jenin, Tulkarm and Qalqilya districts, is an extension of land inside the Green Line (the 1967 borders). Mediterranean climate: It is 120 km² in area and has an average annual rainfall of 600mm. Agricultural activities: Olives, stone fruits, field crops and vegetables.*
- *Coastal zone: This is the coastal zone along the eastern Mediterranean. The area has one of the highest population densities in the world. Agricultural activities: Strawberries, cut flowers, citrus, vegetables, almonds, dates and guava.*

Figure 4.2.3-1: Geomorphological zones of Palestine

Sources:
ARIJ, 2016, Opportunities and Challenges of Palestinian Development actions in area C, https://www.arij.org/files/arijadmin/2017/areac_report_2017.pdf
State of Environment and Outlook Report for the occupied Palestinian territory 2020, https://reliefweb.int/sites/reliefweb.int/files/resources/SEORP.pdf

The variation of elevation per Urban Area is presented in Figure 4.2.3-2 below.



Urban Area	Variation of Elevation (m)
Nablus	125 - 925
Ramallah and Al Bireh	450 - 950
Bethlehem	525 - 975
Hebron	500 - 1000
Gaza	0 - 107

Figure 4.2.3-2: Morphology-Topography of Palestine

Sources:
USGS, https://www.usgs.gov/
MoLG - ICUD GIS database, https://geomolg.ps/

4.2.3.2 Geology

The geology of Palestine consists of the following formations (from older to recent):

CRETACEOUS

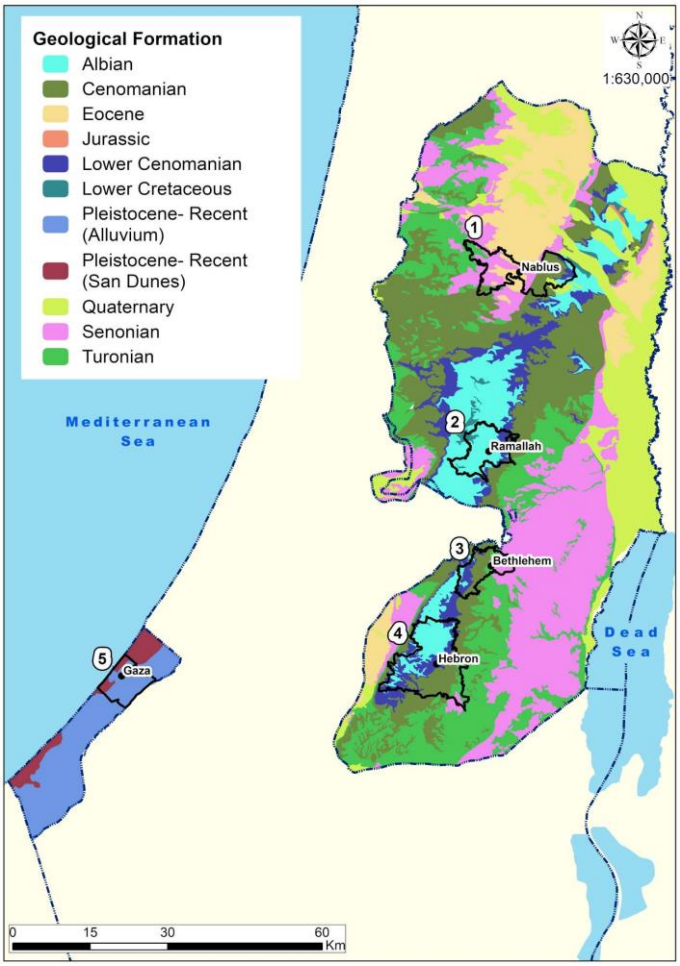
- Cenomanian is characterized by dolomite, chalk, dolomitic limestone at Lower Cenomanian and limestone with clay beds at Middle Cenomanian.
- The Albian consists of limestones (hard cryst., massive with marls, with clay beds) and sandstones
- Basalts of Lower Cretaceous are located at the ENE of Tubas
- Turonian consists of lithographic stone fine grained limestone ("meleke")
- The Upper Cretaceous (Senonian) formations consist of bituminous limestone, chert and hard chalk.

TETRIARY

- The Eocene is formed by chalk, limestone and chert. Late Eocene to Miocene is characterized by marl, limestone, sandstone and conglomerate.
- Quaternary: Pleistocene and recent sediments

- Pleistocene deposits consist of sandstones, conglomerates dark sand with little clay.
- Recent deposits consist of alluvium red clay loam mainly at the North and Central and sandy loam at the South.

Geology types for the five targeted urban areas in details, according to MoLG-ICUD GIS database, are presented in Figure 4.2.3-3.



Geology Type		Urban Area				
		Nablus	Ramallah and Al Bireh	Bethlehem	Hebron	Gaza
Albian		3.9%	**76.1%**	7.5%	**34.7%**	-
Cenomanian		**30.8%**	3.4%	**37.6%**	**29.9%**	-
Eocene		16.1%	-	-	-	-
Lower Cenomanian		4.8%	14.5%	**21.5%**	26.6%	-
Lower Cretaceous		0.1%	6.0%	-	0.2%	-
Pleistocene-Recent	Alluvium	-	-	-	-	**82.3%**
	Sand Dunes	-	-	-	-	17.7%
Quaternary		2.8%	-	-	-	-
Senonian		**33.4%**	-	**22.2%**	1.6%	-
Turonian		8.0%	-	11.2%	7.0%	-

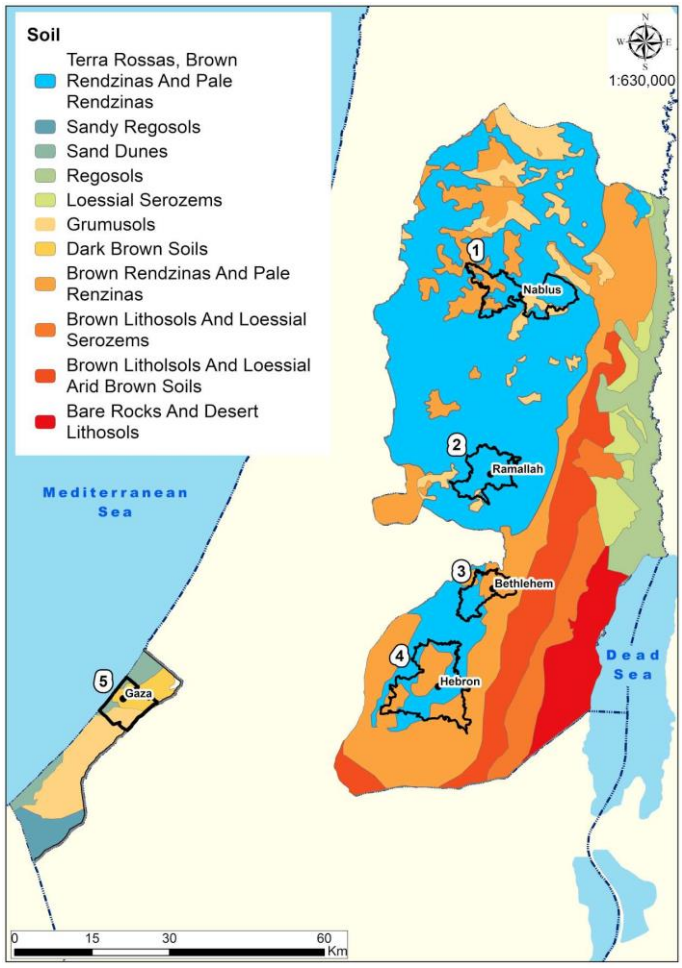
Figure 4.2.3-3: Geological map of Palestine

Source: MoLG - ICUD GIS database, https://geomolg.ps/

4.2.3.3 Soil

Although the geographic area of Palestine is relatively small, soils are highly variable in type and characteristics. The major soil associations in the four (4) targeted Urban Areas in West Bank are Terra Rossa and Brown Rendzinas while in Gaza Urban Area, the most common soil type are dark brown soils and Grumusols.

Soil types for the five targeted urban areas, according to MoLG-ICUD GIS database, are presented in Figure 4.2.3-4.



Soil Type	Urban Area				
	Nablus	Ramallah and Al Bireh	Bethlehem	Hebron	Gaza
Brown Rendzinas and Pale Renzinas	21.1%	-	**48.0%**	**54.0%**	-
Dark Brown Soils	-	-	-	-	**51.2%**
Grumusols	12.7%	2.4%	-	-	**33.5%**
Sand Dunes	-	-	-	-	15.3%
Terra Rossas, Brown Rendzinas and Pale Rendzinas	**66.2%**	**97.6%**	**52.0%**	**46.0%**	-

Figure 4.2.3-4: Soil map of Palestine

Source: MoLG - ICUD GIS database, https://geomolg.ps/

These soil types which underline a considerable area of irrigated arable land, are not very susceptible to soil salinity due to their heavy texture and are therefore considered suitable for agricultural use. However, in areas where the groundwater is shallow, even heavy textured soils exhibit and have salinity problems due to the accumulation of salts from limited leaching capabilities, such as the grumusols in the south-eastern part of the Nablus Governorate.

Soil erosion is induced by the combination of unsustainable agricultural and herding practices, fragile soil classes and harsh topography (steep to very steep slopes). Soil erosion risk is severe in the mountainous areas that are exposed to heavy rainfall. Soil erosion also occurs in areas with very steep slopes and low vegetation cover as in the case of eastern heights.

In the case of steep slopes with certain aspects, even terra rossa and brown rendzina soils, which are clayey, are exposed to a high degree of erosion. According to a recent study, in the southern Hebron region 43% of the area was found to be highly susceptible to erosion risks[79].

Soil erosion in sparsely vegetated areas make up 21% of the West Bank area; this can be mitigated through the implementation of the agroforestry approach, by converting traditional planting systems from planted field crops (i.e. potatoes, onions, forages and grain crops) to pastures with different and beneficial types of shrubs and grazing plants.

[79] *State of Environment and Outlook Report for the occupied Palestinian territory 2020, UNEP 2020*

4.2.3.4 Desertification[80]

Desertification is land degradation in dry-lands, resulting from various factors, including both climatic variations and human activities such as non-sustainable management practices, including over-grazing of available pastures as well as deforestation and urban sprawl. It is essential to recognise that desertification is essentially a man-made phenomenon which is exacerbated by climate change. This is because an increase in weather extremes such as droughts and heavy rains as a result of climate change will lead to further land degradation [81].

In the last few years, the trend is towards more frequent droughts in Palestine. The area suffering from greatest aridity is located at the south-eastern edge of the West Bank.

The FAO Aridity Index map for the period (2000-2010) (Figure 4.2.3-5) shows that 26% of Palestine is arid zone and 74% is Semi-arid zone. The five (5) targeted urban areas fall within the semi-arid zone.

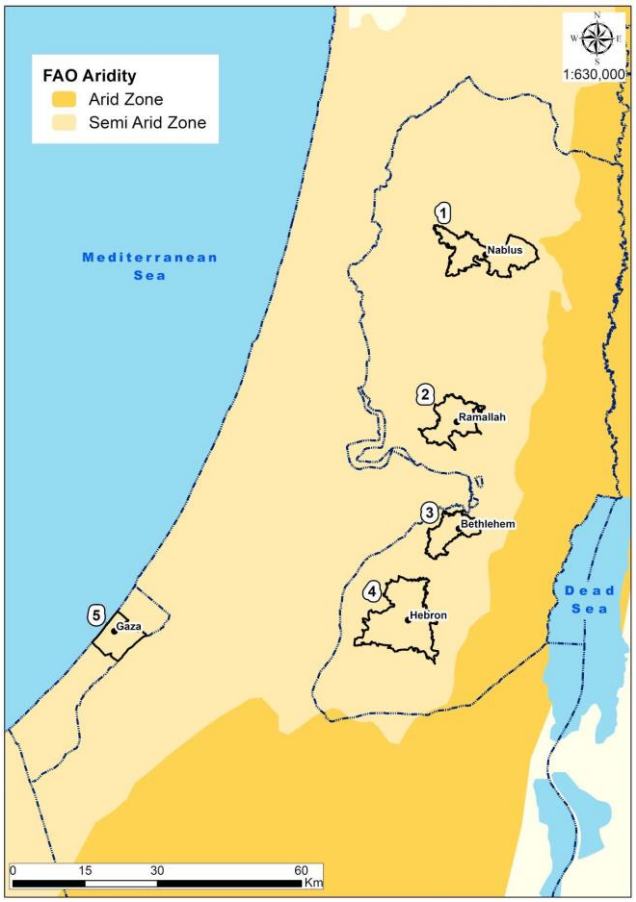


Figure 4.2.3-5: FAO Aridity Index Map, 2000-2010

Within the Palestinian context, the major consequences and impacts of desertification, land degradation and drought are the following[82]:

- Increased frequency of water shortages and a decline in water quality;

[80] http://www.arij.org/component/content/article/126-latest/461-read-watch-arij-report-on-occasion-of-world-day-to-combat-desertification-a-large-amount-of-west-bank-lands-are-under-ongoing-degradation.html
[81] https://cor.europa.eu/en/engage/studies/Documents/relationship-desertification-climate-change.pdf
[82] *The National Strategy, Action Programme and Integrated Financing Strategy to Combat Desertification in the OPT, UNCCD, 2012*

- Decrease in soil fertility and productivity;
- Decrease and deterioration of biomass, biodiversity and endangering flora and fauna;
- Increased food insecurity mainly in marginal areas and among vulnerable groups;
- Less income and more costs of economic activities mainly livestock and agriculture.

The drought condition in Palestine for the period 2000-2010 shows 7 driest years and only 3 wettest years. The individual maps represented in Figure 4.2.3-6 of the standardized residuals show how much each location in Historic Palestine departs from its own mean during the period (2000-2010) in any given hydrological year. The maps show that the whole area contains extreme deviation for the individual locations and many locations received much more or much less precipitation than their respective average.

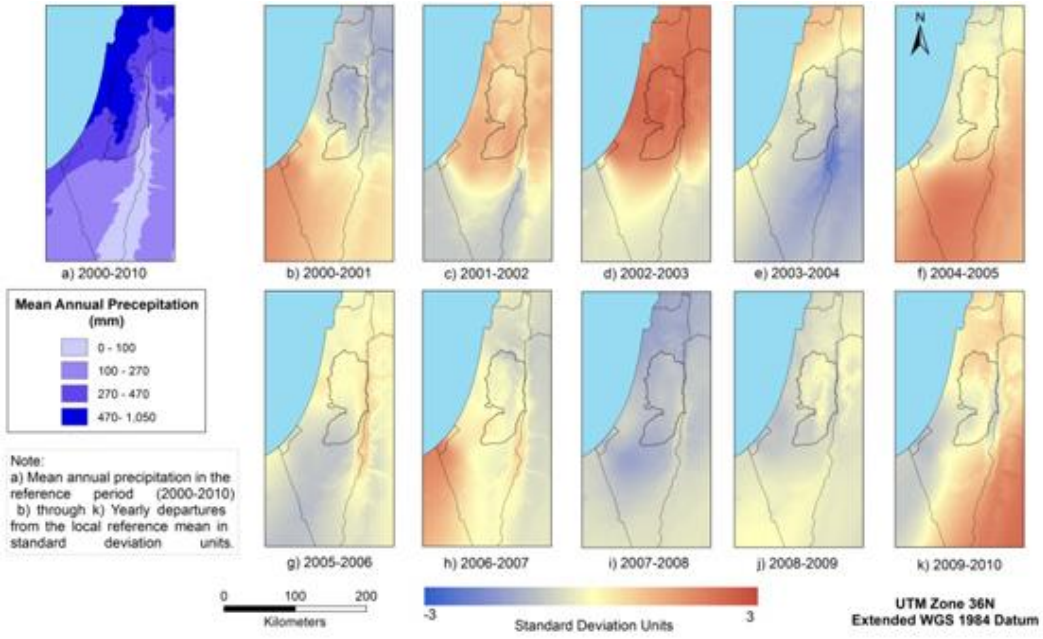


Figure 4.2.3-6: Yearly departures from the local mean annual precipitation in standard deviation units

The drought condition in Palestine occurs as a result of the low amount and poor distribution of rainfall, which have drastically affected the growing season of crops and grazing plants during the last few years. Drought in Palestine is equally affecting farmers who cannot water their crops, and the herders who cannot rely anymore on pastures (which are dry and with very limited grazing capacity as a result of drought) for grazing. Land Degradation increases irrigation needs which in turn lower water tables, resulting in water shortages and salt intrusion in coastal areas, and worsening the effects of drought on affected populations and ecosystems.

The amount of land under active degradation processes for the period (2000-2010) was 16% of the West Bank area (876 km²). The results show that the Jordan Valley and the Semi-coastal agro-zones are mostly affected by land degradation; 23.7 % of the Semi-coastal zone area (112.3 km²) and 22.3% of the Jordan Valley area (89.4 km²) are under active degradation.[83]

Soil salinisation is regarded as a major cause of desertification. Salinisation greatly reduces soil quality and vegetation cover and induces loss of soil fertility, soil structure destruction and compaction, and soil crusting. The most influential human-induced factors are land use, farming systems and poor land management. Inappropriate irrigation practices (such as the use of salt-rich irrigation water) and

[83] *http://www.arij.org/component/content/article/126-latest/461-read-watch-arij-report-on-occasion-of-world-day-to-combat-desertification-a-large-amount-of-west-bank-lands-are-under-ongoing-degradation.html*

insufficient drainage both cause salinisation. In Gaza Strip, salinisation is associated with the over-exploitation of groundwater caused by the demands of growing urbanization and agriculture. Over-extraction of groundwater lowers the normal water table and leads to the intrusion of seawater.

4.2.4 Biological Environment [84] [85]

4.2.4.1 Flora and Fauna species

There are approximately 51,000 living species in Palestine, constituting approximately 3% of global biodiversity. There are more than 30,850 animal species, as presented in Table 4.2.4-1.

Table 4.2.4-1: Fauna species in Palestine

Fauna Species	Birds	Mammals	Amphibians	Reptiles	Fish	Invertebrates	Total
Number	373	92	7	81	297	30,000	**30,850**

Source: State of Environment and Outlook Report for the occupied Palestinian territory 2020, https://reliefweb.int/sites/reliefweb.int/files/resources/SEORP.pdf

Of the 1,938 wild plant species in Palestine, 102 (5.3%) are classified as endangered species and constitute the International Union for Conservation of Nature Red List . These species belong to 83 genera and 39 plant families. Palestine has 54 endemic plants that do not exist in any other part of the world.[86]

Based on the International Union for Conservation of Nature global guidelines, criteria and Red List publications, there are 24 fauna species in Palestine listed as globally threatened. There are no plant species indigenous to Palestine that are on the IUCN's red species list (as this list does include plants). The categorization of the Red List fauna species that are listed as globally threatened is presented in Table 4.2.4-2 below.

Table 4.2.4-2: Globally threatened fauna species in Palestine

Fauna Species	Birds	Mammals	Amphibians	Reptiles	Fishes	Molluscs	Other Inverts	Total
Number	10	3	1	4	2	2	2	**24**

Source: IUCN Red List version, 2015

4.2.4.2 Biodiversity significant areas

Key Biodiversity Areas (Biodiversity Hotspots)

Key Biodiversity Areas (KBAs) are sites that contribute significantly to the global persistence of biodiversity in terrestrial, freshwater, marine and subterranean ecosystems. The process of KBA identification and delineation does not include steps to advance management activity and does not imply that any specific conservation action, such as protected area designation, is required[87]. The identification of a site as a KBA simply implies that the site should be managed in ways that ensure

[84] *Convention on Biological Diversity (2015 EQA Report)*
[85] *Environmental Conservation and protected areas in Palestine (Challenges and Opportunities)* www.mahmiyat.ps
[86] *State of Environment and Outlook Report for the occupied Palestinian territory 2020,* https://reliefweb.int/sites/reliefweb.int/files/resources/SEORP.pdf
[87] *https://portals.iucn.org/library/sites/library/files/documents/2019-001.pdf*

the persistence of the biodiversity elements for which it is important[88]. If a KBA is to be officially designated as a protected area, further mechanisms are needed to legally protect it. As of 2018, 21% of KBAs world-wide are fully covered by protected areas[89].

In 2016, the International Union for the Conservation of Nature (IUCN) published a Global Standard for the Identification of Key Biodiversity Areas, providing criteria under which an area can be quantitatively assessed for inclusion as a Key Biodiversity Area. KBA identification should build off the existing network of KBAs, which includes, among others:

- Important Bird and Biodiversity Areas (IBAs);
- Important Plant Areas (IPAs)[90].

Palestine is rich in biodiversity including more than 50 sites identified as key biodiversity areas. These sites were included in the National Spatial Plan for protection from any change or land use.

Important Bird Areas (IBAs)

Important Bird and Biodiversity Areas (IBAs) are areas of international significance for the conservation of birds and other biodiversity in terrestrial, freshwater and marine ecosystems[91]. The IBA network may be considered as the minimum essential to ensure the survival of many of these bird species across their ranges and throughout their life cycles.

Four sites in Palestine (Ein Al-Fashkha, Jericho, Jerusalem (east), and Jerusalem wilderness) are recognized by Birdlife International (BI) in 2015 as Important Bird Areas (IBAs) using a set of internationally agreed criteria, based on the presence of species at sites and their population sizes[92].

Important Plant Areas (IPAs)

Important Plant Areas (IPAs) are natural or semi-natural sites exhibiting exceptional botanical richness and/or supporting an outstanding assemblage of rare, threatened and/or endemic plant species and/or vegetation of high botanic value[93]. The IPA programme is a site-based approach for the conservation of plants at a national level, and forms a subset of Key Biodiversity Areas (KBAs) around the world.

A total of nine IPAs have been identified in Palestine. Four have been confirmed and described as internationally important sites while the remainder requires further investigation. [94]

As presented in Table 4.2.4-5 and Figures (Figure 4.2.4-1 to Figure 4.2.4-5) below, only two (2) Important Plant Areas (IPAs) are identified within Nablus Urban Area.

[88] *https://portals.iucn.org/union/sites/union/files/doc/a_global_standard_for_the_identification_of_key_biodiversity_areas_final_web.pdf*
[89] *A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values' International Union for Conservation of Nature (IUCN) 2008*
[90] *https://biodiversitya-z.org/content/key-biodiversity-areas-kba*
[91] *https://www.birdlife.org/worldwide/programme-additional-info/important-bird-and-biodiversity-areas-ibas*
[92] *STATE OF PALESTINE FIFTH NATIONAL REPORT (CBD) 2015, https://www.cbd.int/doc/world/ps/ps-nr-05-en.pdf*
[93] *https://www.biodiversitya-z.org/content/important-plant-areas-ipa*
[94] *STATE OF PALESTINE FIFTH NATIONAL REPORT (CBD) 2015, https://www.cbd.int/doc/world/ps/ps-nr-05-en.pdf*

Protected areas (Nature Reserves) [95]

According to IUCN definition (2008), a protected area is '*a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values*'.

According to the National Spatial Plan prepared by the MoLG, the total area of nature reserves covers 51,157 hectares and 9% of the West Bank. As mentioned in the Palestinian Presidential Decree of January 2010, nature conservation, including the promotion of related activities, is the only land use that is allowed in nature reserves.

With regard to protected areas (nature reserves), the Israeli occupation power has declared 48 nature reserves in the West Bank [96]. Most protected areas in the West Bank lie in the zone designated as Area C, where control continues to be under the exclusive authority of Israel[97]. The segregation zones (eastern and western) along the western and eastern parts of the West Bank within Area C isolate and/or fragment approximately 68.5% of the nature reserves in the West Bank[98].

Forests

According to the Palestinian Presidential Decree of January 2010, nature conservation is the only land use that is allowed in forests.

The types of forests in Palestine according to the Fifth National Report to the Convention on Biological Diversity in 2015 are presented in the Table below.

Table 4.2.4-3: Types of forests in the Palestine

Forest Category	Main Trees
Carob-lentisk maquis	Pistacia lentiscus, Ceratonia siliqua
The pine forest	Pinus halepensis, Quervus calliprinos, Arbutus andrachne, Juniperus oxycedrus, Pistacia lentiscus, Pistacia palaestina
Evergreen oak maquis	Quercus calliprinos, Pistacia palaestina, Laurus nobilis, Rhamnus palaestina, Arbutus andrachne
Decidious oak forest	Crataegus azarolus, Pistacia palaestina, Quercus calliprinos
Savannah forests	Acacia raddiana, Ziziphus spina-cristi, Salvadora persica
Riparian forests	Salix acmophylla, Tamarix jordani, Populus euphratica, Populus orientalis, Fraxinus Angustifolia subsp, Syriac asp, Umlus anescens

According to the MoLG-ICUD GIS database, the forested Areas in the five (5) targeted Urban Areas are presented in the Table 4.2.4-5 and Figures (Figure 4.2.4-1 to Figure 4.2.4-5) below. More details about forests are presented in section 4.3.2.2 of this repost.

[95] *'A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values' International Union for Conservation of Nature (IUCN) 2008*
[96] *STATE OF PALESTINE FIFTH NATIONAL REPORT (CBD) 2015, https://www.cbd.int/doc/world/ps/ps-nr-05-en.pdf*
[97] *Opportunities and Challenges of Palestinian Development actions in Area C, ARIJ, 2016*
[98] *ARIJ (The Applied Research Institute — Jerusalem) - GIS (Geographic Information System) and RS (Remote Sensing) Department, 2015. West Bank Land Use/ Land Cover analysis 2012. Bethlehem. Palestine.*

Wetlands

There are only a few wetland zones in Palestine; some of these are seasonal, in that they are flooded in winter and dry up in the summer. Wetlands serve as a refuge, providing feeding and resting stations for migratory waterfowl and a home for amphibians.

It must be noted that, at the time of writing this report, Palestine has not yet ratified the Ramsar Convention[99]. The proposed Wetland sites by GlobWetland II[100] within the five (5) targeted urban areas are presented in Table 4.2.4-4 below.

Table 4.2.4-4: Wetlands identified within the five (5) targeted urban areas and their characteristics

Wetland	Urban area	Characteristics
Wadi Al Badhan	Nablus	Considered an IBA Most fauna frequents this area for food and water High biodiversity of birds
Wadi Gaza	Gaza	A station point for migratory birds. Most important coastal wetland in the Eastern Mediterranean Basin.

Source: http://www.mahmiyat.ps/uploads/171013%20HSF_Bethlehem_Printed%20Version_NC.pdf

Wadi Gaza is considered one of the most important coastal wetlands in the Eastern Mediterranean Basin. In recognition of its importance as a natural area and as the only permanent wetland in the Palestine, Wadi Gaza was declared a nature reserve in June 2000 [101]. However, Wadi Gaza is rapidly degrading due to anthropogenic activities including, but not limited to, discharge of municipal sewage, dumping of solid wastes, rampant use of pesticides and illegal poaching. These waste products form a river of untreated wastewater of more than 5 km long that discharges into the Mediterranean Sea. Wadi Gaza is now mostly dry, other than during periods of heavy rainfall and resultant flash flooding. The draining of the wetland and the urban expansion of Gaza pose threats to the wetland's avifauna.

4.2.4.3 Biodiversity Status of the project area

Table 4.2.4-5 and Figures (Figure 4.2.4-1 to Figure 4.2.4-5) below present the current biodiversity status of the project area (i.e. the identified biodiversity significant areas within the five (5) targeted urban areas) as described in section 4.2.4.2 of this report.

Table 4.2.4-5: Current Biodiversity status in five (5) targeted Urban areas

Urban Area	Category	Name	Area Coverage (km²)	% of the total urban area
Nablus	Key Biodiversity Areas	El Mizrab	3.72	3%
		Ein Sebastia	0.0005	~0%
		Salman Faresi	2.53	2%

[99] *https://www.informea.org/en/node/170/parties*

[100] *GlobWetland II is a regional pilot project of the Ramsar Convention on Wetlands including Palestine, funded through the EuropeanSpace Agency (ESA). The primary objective of GlobWetland II is to facilitate the integration of remote sensing into the conservation and management of wetlands. The overarching objective of the GlobWetland II project is to contribute to the set up of a Global Wetlands Observing System (G-WOS). The GlobWetland II project aims principally at developing a G-WOS pilot information system, also called the GlobWetland II information system. The system consists of maps and system software. The system software capacity was demonstrated through the production of a number of wetland related geo-information maps and indicators, over 200 wetland sites and surrounding areas, which was selected over the coastal catchment areas of the Southern and Eastern part of the Mediterranean basin, extending from Morocco to Turkey (less than 100 km from the coastline) including maps of 5 areas in Palestine (http://webgis.jena-optronik.de/) for three different periods of time (years 1975,1990, 2005) for change detection.*

[101] *State of Environment and Outlook Report for the occupied Palestinian territory, UNEP 2020*

Urban Area	Category	Name	Area Coverage (km²)	% of the total urban area
	IPAs	Wadi Qana -Wadi Eshal'r	8.58	8%
		Yaseed-Ibzeik	0.45	0.4%
	Protected areas (Nature reserves)	Jebel El-Kabir (Jebel Al Ka-beer)	17.24	16%
	Forests	-	1.39	1%
	Wetlands delineation area	Wadi Al-Badhan	64.81	60%
Ramallah and Al Bireh	Key Biodiversity Areas	Jebel El Nijma	0.99	1%
		Ein Qinia	0.66	1%
	IBA	Ein Qinia	10.16	14%
	Protected areas (Nature reserves)	Wadi el Dilb (Wadi Al Dilb)	1.73	2%
Bethlehem	Key Biodiversity Areas	Wadi Al Makhrour	1.85	3%
		Jebel Abu Ghunaim	3.54	6%
		Suleiman Pools	1.01	2%
	IBAs	Jerusalem (East)	4.41	8%
	Forests	-	0.634	1%
Hebron	Key Biodiversity Areas	West Karma	0.0013	~0%
		Tarqoumia	0.0001	~0%
		Beit Hahil	1.14	1%
		Ith-nah-Suba	3.36	2%
		Dura Al Qare'a	1.60	1%
		South East Al ghowar	2.91	2%
	IPAs	Khall (Hebron) Gradient	40.10	25%
	Protected areas (Nature reserves)	Wadi el Quff	1.64	1%
		Suba	8.49	5%
		Fuqeiqis	0.80	~0%
	Forests	-	2.73	2%
Gaza	Protected areas (Nature reserves)	Wadi Gaza	53.16	95.6

Further to the above, according to literature review, there is a natural wetland (balou') area in Al Bireh and Beitunia[102], however geospatial data are available on its exact location.

The main pressures and threats faced in the identified protected areas within the targeted urban areas are as follows:

- Jebel El-Kabir (Jebel Al Ka-beer) in Nablus Urban Area is faced with are fires and grazing; 66.7% of its total area within Nablus Urban Area limits is located within Area C.
- Wadi el Dilb (Wadi Al Dilb) in Ramallah Al Bireh Urban Area is faced with are grazing and habitat destruction; 33.9% of Wadi el Dilb (Wadi Al Dilb) total area within Ramallah and Al Bireh Urban Area limits is located within Area C.
- Wadi el Quff in Hebron Urban Area is faced with are grazing and drought;
- Suba in Hebron Urban Area is faced with logging and grazing; 31.5% of Suba total area within Hebron Urban Area limits is located within Area C.

There are no data on the pressures and threats that Fuqeiqis within Hebron Urban Area is faced with. 100% of Fuqeiqis area within Hebron Urban Area limits is located within Area C.

[102] http://environment.pna.ps/ar/files/Third_national_Report_On_Biodiversity.pdf

The Key Biodiversity Area (Jebel Abu Ghuneim) in Bethlehem Urban Area is now converted into urban areas.

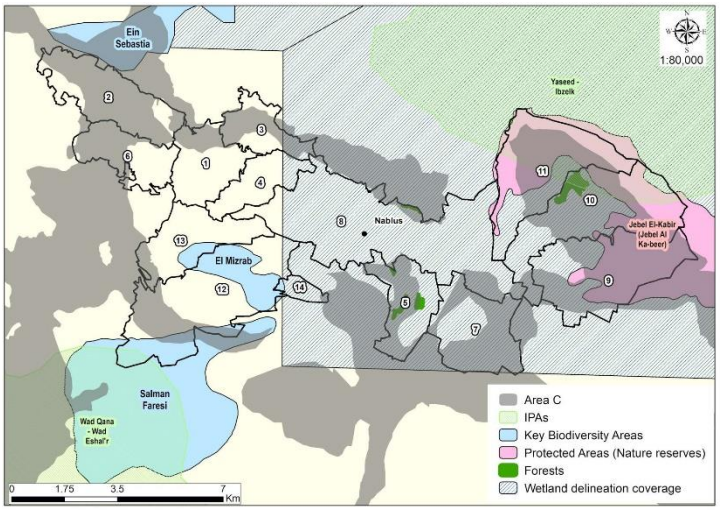


Figure 4.2.4-1: Current Biodiversity status in Nablus Urban Area

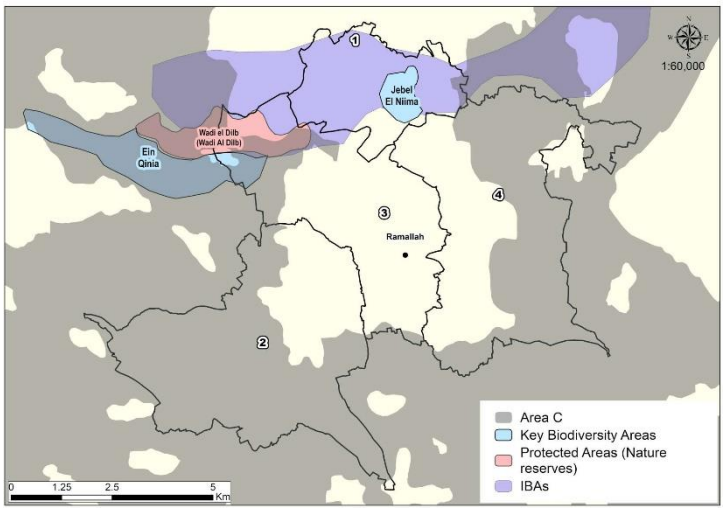


Figure 4.2.4-2: Current Biodiversity status in Ramallah and Al Bireh Urban Area

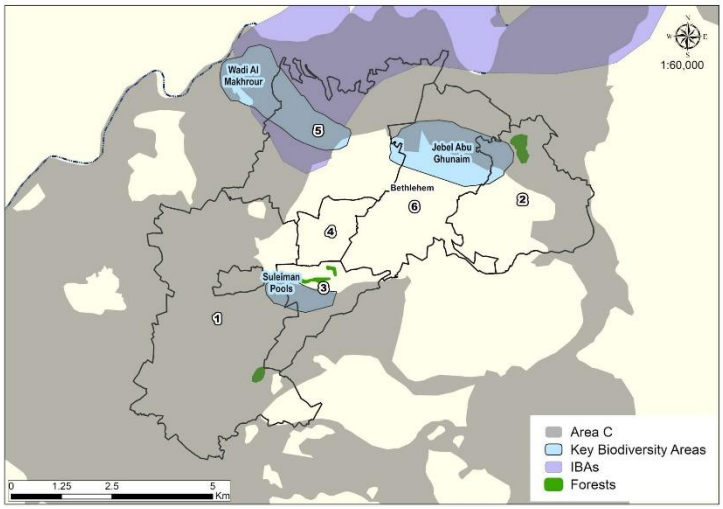


Figure 4.2.4-3: Current Biodiversity status in Bethlehem Urban Area

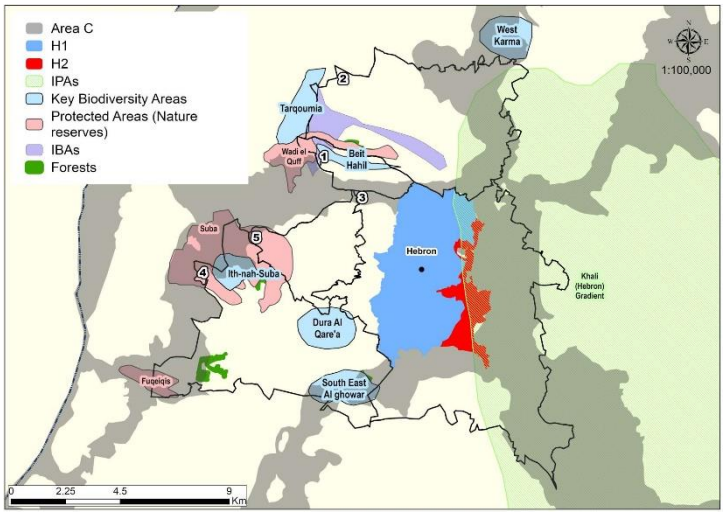


Figure 4.2.4-4: Current Biodiversity status in Hebron Urban Area

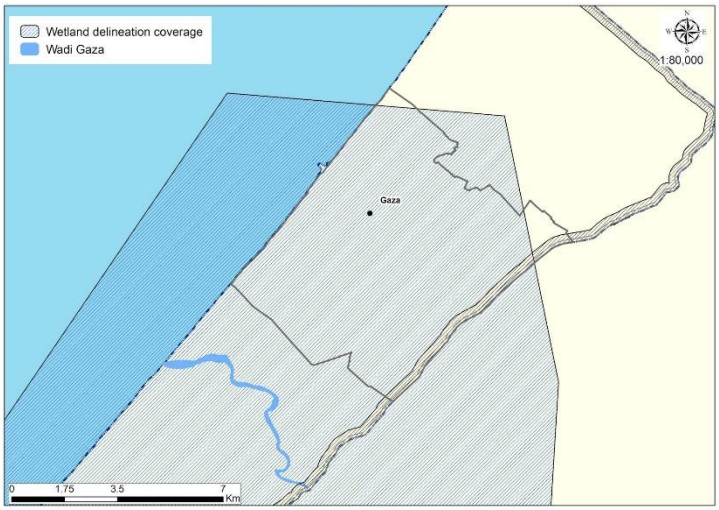


Figure 4.2.4-5: Current Biodiversity status in Gaza Urban Area

Source: MoLG - ICUD GIS database, https://geomolg.ps/

4.2.4.4 Biodiversity Loss[103]

The main forces driving biodiversity loss in Palestine are:

- Habitat destruction, which comes from a broad range of sources including: unplanned urban expansion; unplanned forestry activities; settlements; overgrazing in dryland areas; wetland reclamation; and mining and quarrying;
- The constant increase in population density on a fixed amount of land and resources and the unplanned development. Zoning for urban, industrial, agricultural, recreational, protected areas and territories for other destination is urgently needed;
- Pollution from (i) agro-chemicals; (ii) liquid waste; and (iii) solid waste;
- Illegal trade and hunting. Species effected by illegal trade include various desert reptiles and songbirds. Large mammals are vulnerable to hunting.

Land expropriation by Israel and construction of the separation barrier has led to environmental degradation, particularly for biodiversity, as follows:

-
- Fragmentation of ecosystems and habitats, which can isolate and limit the movement of land animals and access to their habitats;
- Removal and clearing of natural vegetation cover from wilderness areas through which the separation barrier passes. This deprives wildlife of sources of food and shelter; and
- Impact on all ecosystem goods and services
- Habitat fragmentation, urbanization and barrier construction are considered by the Environmental Quality Authority to pose "very high" threats to biodiversity in the West Bank.

In Gaza, desertification, soil erosion, land degradation, overexploitation and pollution are assessed to pose "very high" threats to biodiversity.

4.2.5 Water

4.2.5.1 Surface water

Surface water resources in Palestine consist of the Jordan River and mostly ephemeral wadis flowing towards the Mediterranean, the Jordan Valley and the Dead Sea. [104] The surface water resources identified in the five (5) targeted urban areas are wadis and coastal waters; these are discussed below.

Wadis

Palestine experiences a range of rainfall intensities. In the event of high rainfall intensity, most of the rain and water flows into wadis and valleys and from there either to the Mediterranean or the Dead Sea. The West Bank contains 10 to 15 major streams that either drain toward the Mediterranean Sea in the west or the Dead Sea/Jordan River system in the east. In the Gaza Strip, the major wadis

[103] *National Biodiversity Strategy And Action Plan For Palestine 1999*
[104] *State of Environment and Outlook Report for the occupied Palestinian territory 2020, https://reliefweb.int/sites/reliefweb.int/files/resources/SEORP.pdf*

originate east of the border where Israel is blocking the natural flow for irrigation purposes. This makes the wadis dry except in years of heavy rainfall.[105]

Table 4.2.5-1 shows the main catchment areas within the five (5) targeted urban areas and their average flow rate.

Table 4.2.5-1: Average flow rate of catchment areas within the five (5) targeted urban areas

Urban Area	Catchment	Average flow rate (mcm)	Coverage	
			(km²)	% of total Urban Area
Nablus	Faria	6.4	50.00	46.2%
	Alexander-Zeimar	8.7	28.15	26.0%
	Alexandar-Abraq	8.1	23.60	21.8%
	Qana	12.8	6.45	6.0%
Ramallah and Al Bireh	Al-Dilb	16.4	40.12	55.7%
	Qilt	4.2	12.56	17.4%
	Soreq	2.1	8.90	12.4%
	Sarida	22.8	6.80	9.4%
	Salman	6.5	2.45	3.4%
	Nueima	1.7	1.17	1.6%
Bethlehem	Daraja	5.3	34.80	63.2%
	Soreq Al sarar	1.7	16.60	30.1%
	Lakhish-Saint	5	3.60	6.5%
	Ghar	6.5	0.10	0.2%
Hebron	Besor-Nar	4.9	68.00	41.8%
	Lakhish	5.4	57.30	35.2%
	Lakhish-Saint	5	14.18	8.7%
	Ghar	6.5	13.20	8.1%
	Shiqma	2.6	5.76	3.5%
	Abu El-hayyat	2.4	3.78	2.3%
	Besor	2.1	0.58	0.4%
Gaza	Wadi Gaza	1.5-2	14.05	25.3%
	Unknown	-	-	74.7%

Sources:
Palestinian Water Authority, 2013, STATUS REPORT OF WATER RESOURCES IN THE OCCUPIED STATE OF PALESTINE-2012, http://www.pwa.ps/userfiles/file/%D8%AA%D9%82%D8%A7%D8%B1%D9%8A%D8%B1/%D8%AA%D8%B5%D9%86%D9%8A%D9%81%201/WR%20STATUS%20Report-final%20draft%202014-04-01.pdf
UN-ESCWA and BGR (United Nations Economic and Social Commission for Western Asia; Bundesanstalt für Geowissenschaften und Rohstoffe). 2013. Inventory of Shared Water Resources in Western Asia. Beirut. CHAPTER 20 - COASTAL AQUIFER BASIN, https://www.unescwa.org/sites/www.unescwa.org/files/publications/files/e_escwa_sdpd_13_inventory_e.pdf

In the absence of sufficient wastewater infrastructure and limited number of wastewater treatment plants (see section 4.2.5.6.2 below) in the West Bank to deal with the generated wastewater, Wadis in many cases are converted to wastewater streams, polluting the surrounding environment; leaching contaminants into groundwater, and increasing the health risks of waterborne diseases. [106] More specifically: [107]

- Hebron Stream (Wadi Al Samen), which flows towards the Beer Sheva Valley and contributes to the Besor Stream (Besor Nar catchment), has become a polluted wastewater channel. Nearby communities suffer badly from polluted water, odour, flies and mosquitoes.

[105] https://procurement-notices.undp.org/view_file.cfm?doc_id=27192
[106] *ARIJ, 2015, Status of the Environment in the State of Palestine – 2015, https://www.arij.org/files/arijadmin/2016/SOER_2015_final.pdf*
[107] *State of Environment and Outlook Report for the occupied Palestinian territory 2020, https://reliefweb.int/sites/reliefweb.int/files/resources/SEORP.pdf*

- Nablus Stream (Wadi Al Zomar), which flows in a westward direction, has become a wastewater channel for Nablus, while in the downstream section it also serves as a wastewater channel for Tulkarem. Flows containing wastewater from both sources debouch into the Alexander Stream to the west of the Green Line (Alexander Zeimar catchment).

- Other major wastewater streams include
  - Wadi Suriq near Ramallah (Salman Catchment),
  - Wadi Al-Bathan (Faria Catchment) and Wadi Al-Zuhur (Qana Catchment) near Nablus and
  - Wadi Beit Jala (Soreq Al Sarar Catchment) near Bethlehem.

- Wadi Gaza is rapidly degrading due to anthropogenic activities including, but not limited to, discharge of municipal sewage, dumping of solid wastes, rampant use of pesticides and illegal poaching. These waste products form a river of untreated wastewater of more than 5 km long that discharges into the Mediterranean Sea. [108] Wadi Gaza flow rate is limited in most of days due to the Israeli barriers at the Gaza Strip borders. In some of rainy days Israeli remove the barriers and cause flooding problems.

As shown in Table 4.2.5-2 below, which presents wastewater characteristics of some wadis in West Bank, nitrate (NH_4) and chloride (Cl) concentrations' values are very high and well above the limits that are toxic to aquatic organisms; this is due to intensive use of agricultural pesticides and to the sewage inflow into wadis and is expected to have significant implications for the ecological systems that rely on this water.

Table 4.2.5-2: Quality data of some wastewater streams within the Governorates relevant to the project (average)

Wadi	pH	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	NH4 (mg/l)	PO4 (mg/l)	Cl (mg/l)	B (mg/l)	TDS (mg/l)	DO (%)	Temp. ° C
Wadi Al Samen	7.6	265.2	404.3	9,774.7	104.0	1.9	754.8	5.0	1,839.3	1.9	20.4
Wadi Al Zomar	7.6	282.4	502.7	3,566.7	81.9	1.5	774.7	6.4	1,736.5	1.4	19.8
Wadi Beit Jala	7.8	468.7	900.0	625.6	114.3	2.1	422.7	5.6	1,437.7	1.9	20.4
Wadi Al-Zuhur	7.3	241.8	493.3	285.3	35.6	1.4	258.3	9.6	1,013.2	1.3	20.1

Source: House of Water & Environment, 2012 Understanding and Analyzing the Current Israeli, Wastewater Practices for Transboundary, https://ecopeaceme.org/uploads/Transboundary_Final_Report_HWE_April_2012.pdf

[108] *State of Environment and Outlook Report for the occupied Palestinian territory 2020, https://reliefweb.int/sites/reliefweb.int/files/resources/SEORP.pdf*



Figure 4.2.5-1: Wadi East of Nablus - Industrial & domestic Wastewater Flow (left) & Wastewater dumping (right)



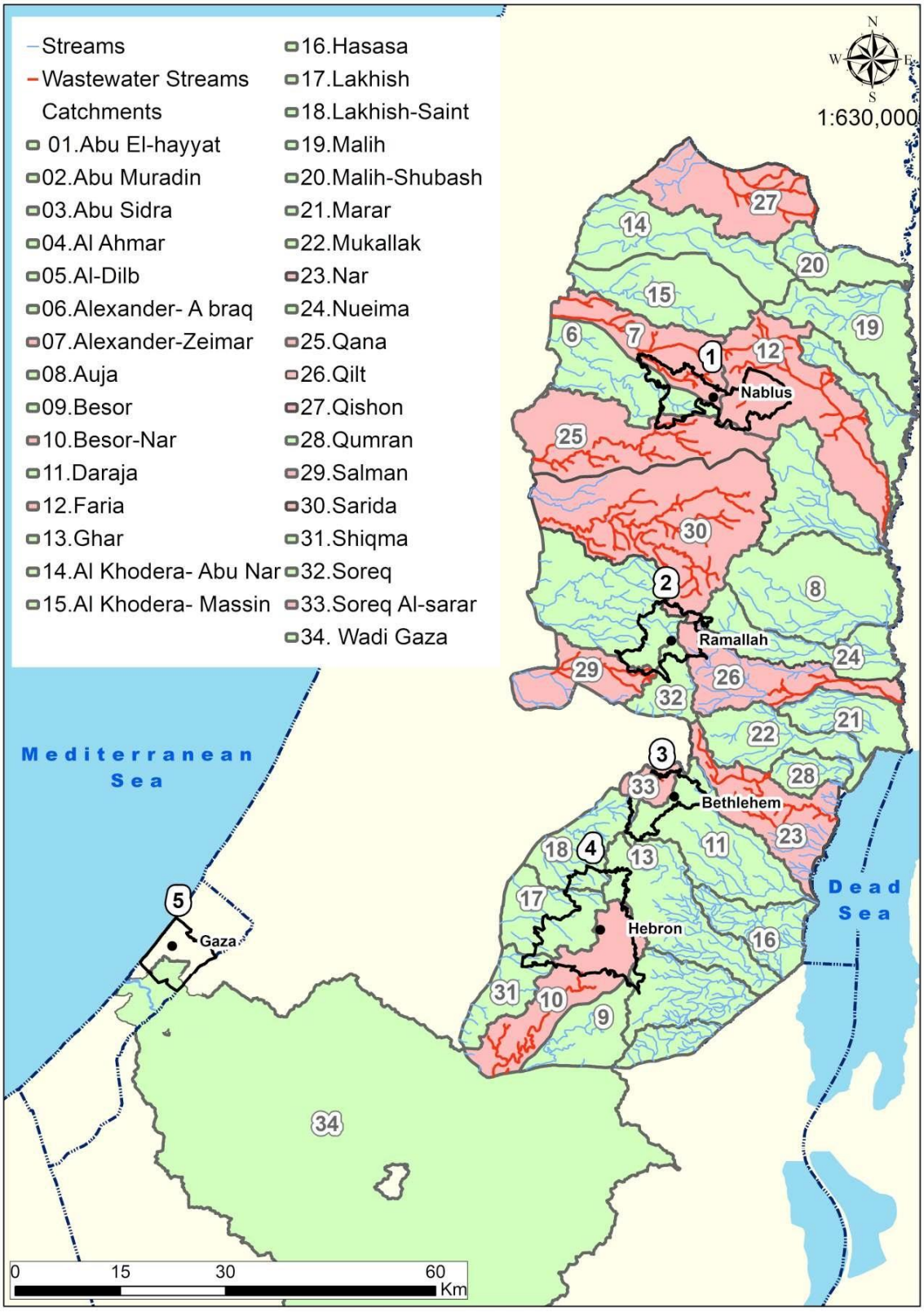
Figure 4.2.5-2: Wastewater flow and Solid Waste Dumped at Wadi Al-Samen Hebron



Figure 4.2.5-3: Wastewater flow and Solid Waste Dumped at Wadi Zomar_Nablus West

Source: local project team

Figure 4.2.5-4 below shows the surface catchment areas, streams and main wastewater streams within the five (5) targeted urban areas. Most wastewater streams are located within Nablus Urban Area; this affects three out of four catchment areas in Nablus Urban Area. For more details see Annex I 'Water and wastewater streams'.



Note: The pink areas are catchments that include wastewater streams

Figure 4.2.5-4: Surface catchment areas, streams and wastewater streams (red lines) within the five (5) targeted urban areas

Sources:
Palestinian Water Authority, 2013, STATUS REPORT OF WATER RESOURCES IN THE OCCUPIED STATE OF PALESTINE-2012
MoLG - ICUD GIS database, https://geomolg.ps/
House of Water & Environment, 2012 Understanding and Analyzing the Current Israeli, Wastewater Practices for Transboundary, Wastewater Management from Palestinian, https://ecopeaceme.org/uploads/Transboundary_Final_Report_HWE_April_2012.pdf

With respect to surface water harvesting and collection, the potential for water harvesting of surface water is limited due to weak financial possibilities and lack of technical and engineering expertise in this area and also the control of land and water resources; however, a limited number of small dams have been established, as summarized in Table 4.2.5-3 below. These dams have faced some technical problems and need to be repaired.

Table 4.2.5-3: Water harvesting facilities in West Bank

No.	Description	Location	Storage Capacity (m^3)	Amount Used (m^3)
1	Al- Oja Dam	Jericho Area	750,000	Not used until now
2	**Al- Fara'a Dam**	**Nablus Area**	**35,000**	**Not used until now**
3	Beit Al- Rush Dam	Hebron Area	200,000	Not used until now
4	**Bani Naim Dam**	**Hebron Area**	**220,000**	**220,000**
5	Rain Water Pond in Arraba	Jenin	76,000	76,000
6	Small Agricultural Ponds	-	2,000,000	2,000,000
Total (in West Bank)			3,281,000	2,296,000

Source: Water Resources in Palestine – Present situation for the water resources for the year 2019 – October 2020

There is a limited number of impoundments near villages where surface water is collected for agricultural, drinking and sanitary purposes. [109] In Gaza, because the topography is flat and land is scarce, the scope for storing and using any remaining surface water is very limited.

In response to the growing water shortages, concerted efforts were made to harvest and collect surface water, mainly in cisterns with capacities of 80–100 mcm. It is estimated that the annual water collected is in the range of 3 to 4 mcm, most of it used for the supplementary irrigation of fruit trees, in particular olives. [110]

Israel does not permit the establishment of small and medium-sized dams to be used to collect and store rainwater and release it at appropriate times throughout the year. [111]

It should be noted that some of the partially treated wastewater from Palestinian towns and villages and untreated wastewater streams flow into Israel and is treated or partially treated in Israeli treatment plants (Bethlehem and Beit Jala at the Soreq plant, Tulkarem and Nablus at the Yad Hannah plant, and Qalqiliya at the Drom Sharon Mizrachi plant) and thereafter reused in the Israel's agricultural sector. The cost associated with this treatment is charged to the PWA and deducted annually by Israel from Palestinian tax revenues. [112] The Palestinian Authority reports that Israeli settlements discharge 40 mcm per year of untreated wastewater into wadis.

Coastal Water

The coastline of the Gaza strip forms only a small section of a larger concave system (a 'littoral cell') that extends from Alexandria to the Bay of Haifa. Within this concave SE corner of the Mediterranean, the relatively short 42 km Gaza coastline is almost straight[113]. The length of Gaza Urban Area's coastline is about 8.5 km; 21,2% of the total coastline in Gaza Strip.

[109] *State of Environment and Outlook Report for the occupied Palestinian territory 2020, https://reliefweb.int/sites/reliefweb.int/files/resources/SEORP.pdf*
[110] *https://unctad.org/en/PublicationsLibrary/gdsapp2015d1_en.pdf*
[111] *https://unctad.org/en/PublicationsLibrary/gdsapp2015d1_en.pdf*
[112] *State of Environment and Outlook Report for the occupied Palestinian territory 2020, https://reliefweb.int/sites/reliefweb.int/files/resources/SEORP.pdf*
[113] *Gaza Coastal and Marine Environmental Protection and Management Action Plan*

In Gaza, sewage treatment plants have been damaged by conflicts, and are affected by power outages and lack of adequate maintenance. Approximately 80,000–100,000 m³ of sewage, partially treated and raw wastewater, are released every day to the Mediterranean Sea. In Wadi Gaza, municipal sewage, dumping of solid wastes and other anthropogenic activities form a river of untreated wastewater of more than 5 km long that discharges into the Gaza Sea. The discharge of raw or partially treated sewage into the Gaza sea continues and flows northward with the current, reaching Ashkelon and the desalination plant in the southern shores of Israel.

According to the Environment Quality Authority in Gaza, by June 2019 around 64% of Gaza's beaches were contaminated compared to 74% recorded in April 2018 (see Figure 4.2.5-5).[114] The Environmental Quality Authority in Gaza declared the beaches of Gaza City, the main destination for internal tourism, and in Rafah governorates, as highly polluted. These beaches constitute 75% of all Gaza beaches and swimming in these areas is strongly discouraged.

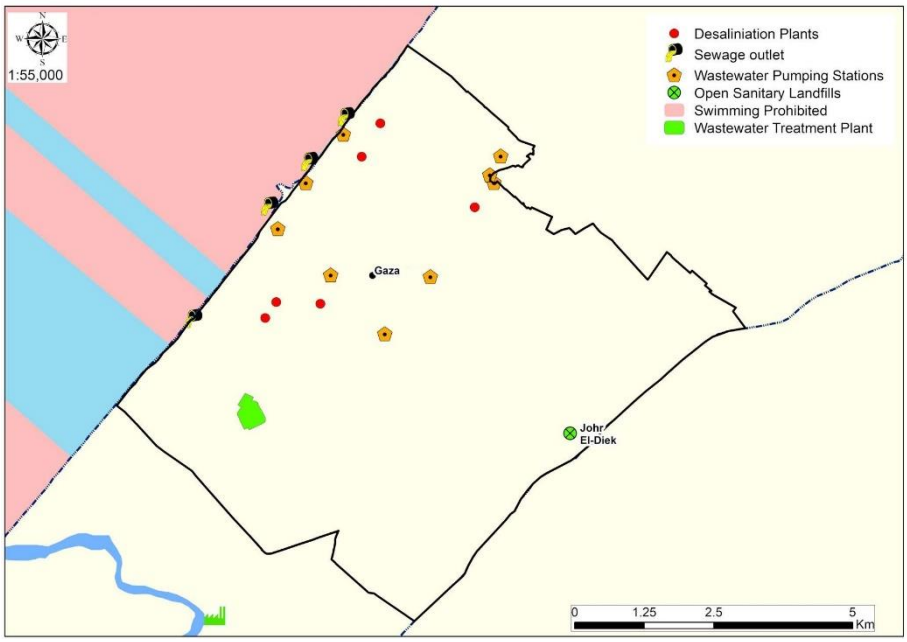


Figure 4.2.5-5: Water and wastewater status, Gaza Urban Area

Sources:
MoLG - ICUD GIS database, https://geomolg.ps/
OCHA, 2019, Increased electricity supply improves access to water and sanitation in Gaza, https://www.ochaopt.org/content/increased-electricity-supply-improves-access-water-and-sanitation-gaza
Spatial and Sectoral Assessment Report, 2020, World Bank, Integrated Cities and Urban Development Project Gaza City - Improving Resilience of Urban Service Systems

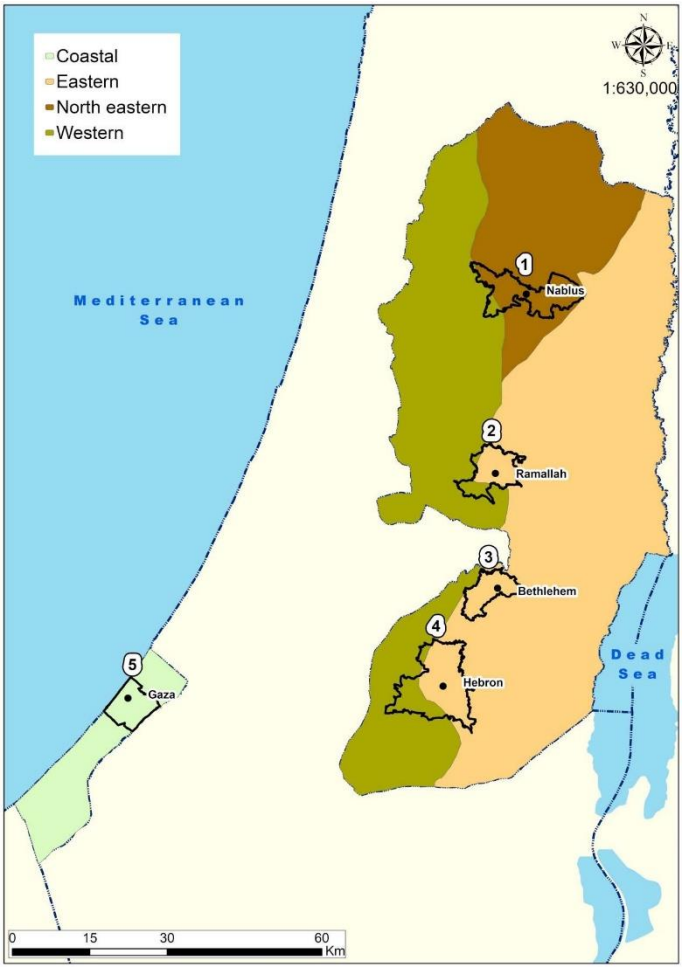
One of the biggest problems regarding beach pollution in Gaza is the problem of construction debris that the harbor authority used for a long time to dump in the sea to build the fishery harbor. This practice actually added huge amount of debris into the sea. Another dangerous phenomenon that takes place from time to time is the illegal disposal of some hazardous chemicals to the sea.[115]

[114] *OCHA, 2019, Increased electricity supply improves access to water and sanitation in Gaza, https://www.ochaopt.org/content/increased-electricity-supply-improves-access-water-and-sanitation-gaza*
[115] *Afifi, S., Elmanama, A., Shubair, M., Microbiological Assessment of Beach Quality in Gaza Strip,2000.*

4.2.5.2 Groundwater

Aquifer basins - hydrogeology

Groundwater is considered the main source of fresh water for the Palestinians in the West Bank and Gaza Strip. The system is classified into four groundwater basins: three major basins in West Bank (Western, North Eastern and Eastern), comprising the Mountain Aquifer and the only source of water in the Gaza Strip, the Coastal Aquifer. As presented in Figure 4.2.5-6 below Bethlehem Urban Area falls within the Eastern Aquifer; Ramallah & Al Bireh and Hebron Urban Areas fall mostly within the Eastern Aquifer, with approximately 30% of their surface falling within the Western Aquifer. Nablus falls within the North Eastern Aquifer, while Gaza Urban Area falls within the Coastal Aquifer.



Urban Area	Percentage of area within Groundwater basins			
	Eastern	North Eastern	Western	Coastal
Nablus	-	90.3%	9.7%	-
Ramallah and Al Bireh	72.4%	-	27.6%	-
Bethlehem	98.6%	-	1.4%	-
Hebron	68.0%	-	32.0%	-
Gaza	-	-	-	100.0%

Figure 4.2.5-6: Groundwater basins within five (5) targeted urban areas

Source: Palestinian Water Authority (PWA), Annual water status report 2011, http://pwa.ps/userfiles/file/%D8%AA%D9%82%D8%A7%D8%B1%D9%8A%D8%B1/Annual%20Water%20Status%20report%202011.pdf

In their majority, the dominant geology types per Urban Area in the West Bank have high recharge rates. In geology types with low recharge rate, water level decline is more likely, thus making these areas less preferable for agricultural uses. In Gaza Urban Area the geology types are of unknown recharge rate. Recharge rates of Geology types and Hydrogeology types per Urban Area, are summarized in Table 4.2.5-4.

Table 4.2.5-4: Recharge rate and hydrogeology of geology types per Urban Area

Recharge rate	Geology type	Hydrogeology type	Urban Area				
			Nablus	Ramallah and Al Bireh	Bethlehem	Hebron	Gaza
High	Albian	Lower *Aquifer* (BK)	3.9%	76.1%	7.5%	34.7%	-
	Cenomanian	Upper *Aquifer* (Heb,Beth,Jer)	30.8%	3.4%	37.6%	29.9%	-
	Turonian	Upper *Aquifer* (Heb,Beth,Jer)	8.0%	-	11.2%	7.0%	-
Total area with ***high*** recharge rate			**42.7%**	**79.5%**	**56.3%**	**71.6%**	**-**
Medium to High	Eocene	Shallow *Aquifer* (Eocene)	16.1%	-	-	-	-
Total area with ***medium*** recharge rate			**16.1%**	**-**	**-**	**-**	**-**
Low to Medium	Lower Cenomanian	*Aquitard* (Yatta)	4.8%	14.5%	21.5%	26.6%	-
Low	Senonian	*Aquitard* (AD)	33.4%	-	22.2%	1.6%	-
Very Low	Lower Cretaceous	Lower Cretaceous	0.2%	6.0%	-	0.2%	-
	Quaternary	Quaternary	2.8%	-	-	-	-
Total area with ***low*** recharge rate			**41.2%**	**20.5%**	**43.7%**	**28.4%**	**-**
Unknown	Pleistocene- Recent (Alluvium or Sand Dunes)	Unknown	-	-	-	-	100.0%

Source: MoLG - ICUD GIS database, https://geomolg.ps/

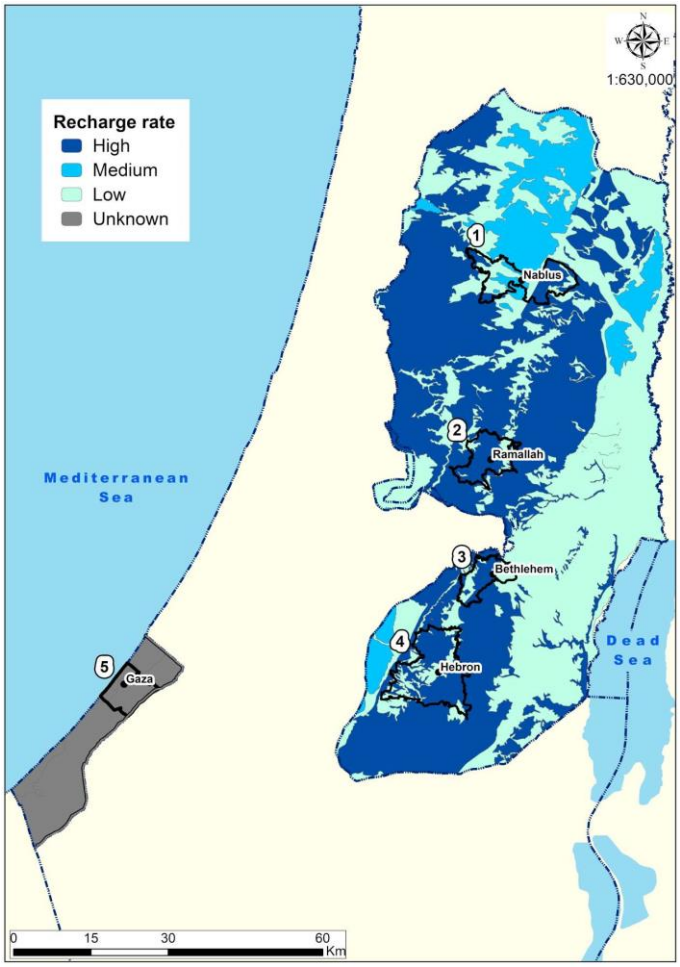


Figure 4.2.5-7: Recharge rate

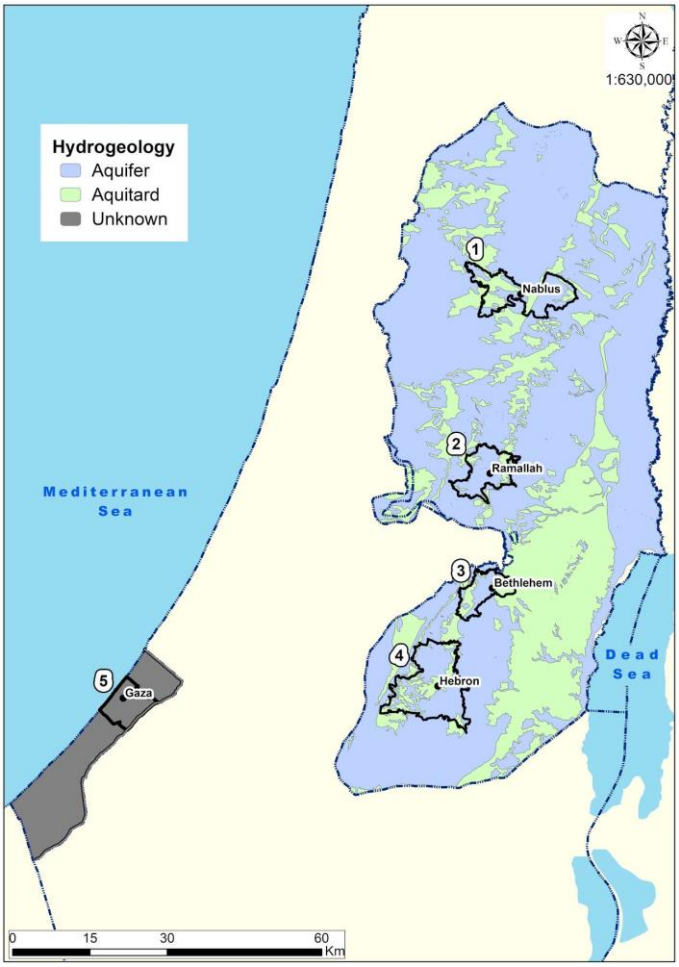


Figure 4.2.5-8: Hydrogeology

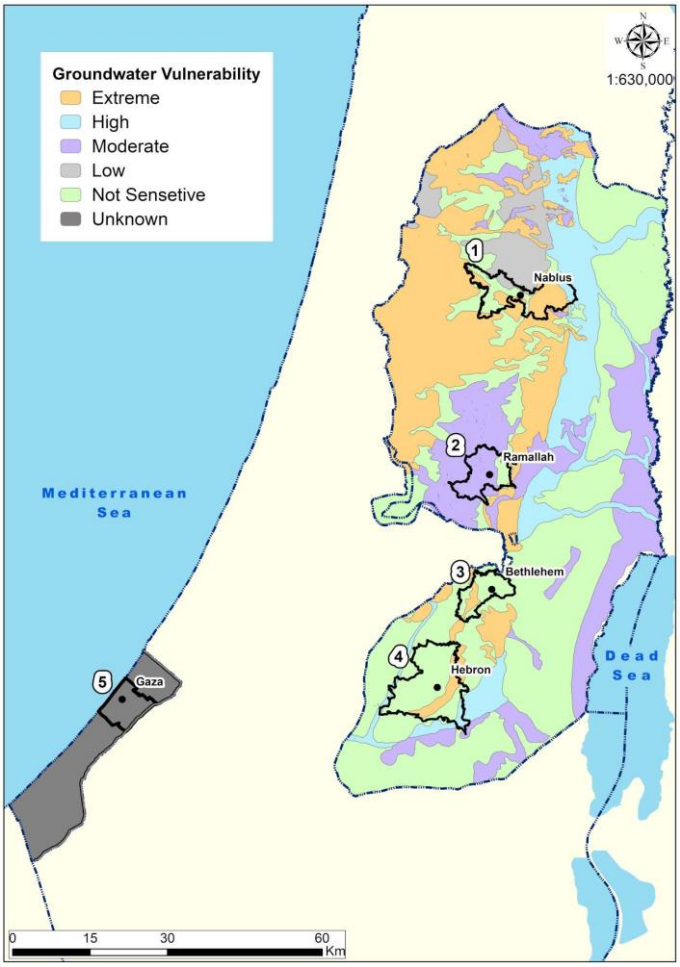
Source: MoLG - ICUD GIS database, https://geomolg.ps/

Groundwater vulnerability

Groundwater vulnerability depends on hydrogeological factors that are related to the movement of pollutants from the ground surface to the aquifer.

Some areas and aquifers are more vulnerable than others, depending on the characteristics of the physical system. These characteristics include: the depth of groundwater, the net recharge, the aquifer media, the soil media, the topography, the impact of vadose zone and the hydraulic conductivity. Since groundwater is hydrologically connected to the land surface, it is the "effectiveness of connection" through the unsaturated zone that mostly determines the aquifer's vulnerability to contamination. Aquifers that receive water (and contaminants) quickly from the land surface are considered more vulnerable than aquifers that receive water (and contaminants) more slowly and in lower quantities.

According to MoLG-ICUD GIS database, Figure 4.2.5-9 below presents the groundwater vulnerability in the five targeted urban areas.



Groundwater Vulnerability	Urban Area				
	Nablus	Ramallah and Al Bireh	Bethlehem	Hebron	Gaza
Extreme	43.14%	3.35%	17.95%	16.10%	No data
High	7.90%	0%	0%	5.80%	
Moderate	0.06%	77.05%	0%	0.50%	
Low	9.25%	0%	0%	0%	
Not Sensitive	39.65%	19.60%	82.05%	77.60%	

Figure 4.2.5-9: Groundwater vulnerability (Sensitive areas for water resources pollution) per Urban Area
Source: MoLG - ICUD GIS database, https://geomolg.ps/

Groundwater quality

West Bank

Although groundwater quality in the West Bank is generally acceptable, localized high concentrations of nitrates and chlorides have been identified[116].

[116] *Securing water for development in West Bank and Gaza. Washington, DC: World Bank, 2018*

Elevated nitrate concentrations in the groundwater and spring water of the West Bank are of increasing concern. 9% and 7% of samples in 2007 and 2009, respectively, contain nitrate concentrations above the Maximum Allowable Concentration of 50 mg/L of Palestinian and WHO guidelines. Highest values were recorded in Ramallah (293 mg/L) and Nablus (130 mg/L).

The areas with the most elevated **nitrate concentrations** are areas characterized by heavy agricultural activities. Other anthropogenic influences are from nitrogen fertilizers, pesticides, manure and animal farms. However, nitrate contamination in populated areas, where no agricultural activities exist, is attributed to leaking septic and sewer systems. Overall, the combination of poor wastewater facilities, uncontrolled intensive chemical fertilizers use for agriculture, Israeli settlement wastewater and aquifer vulnerability (karstic aquifers) are causing nitrate contamination levels to rise.

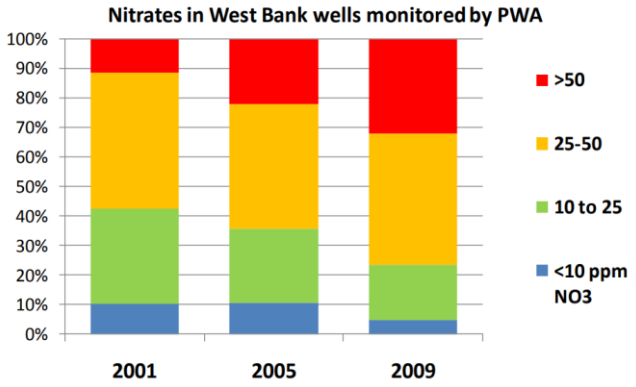


Figure 4.2.5-10: Percentage of wells in West Bank with nitrates in excess
Source: https://procurement-notices.undp.org/view_file.cfm?doc_id=27192

Data on groundwater quality in West Bank are limited to selected wells located in the Jordan Valley, Qalqiliya, and Tulkarm. In Tulkarm and Qalqiliya, water testing shows that the nitrate concentration exceeds the WHO allowable limit (50 mg/L) in some wells, while the **chloride concentration** in these wells remains within acceptable limits [117] [118] [119] . Most of the wells in the Jordan Valley have a high concentration of chloride, exceeding the acceptable guideline set by the WHO (250 mg/L), while the nitrate concentration is quite low.

Gaza [120]

In Gaza Strip, the principal sources of groundwater pollution are poorly treated or raw sewage and the lateral inflow of saline groundwater and seawater.

The majority of Gaza households are connected to a sewage network (see section 4.2.5.6.2 below), but as most treatment plants are currently not or only partly functional, only small amounts of sewage are treated. As a result, wastewater is discharged into wastewater lagoons, wadis, open cesspits or directly into the Mediterranean Sea. The intensive use of agricultural pesticides, along with the inflow of sewage into the aquifer, has resulted in high concentrations of nitrate in groundwater in Gaza

[117] *http://documents1.worldbank.org/curated/en/736571530044615402/pdf/Securing-water-for-development-in-West-Bank-and-Gaza-sector-note.pdf*
[118] *State of Environment and Outlook Report for the occupied Palestinian territory 2020, UNEP 2020, https://reliefweb.int/sites/reliefweb.int/files/resources/SEORP.pdf*
[119] *PWA. (2013). Status Report of Water Resources in the Occupied State of Palestine - 2012. Palestinian Water Authority. Retrieved May 3, 2019, http://www.pwa.ps/ userfiles/file/%D8%AA%D9%82%D8%A7%D8%B1%D9%8A%D8%B1/%D8%AA%D8%B5%D9%86%D9%8A%D9%81%201/WR%20STATUS%20Report-final%20draft%202014- 04-01.pdf*
[120] *Palestinian water Authority, Water Resources Directorate, 2018, Gaza Water Status Report 2017*

Strip. As a consequence, over 90% of the total groundwater volume in Gaza is unfit for domestic use according to internationally accepted guidelines. [121]

The actual concentration of nitrate varies from 50 mg/L in non-residential areas (southeast of Rafah) to more than 300 mg/L in parts of Gaza that are still served by cesspits, such as Khan Younis (Figure 4.2.5-11). Only small parts of the aquifer in Northern Gaza and west of Khan Younis have waters with a chloride concentration of less than 250 mg/L. Chloride concentrations in the aquifer vary between 500 and 1,500 mg/L, while along the coastline the concentration of chloride exceeds 2,000 mg/L. (Figure 4.2.5-12); this is due to saltwater intrusion as a result of excessive pumping, but also to the intensive use of agricultural pesticides along with the inflow of untreated or undertreated sewage into the aquifer.

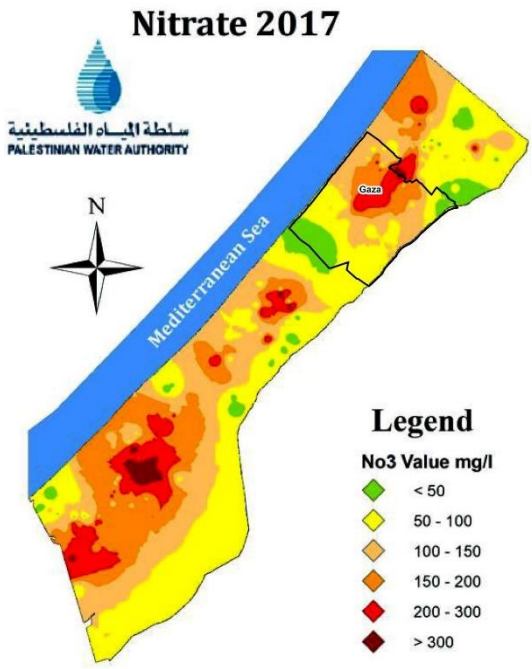


Figure 4.2.5-11: NO3 Contour Map 2017

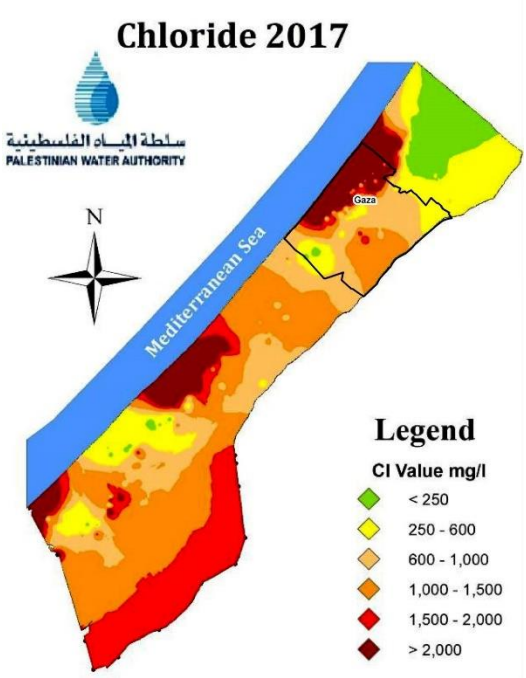


Figure 4.2.5-12: Chloride Contour Map 2017

Source: Palestinian water Authority, Water Resources Directorate, 2018, Gaza Water Status Report 2017

Partially treated wastewater infiltrates into the groundwater in North Gaza. Although pollution levels have reduced from a biological oxygen demand average level of 265 mg/L in 2017 to an average of 185.6 mg/L during the first five months of 2019, the level is far above the international standard of 60 mg/L.[122]

Figure 4.2.5-13 shows selected wells that are characterized by continued trend decline of groundwater levels. The significant water level decline occurred in the wells that are located in the central part of the northern area with maximum decline of 5.8 m below MSL.

[121] *UN-ESCWA and BGR (United Nations Economic and Social Commission for Western Asia; Bundesanstalt für Geowissenschaften und Rohstoffe). 2013. Inventory of Shared Water Resources in Western Asia. Beirut. CHAPTER 20 - COASTAL AQUIFER BASIN, https://www.unescwa.org/sites/www.unescwa.org/files/publications/files/e_escwa_sdpd_13_inventory_e.pdf*

[122] *OCHA 2019*

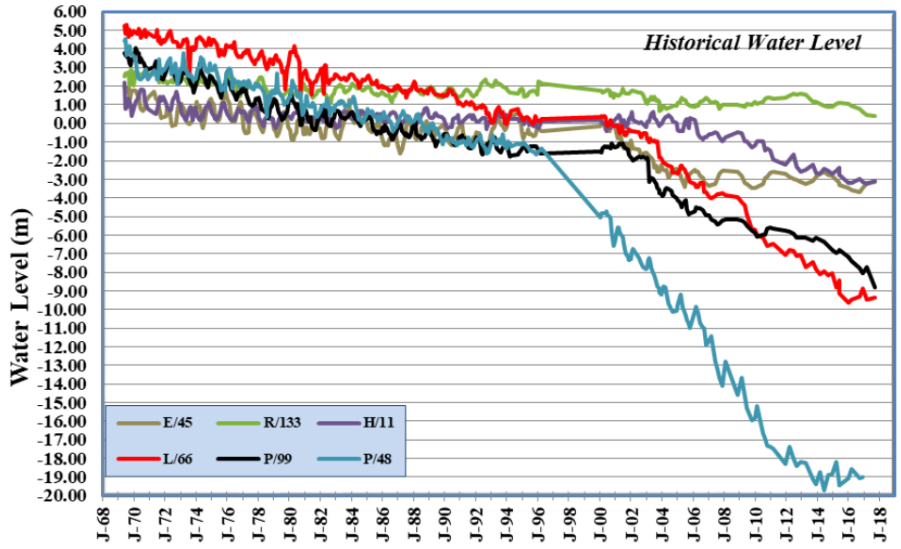


Figure 4.2.5-13: Continuous Decline Trend (1968-2018)

Source: Palestinian water Authority, Water Resources Directorate, 2018, Gaza Water Status Report 2017

Groundwater Abstractions – Wells & Springs

During the Oslo process, Israel and the Palestine Liberation Organization identified water as a final status issue, allocation of which would be resolved via the envisaged comprehensive peace agreement. The 1995 Interim Agreement clarified that the Palestinians had water rights, though the extent of such rights was not specified. In 1995, the parties agreed to coordinate the use of shared waters. Of the total "estimated potential" of the three aquifers, 483 mcm was allocated to Israel (71%) and 138 mcm was allocated to the Palestinians (20%). Of the Palestinian share, 20.5 mcm was to come from "additional wells" yet to be developed. The balance of 57.5 mcm was left "to be developed" from the Eastern Aquifer[123]. 70% of Ramallah and Al Bireh Urban Area, 100% of Bethlehem Urban Area and 70% if Hebron Urban Area fall within the Eastern Aquifer; and could exploit the unallocated 57.5 mcm of from the Eastern Aquifer.

Table 4.2.5-5: West Bank: Allocation of water resources of the three shared aquifers under Article 40 of the Oslo II Accord (mcm) [124]

Aquifer	Article 40 allocation				
	Estimated potential	Total Palestinian	Total Israeli	Unallocated	Total
Western	362.0	22.0	340.0	-	362.0
North Eastern	145.0	42.0	103.0	-	145.0
Eastern	172.0	54.0	40.0	-	94.0
Eastern (additional wells)	-	20.5	-	-	20.5
Eastern (unallocated)	-	-	-	57.5	57.5
Total	679.0	138.5	483.0	57.5	679.0
% of total		20%	71%	9%	100%

Source: Toward Water Security for Palestinians: West Bank and Gaza Water Supply, Sanitation, and Hygiene Poverty Diagnostic. Washington, D.C.: World Bank Group (WBG)

Palestinian abstractions in the West Bank have been in the range 113 MCM – 138 MCM, or about 17-20% of the "estimated potential" from Article 40 of the Oslo Agreement (see Table 4.2.5-5 above) of West Bank aquifers, which is 679 MCM/year. The estimated recharge is 620-887 MCM per year.

[123] *State of Environment and Outlook Report for the occupied Palestinian territory, UNEP 2020*
[124] *Toward Water Security for Palestinians: West Bank and Gaza Water Supply, Sanitation, and Hygiene Poverty Diagnostic. Washington, D.C.: World Bank Group (WBG)*

Depletion is particularly marked in the southern part of the Eastern aquifer, which is subject to unlimited abstraction by Israeli wells that are significantly affecting the nearby Palestinian wells. As a result the drawdown has been more than 70m[125] in just ten years in some places in the southern part of the West Bank and this constitutes a great threat to the groundwater system in this area.

In Gaza Strip, the Coastal Aquifer's annual abstraction rate ranges from 160-200 MCM, which exceeds the recharge rate (55 MCM) and the sustainable use rate based on its recharge rate (50-60 MCM), leading to a severe deterioration of aquifer.[126] Some 40 % of the annual replenishment of the Coastal Aquifer is assured by local rainfall, while irrigation, leakage from deficient distribution networks and wastewater contribute to around 60 % of its replenishment.

The annual abstraction from wells and springs in West Bank and Gaza for years 2010-2018 is presented in more detail in Figure 4.2.5-14 below. Annual abstraction from wells for Gaza is rather stable, showing a slight increase of 3% in years 2010-2018; this is not the case in West Bank, where annual abstraction from wells in 2018 was approximately 35% higher compared to 2010. Overall, in years 2010-2018 there is an increase of approximately 12% regarding abstraction from wells in Palestine. Annual discharge from springs in West Bank shows a slight decrease of approximately 5% in years 2010-2018. Based on the available primary data, for year 2018, in West Bank 79% of water was abstracted from wells, and the remaining 21% was abstracted from springs[127].

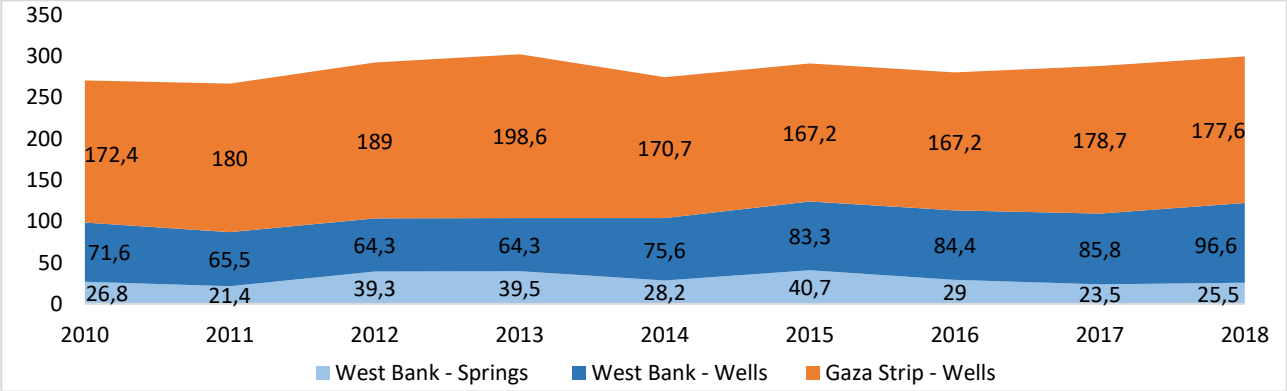


Figure 4.2.5-14: Annual abstraction from wells and springs in West Bank and Gaza, 2010 – 2018 (Unit : million m³)

Source: PCBS, 2018, http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/water/water-E-selected-indicator.html.

According to recent data[128], in Palestine, half of water abstractions from wells are used for agricultural purposes and the remaining are used for domestic purposes. In West Bank approximately 41% of water abstraction from wells is used for agriculture and the remaining 59% is used for domestic purposes; in Gaza Strip, approximately 55% of water abstraction from wells is used for agricultural purposes and the remaining 45% is used for domestic purposes.

The Palestinian wells are 100-150 m deep, have a diameter of about 0.5 m and are iron-lined. Every well has been allocated an annual quota, following the Israeli-Palestinian Agreement, and they are monitored by means of flow meters checked jointly and annually. Pumping equipment for Palestinian-owned wells and conveyance systems are said to be very old, resulting in low efficiency and high operation costs [129]. On-farm irrigation is drip irrigation and in a few cases by sprinklers and

[125] *Palestinian Water Authority, July 2013, National Water and Wastewater Policy and Strategy for Palestine, Toward Building a Palestinian State from Water Perspective*
[126] https://reliefweb.int/sites/reliefweb.int/files/resources/factsheet_water_quality.pdf
[127] http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/water/water-E-selected-indicator.html
[128] http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/water/water-E-selected-indicator.html.
[129] *FAO, Irrigation in the Middle East region in figures – AQUASTAT Survey 2008,* http://www.fao.org/3/i0936e/i0936e00.pdf

flooding. In addition to these wells there are many illegal wells operating, particularly in the Gaza Strip, which are responsible for a substantial extraction of groundwater and a negative effect on the water balance of the aquifer [130]. Wells primarily used for irrigation are usually owned by big landowners who sell water to smaller or landless farmers. Those used for domestic water supply are mainly controlled by municipalities, cooperatives or village councils [131].

Springs on the other hand are either jointly or communally owned. Some have no clear ownership rights, which invariably leads to poor maintenance and management. Approximately 20% of identified springs in the West Bank (1998) had a minimum discharge of 0.1 litre/second[132]. Secondary data[133] show that approximately 22% of the springs in West Bank supply the domestic sector annually, and 60% supply the agricultural sector. The majority of total springs (36 out of 126 springs) are located in Nablus Governorate and, in decreasing order, in Ramallah and Al Bireh, Bethlehem and Hebron. In addition, 9.5% of springs supply both sectors, whereas 7.9% of the springs are not being used.

Table 4.2.5-6: Number of Springs per Water use and Governorate in the West Bank - 2009

Governorate	Number of Springs per water use				Total springs
	Agriculture	Domestic	Both	Not Used	
Nablus	11	19	4	2	36
Ramallah and Al Bireh	22	2	4	3	31
Bethlehem	13	1	-	1	15
Hebron	11	-	-	1	12
West Bank	**76**	**28**	**12**	**10**	**126**

Source: Wafa' Marzouka and Issam Al-Khatib, Annual variation in Spring Water Quality and Discharge in West Bank, Institute of Environmental and Water Studies, Birzeit University, Birzeit, Ramallah, 2012, http://www.pwa.ps/userfiles/Kadoorie%20-%20Conference%20Book-4.pdf

The water of most of the springs of the West Bank is contaminated with coliform bacteria due to the lack of wastewater networks and wastewater treatment plants, the use of septic tanks and cesspits and the illegal disposal of untreated industrial wastewater and solid waste from the Israeli settlements. No advance treatment of water in the West Bank is used except for chlorination to disinfect domestic springs – in order to reduce the risk of waterborne diseases. The use of chlorine creates new potential risks, because it reacts and produces disinfection by-products. [134]

Water samples from spring water in the West Bank for Total Coliform (TC) and Fecal Coliform (FC) showed that in Nablus and Ramallah Governorates 24.3% and 36.0% of tested samples were contaminated by Total Coliforms and 20.3% and 28.0% were fecally contaminated, respectively. The same reason for contamination was also mentioned in Hebron Governorates and in some villages of Bethlehem Governorate[135].

[130] *FAO, Irrigation in the Middle East region in figures – AQUASTAT Survey 2008, http://www.fao.org/3/i0936e/i0936e00.pdf*
[131] *FAO, Irrigation in the Middle East region in figures – AQUASTAT Survey 2008, http://www.fao.org/3/i0936e/i0936e00.pdf*
[132] *FAO, Irrigation in the Middle East region in figures – AQUASTAT Survey 2008, http://www.fao.org/3/i0936e/i0936e00.pdf*
[133] *Wafa' Marzouka and Issam Al-Khatib, Annual variation in Spring Water Quality and Discharge in West Bank, Institute of Environmental and Water Studies, Birzeit University, Birzeit, Ramallah, 2012*
[134] *Annual Variation in Spring Water Quality and Discharge in the West Bank http://pwa.ps/userfiles/Kadoorie%20-%20Conference%20Book-4.pdf*
[135] *Wafa' Marzouka and Issam Al-Khatib, Annual variation in Spring Water Quality and Discharge in West Bank, Institute of Environmental and Water Studies, Birzeit University, Birzeit, Ramallah, 2012*

4.2.5.3 Israeli Water Company (Mekorot)

According to recent data (2015) from OCHA[136], 16 localities within the five (5) targeted urban areas purchase water from Israeli National Network Co (Mekorot). Of these, half were located in Nablus Urban Area, 3 were located in Ramallah Al Bireh and Bethlehem Urban Areas respectively and 2 were located in Hebron. For more details see in Annex I "Water/Wastewater data".

As presented in Figure 4.2.5-15 below, during the last years, the purchased quantities of water from Mekorot have increased; these are used for agricultural and domestic purposes.

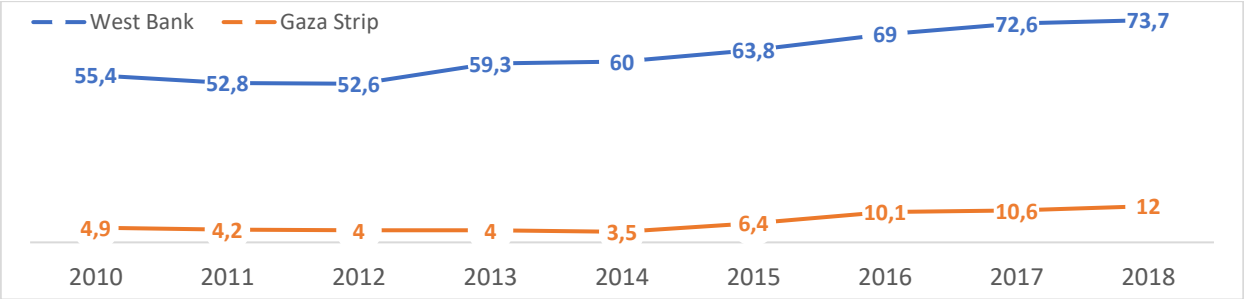


Figure 4.2.5-15: Purchased water quantities from Mekorot - West Bank and Gaza Strip, 2010-2018 (Unit: million m³)

Source: PCBS, 2018, http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/water/water-E-selected-indicator.html.

The Palestinian Water Authority is unable to pay Mekorot for the bulk water it purchases and is accumulating debt to Israel. In the West Bank, every bulk water purchase from Mekorot puts the Palestinian Water Authority in further arrears to Israel because of the lack of cost recovery at the service-provider level. Israel deducts an amount to cover bulk water purchases and wastewater treatment from the taxes (clearance revenues) it collects on behalf of the Palestinian Authority. In 2016, the Israeli Minister of Finance deducted US$94 million from clearance revenues due to the Palestinian Authority for unpaid Mekorot water bills (net lending) and for wastewater treatment[137].

4.2.5.4 Water supply and demand

Water supply

In 2018, of the total water supplied to West Bank Governorates of the project area, 38% was purchased from Mekorot (Israel's water company), while the rest was supplied from groundwater wells and springs. In the Gaza Strip 91,7% was supplied from water wells, whilst 6% was purchased from Mekorot and 2% was provided by desalination plants. (Table 4.2.5-7)

Table 4.2.5-7: Annual Available Water Quantity within the Governorates relevant to the project by Source, 2018

Governorate	Water Pumped from Palestinian Wells(2)		Springs Discharge(3)		Desalinated Drinking Water(4)		Water Purchased from Israeli Water Company (Mekorot)(5)		Total
	mcm	%	mcm	%	mcm	%	mcm	%	mcm
Palestine (1)	**274.2**	**70.4%**	25.5	**6.5%**	**4.1**	**1.1%**	**85.7**	**22.0%**	**389.5**
West Bank (1)	**96.6**	**49.3%**	25.5	**13.0%**	**-**	**-**	**73.7**	**37.6%**	**195.8**

[136] OCHA, https://www.ochaopt.org/page/2015-interactive-community-level-infographics-humanitarian-vulnerability-wash
[137] State of Environment and Outlook Report for the occupied Palestinian territory 2020

Governorate	Water Pumped from Palestinian Wells(2)		Springs Discharge(3)		Desalinated Drinking Water(4)		Water Purchased from Israeli Water Company (Mekorot)(5)		Total
	mcm	%	mcm	%	mcm	%	mcm	%	mcm
Nablus	17.4	67.7%	3.7	14.4%	-	-	4.6	17.9%	25.7
Ramallah and Al Bireh and Jerusalem (1)	1.8	6.4%	1.2	4.2%	-	-	25.3	89.4%	28.3
Bethlehem and Hebron	12.1	30.3%	0.8	2.0%	-	-	27.0	67.7%	39.9
Gaza Strip	**177.6**	**91.7%**	-	-	**4.1**	**2.1%**	**12.0**	**6.2%**	**193.7**

(1) Data exclude those parts of Jerusalem which were annexed by Israeli Occupation in 1967.
(2) This does not include water abstracted from unlicensed wells.
(3) This does not include Fashkha springs.
(4) Desalinated water plants owned by private sector, suplied people with bottled desalinated drinking water.
(5) Includes the pumped water from the wells which are located in the territories of the State of Palestine and controlled by Israeli Water Company (Mekorot) for domestic and agricultural uses, includes 4.4 million m³ for agricultural use in Tubas and Northern Valleys.
(-) Nill
Source: PCBS, 2018, http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/water/water-E-selected-indicator.html.

Water uses

Water is mainly used for agricultural, industrial and domestic uses. Data on water uses are extremely scarce.

Overall, the Palestinian Water Authority estimates that water quantity for agricultural and industrial use (including livestock) in 2017 was 162 mcm in Gaza (50 % of the total water use) and 65 mcm in the West Bank. The overall rate of water consumption for agricultural purposes appears to have been steady in the West Bank between 2010 and 2017 but increased by around 10% over the same period in the Gaza Strip[138].

There is a big gap between domestic water supply and water use – a problem which is likely to aggravate with population growth and the associated increase in demand; in 2016, domestic water deficit was estimated to be 80MCM per year, estimated to reach 90 MCM in 2030.

Table 4.2.5-8 below summarizes the projected water demand in Palestine until the year 2040[139]. Water demand for agriculture and industry & domestic sectors for 2040 is estimated to double compared to 2010. Population growth but also economic growth are the main drivers behind this estimated increase.

Table 4.2.5-8: Projected water demand in Palestine until the year 2040.

Year	Population (Million)	Projected Water Demand (Mcm/year)		
		Domestic use & Industry	Agriculture	Total
2000	3.15	196	191.8	387.8
2010	4.95	416	301.5	717.5
2040	9.98	1,075	607.8	1,682.8

Source: https://www.foei.org/wp-content/uploads/2014/08/Water-injustice-in-Palestine.pdf

[138] *State of Environment and Outlook Report for the occupied Palestinian territory 2020*
[139] *https://www.foei.org/wp-content/uploads/2014/08/Water-injustice-in-Palestine.pdf*

The predicted increase in water demand is expected to pose excessive strain on the West Bank and Gaza Strip Aquifers.

Water losses

Water losses reflect: [140]

- Commercial (Apparent) Losses: all losses similar to meter inaccuracies (customer meters), data entry, thefts, etc. (13.1% in West Bank and 23.3% in Gaza Strip);
- Physical Losses: all losses resulting of leakage from main and distribution pipelines, reservoir leakage and / or flooding, leakage through connections, etc. (15.8% in West Bank and 6.2% in Gaza Strip).

Regarding agricultural uses, the systems that transport water from springs to farms consist of open earthen or lined canals and earthen buffer pools (usually plastic-lined). These tend to be in bad condition and are responsible for substantial losses of water through seepage and evaporation: losses are estimated at about 15 mcm per year. However, the water conveyance systems from agricultural wells to farms are closed, minimizing water losses[141].

Regarding wells abstracted for domestic use, the amount of water lost as it moves through delivery systems is high.

In 2018, in West Bank, the total water losses rate was 26% of the supplied water in 2018 presenting a quantity of 30.8 MCM. In Gaza Strip, in 2018, a total of 95.1 MCM water was supplied for domestic sector, covering just 88.5% of the 107.4 MCM needed water. In 2018 the overall loss of water supplied for the domestic sector was estimated to vary between 18% in Ramallah and Al Bireh Governorate to 24% in Nablus Governorate and 30% in Bethlehem and Hebron governorates[142].

The water losses rate in the Gaza Strip (overall loss and unaccounted for water) is higher than that in the West Bank, and was 37.4% of the supplied water in 2018. In Gaza city due to the inadequate network, there are losses of about 32 % due to the leakage; the water loss zones concentrated in the Beach camp, Zaytown, Sabrahh, and Jdayda. [143]

The total water losses per Governorate are presented in Table 4.2.5-9 below. Detailed data are presented in Annex I "Water/Wastewater data" of this report.

Table 4.2.5-9: Water total losses (million m³) within Governorates relevant to the project, 2018

Governorate	Nablus	Ramallah and Al Bireh, and Jerusalem (1)	Bethlehem and Hebron (2)	Gaza
Total Losses (million m³)	3.7	3.8	11.9	11.4

Notes:
(1) Data exclude those parts of Jerusalem which were annexed by Israeli Occupation in 1967. Where this part inhabited by 281,913 palestinian citizens whom holding Jerusalem identity card and no information is available about the water supplied to them.
(2) Due to water supply system in Bethlehem and Hebron governorates, separation of data for each governorate is not applicable.
Source: PCBS, 2018, http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/water/water-E-selected-indicator.html.

[140] *Water Sector Regulatory Council, 2020, Performance Monitoring Report for Water and Wastewater Service Providers in Palestine for the year 2018,* https://www.wsrc.ps/cached_uploads/download/2020/07/07/performance-monitoring-report-2020-to-print-1594120543.pdf
[141] *Initiative for the Palestinian Economy- Water, Office of the Quartet Representative, 2013*
[142] *http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/water/water-E-selected-indicator.html*
[143] *Spatial and Sectoral Assessment Report, 2020, World Bank, Integrated Cities and Urban Development Project Gaza City - Improving Resilience of Urban Service Systems*

4.2.5.5 Water infrastructure

4.2.5.5.1 Water network

According to PCBS data (2015)[144], all localities within the four (4) targeted urban areas in West Bank (except locality "'Iraq Burin" in Nablus Urban Area[145]) were served by a water network in 2015. For more details see Annex I "Water/Wastewater data". In Gaza city (Gaza Urban Area) the water network covers 65% of the total area and supplies water to almost 90% of the total population of the city. The areas that are not served by the network are mostly agricultural or industrial areas in the east and south of the city.[146]

Despite high network coverage, service delivery is intermittent, with large variations in per capita supply between localities. According to PCBS data (2018)[147], 35.0% of households in Palestine dwell in houses with ongoing (uninterrupted) water service (51.4% in the West Bank compared to 5.5% in the Gaza Strip). The percentage of households in Palestine that suffer interruption of water service for more than once a week reached 33.1% (29.2% in the West Bank compared to 40.1% in Gaza Strip). (see Annex I "Water/Wastewater data"). According to OCHA[148], Table 4.2.5-10 below shows that in 2015, localities in the targeted Urban areas experienced water cuts with percentages ranging from 67% in Bethlehem Urban Area to 71-72% in Ramallah and Al Bireh Urban Area and Nablus Urban Area and 80% in Hebron Urban Area; this percentage reached 100% for Gaza Urban Area. For more details see Annex I "Water/Wastewater data".

Table 4.2.5-10: Number of localities within five targeted urban areas with problems related to water supply (2015)

		Urban Area				
		Nablus	**Ramallah & Al Bireh**	**Bethlehem**	**Hebron**	**Gaza**
Total localities		18	6	9	5	2
Problems related to water supply	**Water cut**	13	5	6	4	2
	Not serviced areas	10	5	7	0	1
	Old Network	11	4	8	2	1
	Polluted water	5	1	0	3	2

Source: OCHA, https://www.ochaopt.org/page/2015-interactive-community-level-infographics-humanitarian-vulnerability-wash

It is important to mention that even the connected localities depend on other sources of water to satisfy their domestic needs, due to the irregular and infrequent supply through the water network. According to PCBS data (2018)[149], 54.2% of households in Palestine which are exposed to disruption in the public water network store water from the public network in order to cope with the state of

[144] *PCBS, 2015, Distribution of Localities in Nablus Governorate by Availability of Infrastructure Services, 2015, http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/LOC%20E16A%202015.htm*
PCBS, 2015, Distribution of Localities in Ramallah and Al-Bireh Governorate by Availability of Infrastructure Services, 2015, http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/LOC%20E8A%202015.htm
PCBS, 2015, Distribution of Localities in Bethlehem Governorate by Availability of Infrastructure Services, 2015, http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/LOC%20E4A%202015.htm
PCBS, 2015, Distribution of Localities in Hebron Governorate by Availability of Infrastructure Services, 2015, http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/LOC%20E2A%202015.htm
PCBS, 2015, Distribution of Localities in Gaza Governorate by Availability of Infrastructure Services, 2015, http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/LOC%20E14A%202015.htm
[145] *In 2020 Iraq Burin locality is served by a water network.*
[146] *Spatial and Sectoral Assessment Report, 2020, World Bank, Integrated Cities and Urban Development Project Gaza City - Improving Resilience of Urban Service Systems*
[147] *Palestinian Central Bureau of Statistics, 2019. Socio-Economic Conditions Survey, 2018 - Main Findings. Ramallah - Palestine.*
[148] *OCHA, https://www.ochaopt.org/page/2015-interactive-community-level-infographics-humanitarian-vulnerability-wash*
[149] *Palestinian Central Bureau of Statistics, 2019, Socio-Economic Conditions Survey, 2018 - Main Findings. Ramallah - Palestine.*

disruption in the public water network. This percentage is 25.0% in the West Bank and 81.5% in Gaza Strip. 29.1% of the households in Palestine resort to purchase water tankers to cope with the state of disruption in the service of the water network, which reached 48.4% in the West Bank and 11.1% in Gaza Strip. (see Annex I "Water/Wastewater data"). Those who rely on water bought in by water tankers pay up to 400% more per liter for clean water.

Piped water in Gaza is unfit for human consumption and is used primarily for domestic purposes other than drinking and cooking. As a result of damage to the Coastal Aquifer, access to safe drinking water in Gaza via the public water network fell from 98.3 % in 2000 to only 10.5 % in 2014, compared to almost 97 % in the West Bank. As a result, reliance on water tanks, containers and bottled water rose from 1.4 % to 89.6 % during the same period. Currently, only 4% of the 180 mcm of water extracted annually from what used to be Gazans' main source of drinking water, the Coastal Aquifer, can be considered potable by World Health Organization standards.[150]

According to PCBS data (2015)[151], 61.1% of households in Palestine considered the water quality to be good: 78.2% in the West Bank compared to 28.2% in Gaza Strip. (see Annex I "Water/Wastewater data")

4.2.5.5.2 Desalination plants

In the Gaza Strip there are a total of 286 desalination plants (62 NGO's Plants, 96 Private Plants, 95 Schools Plants, 33 Municipal Plants) with different capacities and technologies; most of them depend on the groundwater source. [152] There are three Seawater Desalination Plants (SDP) in Gaza Strip; the 20,000 m³/day Southern Gaza SDP, North Gaza SDP to produce 10,000 m³/day and the Middle Gaza SDP (Deir Al-Balah) with a 5,000 m³/day capacity.[153]

There are six (6) desalination plants (5 private and 1 public) within Gaza Urban Area; these are presented in Figure 4.2.5-5 above.

The desalinated water consumed in the Gaza Strip is affected by biological pollution due to: inadequate disinfection at the desalination plants, lack of trained operators, improper handling during distribution and poor user storage habits. Several recent studies and reports indicate that 45% of tested desalination plants among the Gaza Strip contain Total Coliforms (TC) at plant phase, which is considered as a critical indicator of biological pollution at the source, and causes public health diseases especially for children.[154]

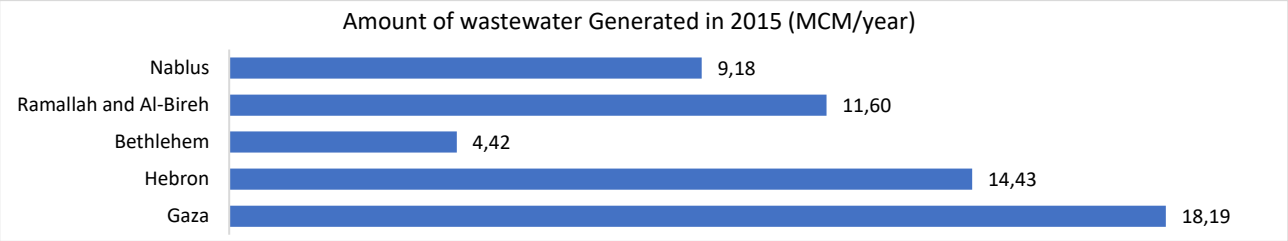
4.2.5.6 Wastewater

4.2.5.6.1 Wastewater generation, collection and treatment[155]

Based on the per capita wastewater generation, the total volume of wastewater generated for the year 2015 was estimated at 114.36 MCM, from which 65.82 MCM are generated in the West Bank

[150] *Toward Water Security for Palestinians: West Bank and Gaza Water Supply, Sanitation, and Hygiene Poverty Diagnostic. Washington, D.C.: World Bank Group (WBG)*
[151] *Palestinian Central Bureau of Statistics, 2015. Household Environmental Survey - 2015: Main Findings . Ramallah - Palestine.*
[152] *https://reliefweb.int/sites/reliefweb.int/files/resources/factsheet_water_quality.pdf*
[153] *https://core.ac.uk/download/pdf/288362683.pdf*
[154] *https://reliefweb.int/sites/reliefweb.int/files/resources/factsheet_water_quality.pdf*
[155] *ARIJ, 2015, Status of the Environment in the State of Palestine – 2015, https://www.arij.org/files/arijadmin/2016/SOER_2015_final.pdf*

and 48.54 MCM are generated in the Gaza Strip. Figure 4.2.5-16 below presents the wastewater generation within the Governorates relevant to the project in 2015. Hebron and Ramallah and Al Bireh produce 40% of the total waste generated in West Bank, while Nablus and Bethlehem produce 20%. Hebron has the highest wastewater production (22% of the total wastewater generated in West Bank) and Bethlehem has the lowest wastewater production (7% of the total wastewater generated in West Bank). Gaza Governorate produces 37% of the total wastewater produced in Gaza Strip.



Note: Consumption volumes were estimated based on the PCBS per capita water consumption 2013, and PCBS population estimate for 2015.

Figure 4.2.5-16: Estimated volume of wastewater generated within the Governorates relevant to the project in 2015

Source: ARIJ, 2015, Status of the Environment in the State of Palestine – 2015, https://www.arij.org/files/arijadmin/2016/SOER_2015_final.pdf

According to recent data, 13% of wastewater generated is collected in West Bank and 36% in Gaza Strip. 69% of wastewater collected is treated or partially treated in West Bank, whereas this percentage is 91% for Gaza Strip. Approximately 32.5 MCM/y of partially treated and raw wastewater are being discharged into the Mediterranean Sea. In the West Bank the treated and raw wastewater are being released directly into the environment [156].

The need for wastewater treatment and disposal will increase with the growth of the Palestinian population and improved network connection; future needs based on the high, central, and low population growth scenarios, give results ranging from 285 to around 435 million m³ of wastewater produced annually.[157]

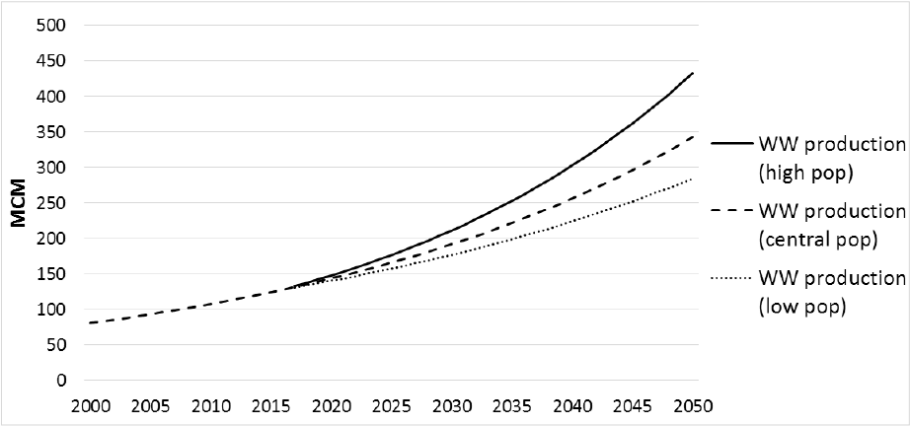


Figure 4.2.5-17: Projected wastewater production (MCM) based on current levels of production per capita

Source: Ives et.al, 2017, A Fast Track Analysis of Infrastructure Provision in Palestine, v2.1, www.itrc.org.uk

[156] https://www.arij.org/files/arijadmin/weruinfographics.pdf
[157] Ives et.al, 2017, A Fast Track Analysis of Infrastructure Provision in Palestine, v2.1, www.itrc.org.uk

Industrial Wastewater[158]

In West Bank and Gaza Strip , few industries have an on-site treatment facility to treat the wastewater to an acceptable standard prior to discharge. Where such facilities exist, they only consist of preliminary treatment processes. The partially treated or untreated industrial wastewater is disposed either through cesspits, septic tanks, open areas or public sewage network.

As stated in Chapter 3 of this report, proper environmental limit values (standards and guidelines) for the discharge of effluent from industrial facilities to environment receptors and the sewage system are in place, as prepared by the Palestinian Standards Institute (PSI) and the PWA. However, these Limit Values are yet to be enforced.

Approximately 750,000 m³ of wastewater from the stonecutting industry (liquid slurry) and 185,000 m³ of dry slurry (cake), which is produced by pressing the liquid slurry is generated annually in the West Bank.

Hebron Industrial Area has an estimated 172 stonecutting factories, of which 96 are licensed businesses who export their products, accounting for one to two thirds of total stone production in the West Bank. On average, Hebron's stonecutting industry produces 400,000 m³ of wastewater per year; each plant produces approximately 7-8 cubic meters of wastewater per day.

Wastewater currently flowing through Hebron Stream is a mix of domestic (94%) and industrial (6%) sewage containing a high level of solid waste and hazardous materials originating from the stonecutting, tannery, metal, and olive oil industries. The density of the untreated slurry (i.e. a mixture made of water and stone dust) from the stonecutting industries, causes blockages when dumped by industry into the domestic sewage network, leading to the frequent flooding of residential neighborhoods in Hebron with raw sewage and an increased probability of spreading disease. [159]

4.2.5.6.2 Wastewater Infrastructure

Sewage networks

According to the PCBS[160], there was an increase in the connection coverage of households from 39.3% for the year 1999, to 52.1% for the year 2009 and to 53.9% for the year 2015. Wastewater collection network is mostly limited to the major cities and refugee camps. In many rural areas, it is not financially feasible to connect rural housing units to conventional centralized wastewater management systems due to the high capital cost of installing sewage collection networks in areas with dispersed housing patterns. (see Annex I "Water/Wastewater data")

According to the PCBS[161], the geography of sewage collection network coverage is as follows:

- 83.5% of the households in the Gaza strip are connected;

[158] *ARIJ, 2015, Status of the Environment in the State of Palestine – 2015, https://www.arij.org/files/arijadmin/2016/SOER_2015_final.pdf*
[159] *https://ecopeaceme.org/uploads/Sites_Tour_Guide_Palestine_Israel_Oct_2012.pdf*
[160] *PCBS, 2015, http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/HHE%202015%20e%203.htm*
[161] *Palestinian Central Bureau of Statistics, 2015, Household Environmental Survey - 2015: Main Findings . Ramallah - Palestine.*

- only 38.4% of the households in the West Bank are connected as follows: In the northern and southern parts of the West Bank only 33.5-36% of households are served by sewage collection network in the Middle part of the West Bank 47.9% of households are served by sewage network. (see Annex I "Water/Wastewater data"). In West Bank, only two thirds of the generated wastewater collected in sewage networks is discharged into a wastewater treatment facility.

On a local level, according to PCBS data (2015)[162], 27 localities were served totally or partially by wastewater networks. (see Annex I "Water/Wastewater data") More specifically:

- 66.7% out of total Nablus Urban Area localities were served by wastewater network in 2015.
- 66.7% out of total Ramallah & Al Bireh Urban Area localities were served by wastewater network in 2015.
- 88.9% out of total Bethlehem Urban Area localities were served by wastewater network in 2015.
- 20% out of total Hebron Urban Area localities was served by wastewater network in 2015. In Hebron city the wastewater network is covering only 60% of the city.
- The 2 localities of Gaza Urban Area were served by wastewater network in 2015. The sewage network in Gaza City, covers approximately 61.5% of the city and provides services to approximately 85% of the city's population. The rest of the city's residents rely on septic tanks to drain the sewage from their homes. [163] The absence of sewage treatment facilities is exposing Gaza residents to a range of diseases and is further contaminating soil and water.

According to OCHA[164], Table 4.2.5-11 below presents the number of localities within the five (5) targeted urban areas with problems related to sewage treatment. 28% out of total Nablus Urban Area and 22% out of total Bethlehem Urban Area were served by old network; most old networks were identified in Gaza (50%) and fewer in Ramallah and Al Bireh (14%) Urban Area.

For more details see Annex I "Water/Wastewater data".

Table 4.2.5-11: Number of localities within five targeted urban areas with problems related to sewage treatment (2015)

		Urban Area				
		Nablus	**Ramallah & Al Bireh**	**Bethlehem**	**Hebron**	**Gaza**
Total localities		**18**	**6**	**9**	**5**	**2**
Problems related to sewage treatment	**Doesn't cover 100%**	3	4	3	1	1
	Old network	5	1	2	0	1
	Inefficient treatment plant	4	0	0	1	1
	Uncovered sewage without network	2	1	1	1	0
	Uncovered sewage network system	1	0	1	1	0

Source: OCHA, https://www.ochaopt.org/page/2015-interactive-community-level-infographics-humanitarian-vulnerability-wash

[162] *PCBS, 2015, Distribution of Localities in Nablus, Ramallah and Al-Bireh, Bethlehem, Hebron and gaza Governorates by Availability of Infrastructure Services, 2015,*
http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/LOC%20E16A%202015.htm
http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/LOC%20E8A%202015.htm
http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/LOC%20E4A%202015.htm
http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/LOC%20E2A%202015.htm
http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/LOC%20E14A%202015.htm

[163] *Spatial and Sectoral Assessment Report, 2020, World Bank, Integrated Cities and Urban Development Project Gaza City - Improving Resilience of Urban Service Systems*

[164] *OCHA, https://www.ochaopt.org/page/2015-interactive-community-level-infographics-humanitarian-vulnerability-wash*

In all Palestinian governorates, sewage overflows are frequent or occasional for 18% of the population using improved sanitation. These overflows occur more often in the northern governorates of the West Bank. North Gaza had the highest percentage of population experiencing an overflow at least once in a month in 2016. [165]

Access to sewer networks also varies strongly by household income: only 13 % in the poorest quintile are connected, compared to 42 % in the richest quintile. Two-thirds of West Bank residents are using cesspits, which are emptied by vacuum tankers, who usually dump their contents in open areas, valleys, sewage networks, and/or dumpsites, thereby increasing the risk of groundwater contamination. [166]

Wastewater Treatment Plants (WWTP)

The existing centralized wastewater treatment plants within the Governorates relevant to the project are presented in Table 4.2.5-12 below; of these West Nablus WWTP is operating at a good efficiency rate, Ramallah and Al Bireh WWTP is overloaded and functioning at low-moderate efficiencies and Al Bireh WWTP has been facing various operational and maintenance problems and is currently under rehabilitation. In Gaza Governorate, the Gaza Central WWTP is overloaded, highly inefficient and hardly functioning.

Table 4.2.5-12: The existing centralized WWTPs within the Governorates relevant to the project

Name of WWTP	Actual Flow (m^3/day)	Capacity (m^3/day)	Status of WWTP	Served area	Year Data
Al Bireh WWTP	6,427	5,750	Operational year 2000; overloaded	60% of Al Bireh city	2019
Ramallah WWTP	2,400	1,200	Operational year 1975 and rehabilitated in 2002/2003 ; not operating well (overloaded) and does not meet the requirements for effluent discharge	Ramallah, Beitunia and Surroundings	2019
Nablus West WWTP	10,858	14,000	Operational year 2013. Operating under monitoring after start up	western parts of Nablus city and the nearby villages (Deir Sharaf, Beit Wazan, Zawata, Beit Iba and Qusin)	2019
Gaza Wastewater Treatment Plant (Gaza Central)	60,000	75,000	Established in 1979 upgraded in 1996 to increase its capacity to 12,000 m^3/d, upgraded again in 1998 to reach a treatment capacity of 35,000 m^3/d, under rehabilitation & Expansion.	Gaza Strip	2019

Sources:
Palestinian Water Authority (PWA), Annual water status report 2011, http://pwa.ps/userfiles/file/%D8%AA%D9%82%D8%A7%D8%B1%D9%8A%D8%B1/Annual%20Water%20Status%20report%202011.pdf
ARIJ, 2015, Status of the Environment in the State of Palestine – 2015, https://www.arij.org/files/arijadmin/2016/SOER_2015_final.pdf
Development of Wastewater Treatment Tariff System, A Case Study of Al–Bireh Wastewater Treatment Plant , 2004, https://core.ac.uk/download/pdf/86430633.pdf
Water Sector Regulatory Council, 2019, The Establishment of the Wastewater Monitoring Program, https://www.wsrc.ps/cached_uploads/download/2019/09/24/establishment-of-ww-monitoring-program-optimize-1569323341.pdf

[165] *State of Environment and Outlook Report for the occupied Palestinian territory 2020, https://reliefweb.int/sites/reliefweb.int/files/resources/SEORP.pdf*
[166] *World Bank, 2018, Securing Water for Development in West Bank and Gaza, http://documents.worldbank.org/curated/en/736571530044615402/WP-P157979-Securing-Water-for-Development-in-West-Bank-and-Gaza-PUBLIC.pdf*

In addition to the centralized wastewater treatment plants (WWTPs), in West Bank a number of the non-governmental organizations (NGOs) and academic institutions have established two types of decentralized WWTPs:

a) Collective wastewater treatment systems: These were established in several localities that lacked sewage collection networks and that depended on cesspits for wastewater disposal. Such wastewater treatment systems are composed of a vacuum truck collection system plus a collective WWTP. The locations of Collective WWTP within the five (5) targeted urban areas are presented in Figure 4.2.5-18 - Figure 4.2.5-21 below.

b) Onsite small-scale wastewater treatment plants have been established in several rural localities of the West Bank, where the dispersed pattern of houses in these rural localities makes it economically unfeasible to construct wastewater collection networks and centralized wastewater treatment plants. On-Site small-scale wastewater treatment plants, which often serve a single house or building, respond to the needs and conditions in rural localities. They can solve the wastewater collection and disposal problems in such communities.

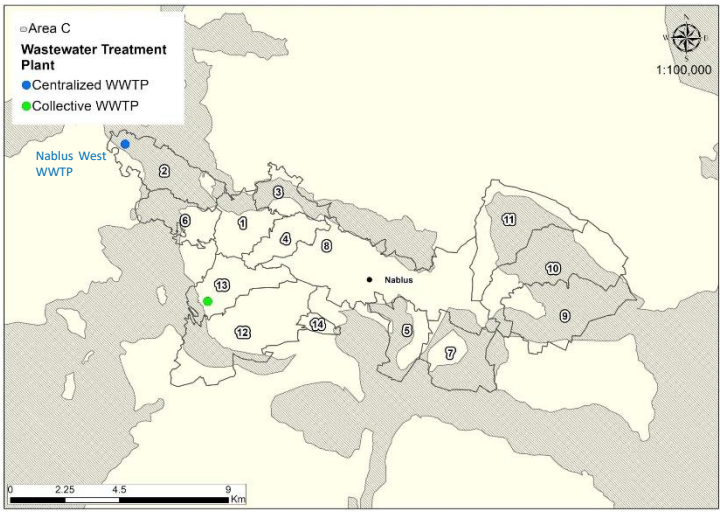


Figure 4.2.5-18: Centralized, Collective and Onsite small-scale WWTP in Nablus Urban Area

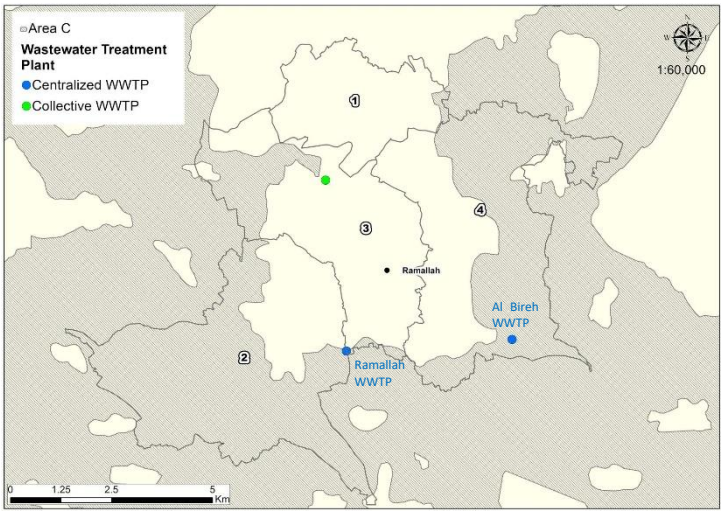


Figure 4.2.5-19: Centralized, Collective and Onsite small-scale WWTP in Ramallah and Al Bireh Urban Area

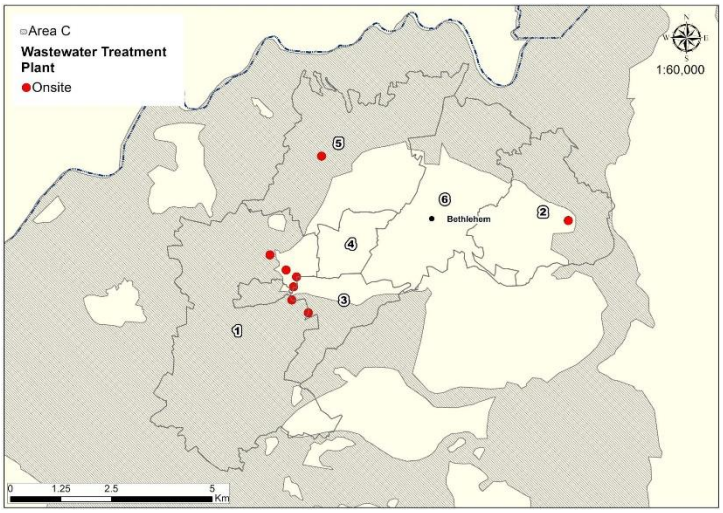


Figure 4.2.5-20: Centralized, Collective and Onsite small-scale WWTP in Bethlehem Urban Area

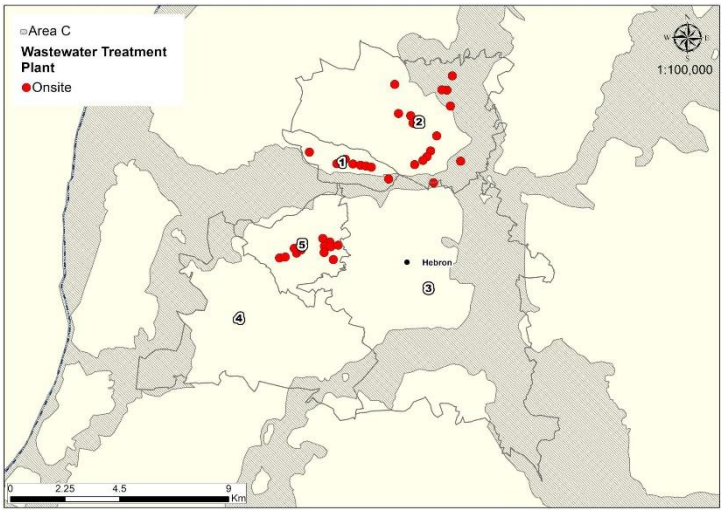


Figure 4.2.5-21: Centralized, Collective and Onsite small-scale WWTP in Hebron Urban Area

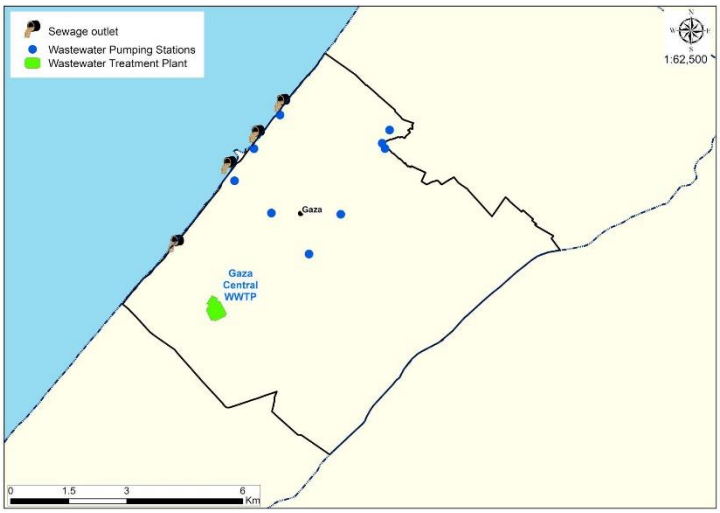


Figure 4.2.5-22: WWTP, Wastewater pumping stations and sewage outlet in Gaza Urban Area

Sources:
ARIJ, 2015, Status of the Environment in the State of Palestine – 2015, https://www.arij.org/files/arijadmin/2016/SOER_2015_final.pdf
Spatial and Sectoral Assessment Report, 2020, World Bank, Integrated Cities and Urban Development Project Gaza City - Improving Resilience of Urban Service Systems

The impact of the chronic energy crisis in Gaza on water and sanitation services has been pervasive. Lengthy power cuts in the Gaza Strip have prevented wastewater treatment plants from keeping up with the area's increasing volume of wastewater. Power shortages and lack of repairs, have severe consequences for the operation of water treatment facilities and wastewater pumping stations. Without the treatment, wastewater, contaminated with feces, gets pumped directly into the sea. This affects the public health of people in Gaza.

In Gaza, the existing water and wastewater facilities required approximately 34MW of electricity as of 2014. By 2030, this is expected to increase to 127 MW as additional desalination and wastewater treatment plants come online.

Supply expansion plans must consider a holistic view that considers the needs of critical infrastructure, such as water, sanitation, and health services.

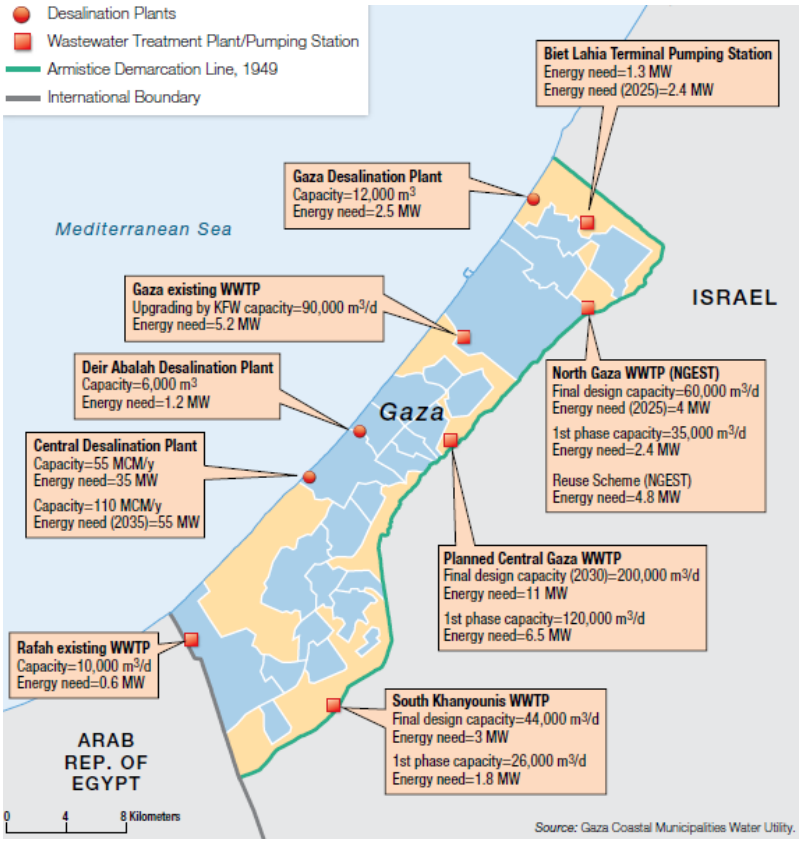


Figure 4.2.5-23: Existing and Future Electricity Needs for Gaza's Water Sector

Figure 4.2.5-24 - Figure 4.2.5-27 below present surface water resources, aquifer recharge rates, the available industrial water pollution sources (industries/quarries), the existing Wastewater Treatment Plants (WWTPs) and the solid waste disposal sites (sanitary landfills and dumpsites) per West Bank Urban Area; the combination of these features provides an overview of the water and wastewater sector status per Urban Area. The relevant information on Gaza Urban Area is presented in section 4.2.5.1 of this report.

It must be noted that, for the purposes of presentation clarity, geology/hydrogeology recharge rate categories *Medium to High* and *Low to Medium, as presented in* in Table 4.2.5-4 of this report, have been classified as of 'medium recharge rate', while categories *Very Low and Low* have been classified as of 'low recharge rate'.

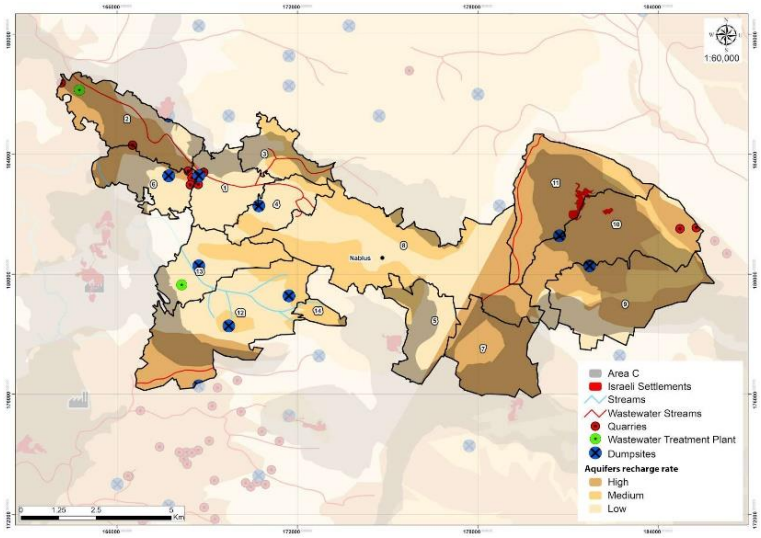


Figure 4.2.5-24: Water and wastewater sector status - Nablus Urban Area

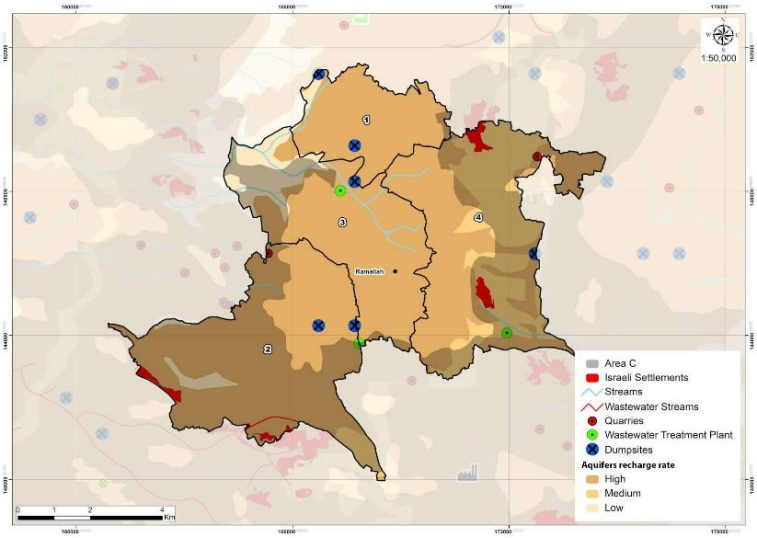


Figure 4.2.5-25: Water and wastewater sector status - Ramallah and Al Bireh Urban Area

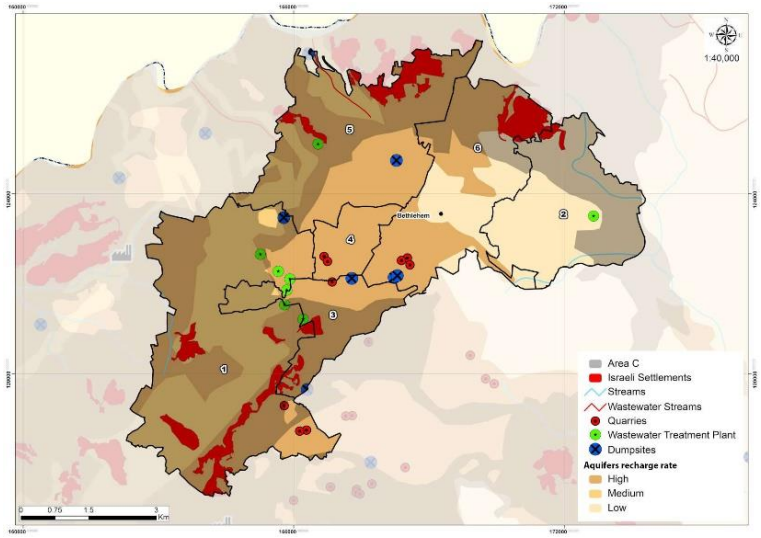


Figure 4.2.5-26: Water and wastewater sector status - Bethlehem Urban Area

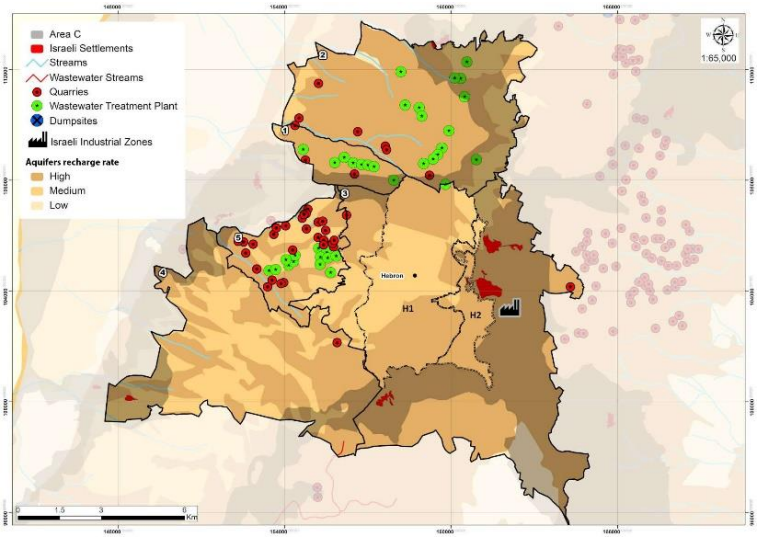


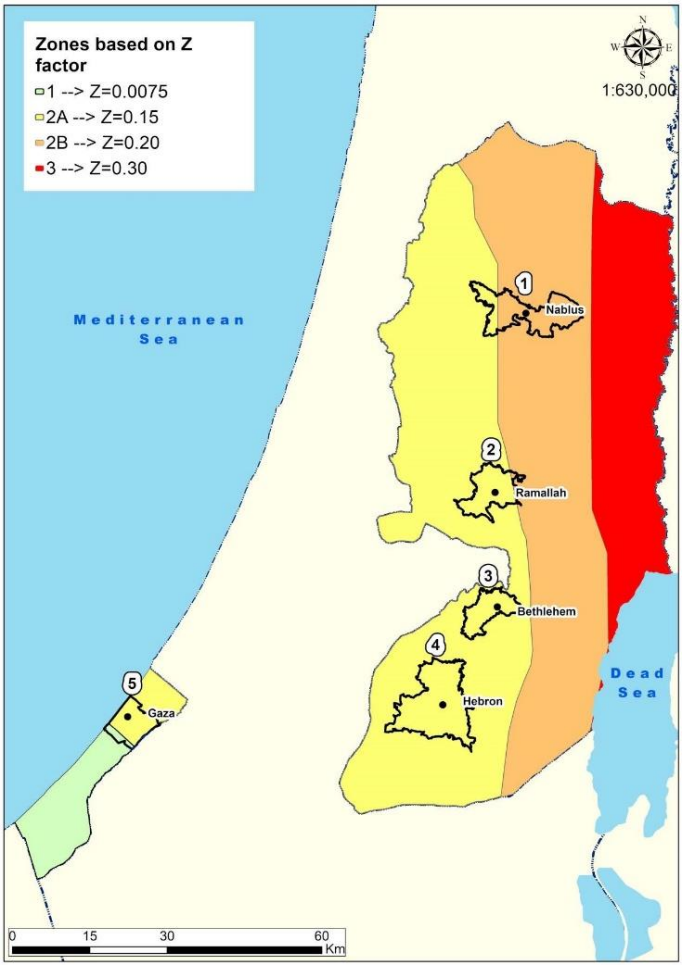
Figure 4.2.5-27: Water and wastewater sector status - Hebron Urban Area

4.2.6 Natural hazards

The most significant natural hazards in the Palestine are earthquakes and floods. However, other natural hazards, such as landslides and wildfires, are also observed.

4.2.6.1 Earthquakes

According to seismic Peak Ground Acceleration map (PGA Map), the five (5) targeted urban areas fall in seismic zones as presented in Figure 4.2.6-1 below. Highest probability for an earthquake is expected in Nablus Urban Area.



Urban Area	Seismic Zone
Nablus	2B
Ramallah and Al Bireh	2A-2B
Bethlehem	2A
Hebron	2A
Gaza	1-2A

Figure 4.2.6-1: Seismic Zones in the five (5) targeted urban areas

Source: SASPARM Project, Seismic Risk Mitigation in Palestine, Urban Planning and Disaster Risk Reduction Center, An Najah National University, 2014

The last major earthquake in the region, which was especially severe, occurred in Nablus in 1927 and resulted in the destruction of many hundreds of buildings and the loss of 130 lives. [167]

4.2.6.2 Floods

Recent studies based on the theoretical framework of flood hazard mapping[168] produced the flood hazard index map for West Bank districts. The map was classified into five hazard categories (very low, low, medium, high, and very high). The percentages of flood hazard areas in West Bank districts of the project area are presented in Figure 4.2.6-2 and Table 4.2.6-1 below.

Very high flood hazard areas are in general sparsely distributed in the western parts of the West Bank with some concentrated areas in the middle parts and in the north (Nablus). This very high flood hazard potential, in these areas, might be a result of their higher runoff potential, rainfall values and population and low surface elevations.

[167] *State of Environment and Outlook Report for the occupied Palestinian territory, UNEP 2020*
[168] *Samer Shadeed, 2019, Article GIS-based Flood Hazard Mapping in the West Bank, Palestine, https://www.researchgate.net/publication/331973616_GIS-based_Flood_Hazard_Mapping_in_the_West_Bank_Palestine*

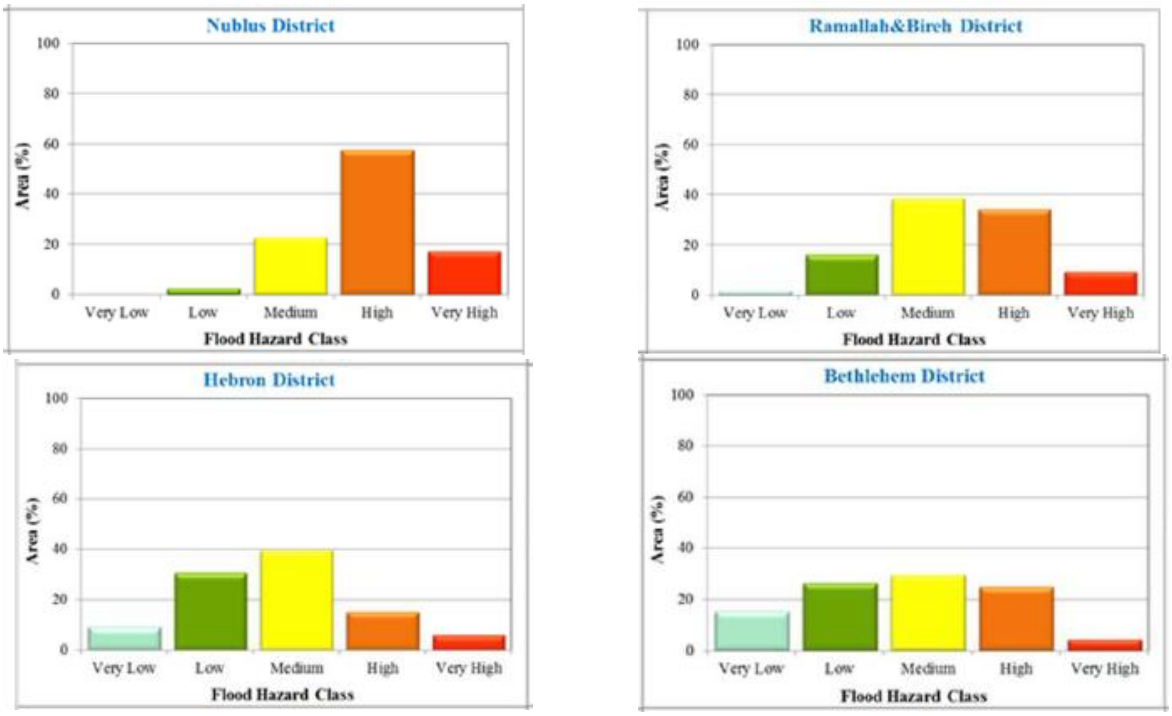


Figure 4.2.6-2: Percentages of flood hazard areas in West Bank districts

Source: Samer Shadeed, 2019, Article GIS-based Flood Hazard Mapping in the West Bank, Palestine, https://www.researchgate.net/publication/331973616_GIS-based_Flood_Hazard_Mapping_in_the_West_Bank_Palestine

Table 4.2.6-1 presents flood hazard prone areas for the West Bank districts; about 75% of Nablus district has very high or high vulnerability to floods; this percentage is 43% for Ramallah and Al Bireh, 29% for Bethlehem and 21% for Hebron.

Table 4.2.6-1: Flood hazard categories by West Bank Governorates relevant to the project

Governorate	Flood Hazard Intensity Class (Area, km²)					Total
	Very Low	Low	Medium	High	Very high	
Nablus	0.6	14.3	143.5	361.5	106.8	626.7
Ramallah & Al Bireh	14.5	135.8	324.9	288.7	76.5	840.4
Bethlehem	93.7	159.1	177.9	150.5	26.0	607.2
Hebron	94.6	316.3	408.4	155.9	59.8	1,035
Entire West Bank	**432**	**836**	**1,608**	**2,046**	**702**	**5,624**

Source: Samer Shadeed, 2019, Article GIS-based Flood Hazard Mapping in the West Bank, Palestine, https://www.researchgate.net/publication/331973616_GIS-based_Flood_Hazard_Mapping_in_the_West_Bank_Palestine

According to a recent study[169] on flood hazard mapping in Gaza Governorate , areas were classified according to their vulnerability to flooding into five categories: "Very high," "High," "Moderate," "Low," and "Very low", taking into consideration five criteria: distance to stormwater drainage network, land use (cover), height, slope, and groundwater depth. Nafaq Street, Zaytoon, Toffah, and Daraj regions are the most vulnerable areas in Gaza Governorate. This was consistent with historical floods inundation data. These areas are presented in Figure 4.2.6-3 below.

In Gaza, recurrent flooding poses threats of water sources contamination due to overflowing of sewage systems, thus increasing the risk of waterborne diseases.

[169] *Ajjur, S.B., Mogheir, Y.K. Flood hazard mapping using a multi-criteria decision analysis and GIS (case study Gaza Governorate, Palestine). Arab J Geosci 13, 44 (2020). https://doi.org/10.1007/s12517-019-5024-6*

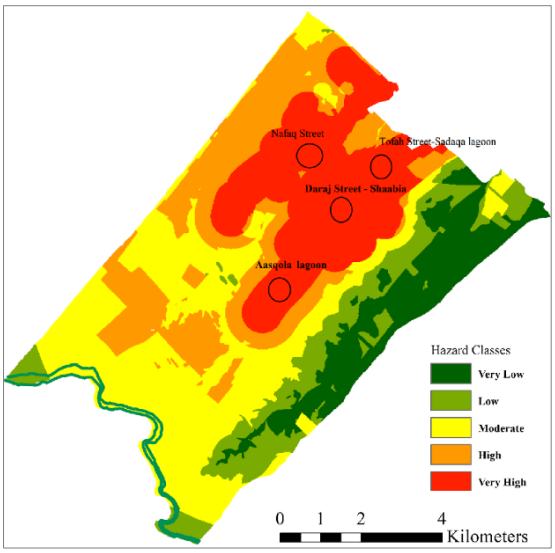


Figure 4.2.6-3: Validation of the final flood-prone areas' map with historically flooded events in Gaza Governorate
Source:
Ajjur, S.B., Mogheir, Y.K. Flood hazard mapping using a multi-criteria decision analysis and GIS (case study Gaza Governorate, Palestine). Arab J Geosci 13, 44 (2020). https://doi.org/10.1007/s12517-019-5024-6

4.2.6.3 Other Natural Hazards [170]

Landslides

Landslide susceptibility is classified as high in Nablus, Ramallah and Al Bireh and Bethlehem Urban Areas, medium in Hebron Urban Area and very low in Gaza Urban Area (see Figure 4.2.6-4). This means that this area has rainfall patterns, terrain slope, geology, soil, land cover and (potentially) earthquakes that make localized landslides a frequent hazard phenomenon. Climate change is likely to alter slope and bedrock stability through changes in precipitation and/or temperature. It is difficult to determine future locations and timing of large rock avalanches, as these depend on local geological conditions and other non-climatic factors.

Wildfires

Wildfire hazard is classified as high in the four (4) targeted urban areas in West Bank and low in Gaza Urban Area (see Figure 4.2.6-5). This means that there is a more than 50% chance of encountering weather that could support a significant wildfire that is likely to result in both life and property loss in any given year. In extreme fire weather events, strong winds and wind born debris may weaken the integrity of infrastructure.

Modeled projections of future climate identify a likely increase in the frequency of fire weather occurrence in this region, including an increase in temperature and greater variance in rainfall. In areas already affected by wildfire hazard, the fire season is likely to increase in duration, and include a greater number of days with weather that could support fire spread because of longer periods without rain during fire seasons. Climate projections indicate that there could also be an increase in the severity of fire. Areas of very low or low wildfire hazard could see an increase in hazard, as climate projections indicate an expansion of the wildfire hazard zone.

[170] https://thinkhazard.org/en/report/91-west-bank-and-gaza

Water scarcity

Water scarcity hazard is classified as high in Bethlehem and Gaza Urban Areas and medium in Nablus, Ramallah and Al Bireh and Hebron Urban Areas (see Figure 4.2.6-6). High water scarcity hazard means that **droughts** are expected to occur on average every 5 years. The present hazard levels may increase in the future due to the effects of climate change (increase of drought hazard, which influences water scarcity).

Tsunami

Generally, tsunami hazard is classified as medium in Gaza Strip (see Figure 4.2.6-7). This means that there is more than a 10% chance of a potentially-damaging tsunami occurring in the next 50 years. The areas at risk of tsunami will increase as global mean sea level rises (estimates for 2100 range from ~20 cm to nearly 1 m) due to climate change. However, regional changes in sea level are difficult to predict. It must be noted that these estimations do not include Gaza Urban Area.

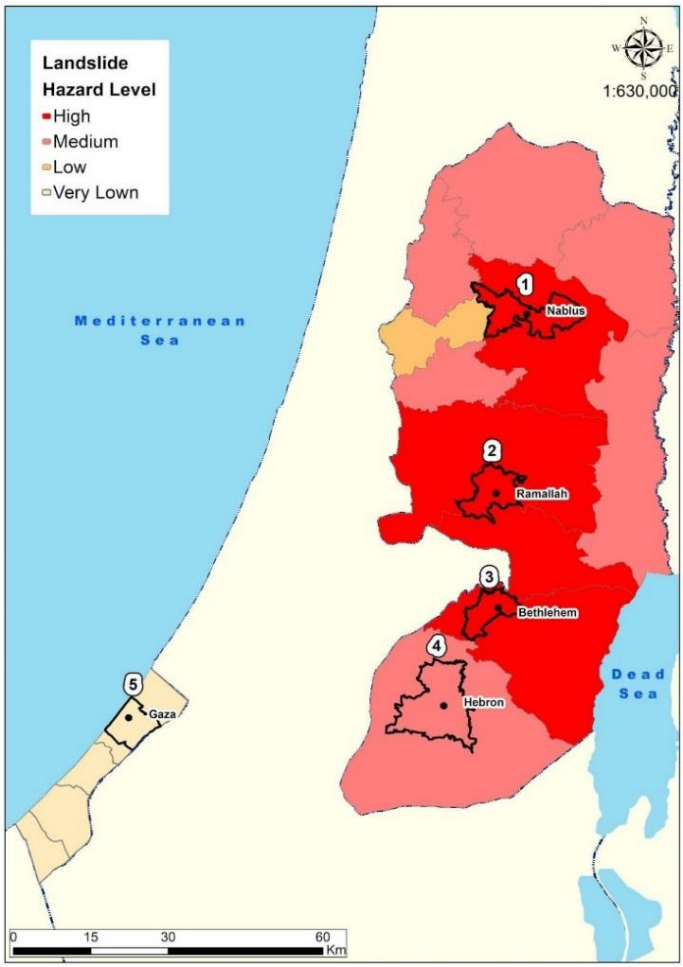


Figure 4.2.6-4: Landslide hazard levels per Governorate

Source: https://thinkhazard.org/en/report/91-west-bank-and-gaza/LS



Figure 4.2.6-5: Wildfire hazard levels per Governorate

Source: https://thinkhazard.org/en/report/91-west-bank-and-gaza/WF



Figure 4.2.6-6: Water scarcity hazard levels per Governorate

Source: https://thinkhazard.org/en/report/91-west-bank-and-gaza/DG



Figure 4.2.6-7: Tsounami hazard levels per Governorate

Source: https://thinkhazard.org/en/report/91-west-bank-and-gaza/TS

4.2.7 Solid Waste

4.2.7.1 Estimated quantities of produced waste

Approximately 45-50% of produced solid waste is generated in households, 25-30% is generated from commercial and institutional activities and the remaining 20-25% is industrial waste[171].

Municipal Solid Waste

Palestinians from West Bank and Gaza generated about 1.59 Million tons of municipal solid waste in 2018[172]. Approximately 34%[173] of municipal solid waste generated in West Bank, originates in Hebron and Bethlehem, which are the two poorest governorates in the West Bank.

In Table 4.2.7-1 below, waste generation figures remain an estimation: some waste management activities are not systematically tracked and recorded and most of the figures from Gaza date from 2012.

[171] https://www.arij.org/files/arijadmin/weruinfographics.pdf
[172] *CESVI, September 2019, Solid Waste Management in the occupied Palestinian territory, West Bank including East Jerusalem & Gaza Strip, Overview Report, http://www.cesvi.eu/wp-content/uploads//2019/12/SWM-in-Palestine-report-Thoni-and-Matar-2019_compressed-1.pdf*
[173] https://www.gprba.org/sites/gpoba/files/OBA46_Solid_Waste_0.pdf

Table 4.2.7-1: Estimated amount of municipal solid waste generated in the Palestine in 2017-2018

	West Bank		Gaza Strip		Palestine (excl. settlements)		Israeli Settlements
	2017	2018	2017	2018	2017	2018	2017
Total Population *	2,881,957	2,953,946	1,899,291	1,961,406	4.78 M	4.91 M	653,621
Solid Waste Generation* (t/day)	2,190	2,622	1,709	1,726	3,891	4,356	1,242
Solid Waste Generation* (t/year)	799,350	957,030	623,917	630,000	1,42 M	1,59 M	453,286
Average generation (kg/ day/capita)	0.84	0.98	0.90	0.88	0.86 - 0.92	0.94 - 0.99	1.9

*Note: * E.J. included*
Source: CESVI, September 2019, Solid Waste Management in the occupied Palestinian territory, West Bank including East Jerusalem & Gaza Strip, Overview Report, http://www.cesvi.eu/wp-content/uploads//2019/12/SWM-in-Palestine-report-Thoni-and-Matar-2019_compressed-1.pdf

The main composition of municipal waste is organic (about 50%), followed by plastic (17% in average) in progression and paper/cardboard (11%). Despite this large portion of biodegradables and recyclables, only a small fraction is collected for reuse (about 3%).

Municipal solid waste generation in Palestine is expected to increase substantially due to population growth and urbanisation trends.

Based on population projections made by the Palestinian Central Bureau of Statistics, Gaza population, as recorded in 2011 is expected to double by the year 2040, reaching 3.2 million. An assessment of the per capita waste generation shows that the total amounts of householde waste are also expected to double compared to 2011, reaching 3383 ton / day in 2040. Additionally, 147 ton / day of commercial waste, 157 ton / day of market waste and 1200 ton / day of agricultural waste are estimated to be generated in 2040. This poses a huge challenge to the waste sector in Gaza, taking into account the limited financial resources and underdeveloped levels of waste management services, but also the limited land availability in the Gaza Strip[174].

Industrial and medical waste

Palestinians from West Bank and Gaza generated about 0.4 Million tons of industrial solid waste and about 0.004 tons of medical waste for the year 2018.

Gaza produces approximately 803 ton / day of hazardous waste[175]. Most of this waste is mixed with the main household waste streams with all associated environmental and public health risks specifically for waste collectors, waste scavengers and landfill operators, but also for the general public.

The activities of medical waste management project for 27 Governmental clinics in south and Middle Gaza and 2 departments of Al Shifa Hospital (lab and hemodialysis) in Gaza were under the service of JSC. Figure 4.2.7-1 presents the total generated infectious and sharps from Al Shifa two departments (lab and hemodialysis), with an average production of 3,759kg/month for the period January - June 2019.[176]

[174] *Feasibility Study and Detailed Design for Solid Waste Management in the Gaza Strip, UNDP – PAPP, January 2012*
[175] *Development of a National Master Plan for Hazardous Waste Management for the Palestinian National Authority" (PNA, 2010*
[176] *JICA, 2019, Program for Establishing a System of Medical Waste Management in Gaza*

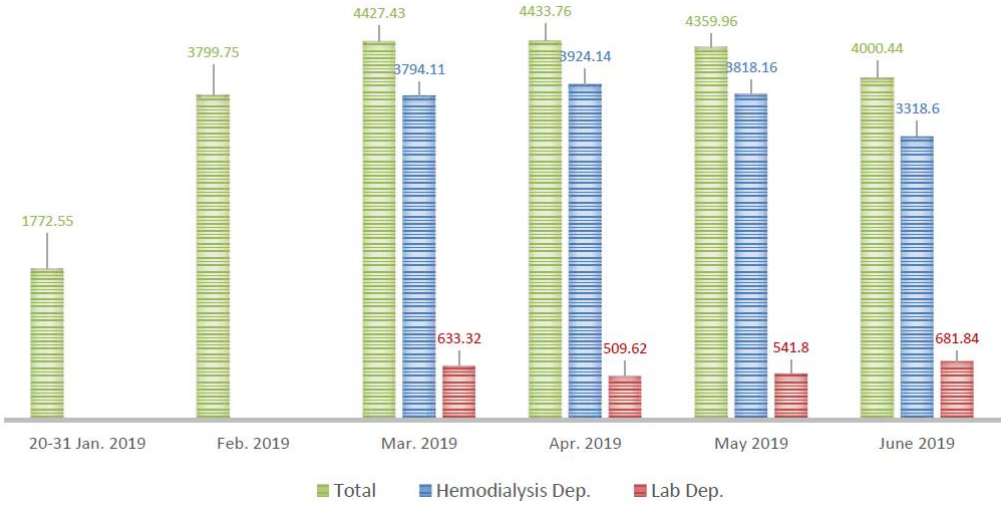


Figure 4.2.7-1: Total Generated Quantities of Sharps and Infectious medical waste from Al Shifa Two Departments (Jan.- June 2019)

Source: JICA, 2019, Program for Establishing a System of Medical Waste Management in Gaza

Construction and Demolition waste

Construction and Demolition waste (CDW) has negative impacts, such as degrading the landscapes, obstructing roads or river beds like wadis, as well as polluting soils.

The composition of CDW is mostly concrete (41.4%), bricks (22.1%) and wood (14.2%). In 2016, it was estimated that about 208,996 tons of CDW was produced in the WB. In the Gaza Strip, two million tons of demolition waste were produced due to the war in Gaza in 2014, 1.8 million ton from residential buildings and 0.2 ton from commercial buildings.

Figure 4.2.7-2 projects growth in solid waste generation arisings, including municipal, medical, institutional, commercial, and industrial wastes, based on 2012 per capita rates and an annual 1% increase in per capita generation; solid waste levels are expected to reach 5.3 million tons by 2050.[177]

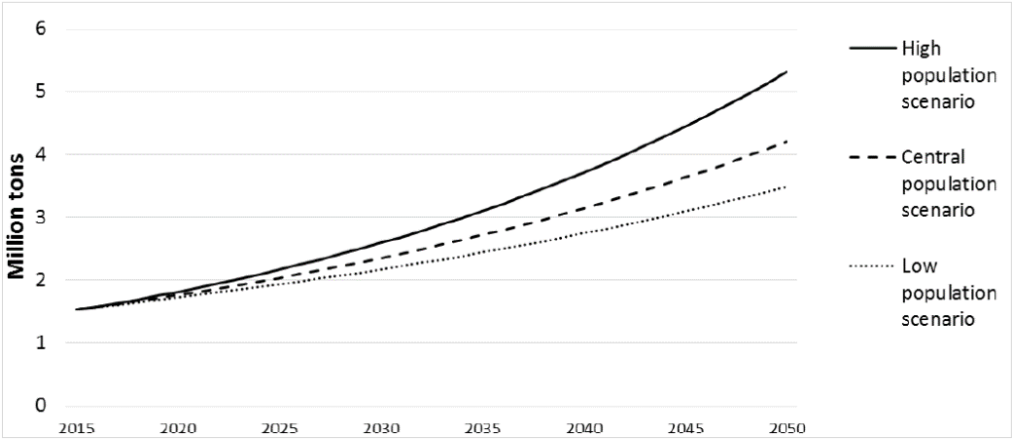


Figure 4.2.7-2: Municipal, medical, institutional, commercial and industrial solid waste generation growth (Mt), 2015-2050

Source: Ives et.al, 2017, A Fast Track Analysis of Infrastructure Provision in Palestine, v2.1, www.itrc.org.uk

[177] *Ives et.al, 2017, A Fast Track Analysis of Infrastructure Provision in Palestine, v2.1, www.itrc.org.uk*

4.2.7.2 Waste separation and recycling

There is no comprehensive data about the total quantities of waste separated and recycled in the West Bank. In 2018 estimates indicate that approximately 3% of total waste is recovered / recycled.[178]

The Palestinian market in materials' reuse/recycling is characterised by its small size, informality and fluctuation. [179] The only materials currently recycled in the Palestine are organic waste, some plastics and some cardboard.

Plastics are collected and reused. The waste is collected either on a door-to-door basis by individuals with their donkey carts, or from spots where debris can be found. The plastic waste is reused in numerous plastics recycling factories, producing plastic bags or simple consumer goods; A few plastic recycling facilities are located in the Nablus and Hebron region, as well as in Gaza. Factories in Dura produce low quality flakes and in Nablus fruit cages.

Paper/cardboard seems to be reused, for example in the Eastern Industrial Area of Nablus

Most of the municipal solid waste (coming from houses, commercial and public institutions, and some industries) is mixed and not recycled when collected. Medical waste and some special waste can be collected separately but, at the final destination level, there is currently no separate special cell dedicated and they end up mixed in the landfill. In most cases, hazardous waste is not treated and disposed separately from municipal solid waste.

The problem with solid industrial waste from Palestinian industries is that it is often mixed, i.e. containing also hazardous components. Most of the industries don't separate; some waste is burned on-site or in dumpsites. There are attempts though of re-using some material, such as solid waste from olive mills or from stone factories. According to PCBS in 2017[180], 82.5% of industries in the Palestine used local authority disposal services, while 12% disposed of their solid waste by themselves. The great majority of industries generates paper/cardboard (89.8%), plastic (76.6%); 45.6% generate soil and stones, 39.2% generate organic waste. Out of all industries in the Palestine, 8.3% declared generating infectious and sharp and 1.4% chemicals. Moreover, 16.7% of industries, which generated chemical waste, as well as 26.5% of those generating sharp and infectious waste, reported that they separated it.[181]

While informal e-waste processing is dispersed across the West Bank, the overwhelming majority takes place in the rural villages of southwest Hebron, which are collectively recognized as a "scrap capital". The amount of e-waste received and processed in these Palestinian villages is estimated at between 57,000 to 64,000 tonnes annually (156–175 tonnes per day). The processing of this waste is mainly carried out by workers who pick through piles of e-waste, item-by-item, dismantling products into critical fractions (e.g. copper, aluminum, iron, etc). About 80% of households in this area are involved either directly or indirectly in processing e-waste to extract copper and other valuable

[178] *CESVI, September 2019, Solid Waste Management in the Occupied Palestinian Territory, West Bank including East Jerusalem & Gaza Strip, Overview Report, http://www.cesvi.eu/wp-content/uploads//2019/12/SWM-in-Palestine-report-Thoni-and-Matar-2019_compressed-1.pdf*

[179] *https://www.arij.org/files/arijadmin/weruinfographics.pdf*
CESVI, September 2019, Solid Waste Management in the Occupied Palestinian Territory, West Bank including East Jerusalem & Gaza Strip, Overview Report, http://www.cesvi.eu/wp-content/uploads//2019/12/SWM-in-Palestine-report-Thoni-and-Matar-2019_compressed-1.pdf

[180] *PCBS, 2017, Environmental Economic Survey. http://www.pcbs.gov.ps/Downloads/book2323.pdf*

[181] *PCBS, 2017, PHC 2017: Census Final Results – Summary. http://www.pcbs.gov.ps/Downloads/book2383.pdf*

metals. Metals recovered from e-waste are one of the largest Palestinian exports to Israel. Waste processing is, therefore, an important source of income for communities in the Hebron area[182].

Construction/building debris is currently intensively recycled in Gaza at and around new building projects[183]; wood can be sold to bakeries and glass to some industries. Currently, there is no information about the percentage of Construction and Demolition Waste recycled.

Waste picking from open dumpsites and landfills is performed by mainly young people looking for valuables including metals scraps (steel bars and non-ferrous metals) and old textile. This situation poses serious health threats, since the waste is often mixed with hazardous or infectious waste streams. In different places in Gaza one can notice big piles of metal scrap ready to be exported once the borders with Israel or Egypt would open[184].



Figure 4.2.7-3: Left: Waste pickers in the southern West Bank, Right: 6 year old child picking waste in one of Gaza Streets
Sources:
https://www.worldbank.org/en/news/feature/2016/02/17/working-amid-fragility-delivering-results-in-essential-services-in-palestine
CESVI, September 2019, Solid Waste Management in the Occupied Palestinian TERRITORY, West Bank including East Jerusalem & Gaza Strip, Overview Report, http://www.cesvi.eu/wp-content/uploads//2019/12/SWM-in-Palestine-report-Thoni-and-Matar-2019_compressed-1.pdf

4.2.7.3 Collection system

In 2015 in Palestine, about 94.5% average of households[185] had access to solid waste collection services: either from a local authority (78.8%), from UNRWA (9.4%), from a private contractor (0.3%) or by other means (4.6%).[186] (Table 4.2.7-2).

Table 4.2.7-2: Percentage Distribution of Households in Palestine by the Solid Waste Collection Doer and Region, 2015

Region	Solid Waste Collection Doer						
	Local Authority	Household Member (No Solid Waste Collection Service)	UNRWA	Private Contractor	Participation Between Household Member and Another Doer	Others	Total
Palestine	**78.8**	**5.5**	**9.4**	**0.3**	**1.4**	**4.6**	**100**
West Bank	**77.5**	**7.3**	**6.0**	**0.1**	**2.1**	**7.0**	**100**
North of West Bank	90.6	2.3	6.7	0.3	0.1	0.0	100
Middle of	63.2	5.0	7.5	0.0	0.0	24.3*	100

[182] *State of Environment and Outlook Report for the occupied Palestinian territory, UNEP 2020*
[183] *Feasibility Study and Detailed Design for Solid Waste Management in the Gaza Strip, UNDP – PAPP, January 2012*
[184] *Feasibility Study and Detailed Design for Solid Waste Management in the Gaza Strip, UNDP – PAPP, January 2012*
[185] *One person or a group of persons with or without a household relationship, who live in the same housing unit, share meals and make joint provision of food and other essentials of living*
[186] *Palestinian Central Bureau of Statistics, 2015. Household Environmental Survey - 2015: Main Findings . Ramallah - Palestine.*

Region	Solid Waste Collection Doer						
	Local Authority	**Household Member (No Solid Waste Collection Service)**	**UNRWA**	**Private Contractor**	**Participation Between Household Member and Another Doer**	**Others**	**Total**
West Bank							
South of West Bank	74.3	15.2	3.7	0.0	6.6	0.2	100
Gaza Strip	**81.3**	**2.1**	**15.9**	**0.7**	**0.0**	**0.0**	**100**

** The high percentage is because solid waste is collected by the Israeli Jerusalem municipality for the majority of households in Jerusalem governorate.*
Source: Palestinian Central Bureau of Statistics, 2015, Household Environmental Survey - 2015: Main Findings . Ramallah - Palestine

In general, there are no estimates of the un-collected waste distribution in urban, rural, and camps areas.

Municipalities commonly spend 20–50% of their budgets on solid waste management, of which 80–90% is spent on waste collection. Cost recovery is a real issue for municipalities in Palestine. Despite the fact that there are national guidelines for tariff, cost, and fee collection, there is no unified application in the fee collection system.

Waste collection tends to be high, although the service itself is inefficient; only about half of what is collected is processed to minimum acceptable standards, with the rest being disposed of in unsanitary dumpsites and by open burning, which is particularly common in rural areas[187].

In the West Bank, the door-to door collection is done by street sweepers with wheelbarrows or/and the street container are the most commonly applied waste collection systems. Trucks and compactors are taking the waste to transfer stations or directly to dumping sites. In West Bank villages, collection is done through wheelbarrows and tractors.

Primary collection is applied with street sweepers with **wheelbarrows** or **donkey carts** (since 2008) in Gaza; Donkey carts collect more than a third of primary collection in Gaza Strip, and about half of Gaza City waste. In Gaza Municipality there are 245 donkey carts with 1.5ton/day capacity for each one[188]. About half of the households are served on a daily basis, the other half uses street containers which are emptied by the Municipality about twice per week. Sometimes, waste is piled up in and around these containers, causing direct public health threats. Local people tend to burn the waste in the containers if not emptied in time, to make space for more waste[189].

Table 4.2.7-3 below shows the main characteristics of the JSCs' collection system for the Governorates relevant to the project, whereby on average, approximately 70% of the population has access to solid waste collection services. Ramallah and Al Bireh Urban Area drops 50% of the waste collected into dumpsites. Except for Bethlehem governorate, the average transportation distance to landfills is 25 km minimum and, in some cases exceeds 80 km (cf. Ramallah for example).

[187] *https://www.gprba.org/sites/gpoba/files/OBA46_Solid_Waste_0.pdf*
[188] *Spatial and Sectoral Assessment Report, 2020, World Bank, Integrated Cities and Urban Development Project Gaza City - Improving Resilience of Urban Service Systems*
[189] *Feasibility Study and Detailed Design for Solid Waste Management in the Gaza Strip, UNDP – PAPP, January 2012*

Table 4.2.7-3: Main characteristics of the collection system run by the JSCs in 2018 within the Governorates relevant to the project

JSCs	Collection system type [190]	LGUs served out of total LGUs	% population covered	Number of vehicles	Vehicle's condition status	Transportation of collected Solid Waste
Nablus	FTFP 85%	32 of the 57 LGUs	47%	5 compactors	3 bad / 2 good	88% to Al Sarayfi TS then ZAF LF (40 km) 8.4% to dumpsites 3.6% recycled
Ramallah & Al Bireh	n.a.	60 of the 70 LGUs	79%	13 (11 compactors) In some areas tractors used	Good 43 LGUs use them	50% to ZAF LF and 50% to dumpsites
Bethlehem	FTFP 90% HtH 9% Containers 1%	28 of the 36 LGUs	80%	25 (18 compactors)	all good	100% to Al Minya LF
Hebron	FTFP 75%	32 of the 55 LGUs	53%	27 (25 compactors)	12 bad/ 15 good	50% to Al Minya LF directly; 50% through TS (Tarqumia 39 kms, Al Fahs 33kms and Yatta)
Gaza Governorate and North (not operational)	Municipalities do all the collection	100% of the 8 LGUs	JSC covers 0% of waste collection, but municipalities and UNRWA covers 97%	5 (2 compactors, tractor, loader, and tipper crane)	Bad conditions	31% sent to Al- Yarmouk TS then to Johr Al-Diek LF (10km); 36% sent to open illegal dumpsites at the north of Gaza governorates; 33% sent directly to Johr Al-Diek Landfill

Source: CESVI, September 2019, Solid Waste Management in the Occupied Palestinian Territory, West Bank including East Jerusalem & Gaza Strip, Overview Report, http://www.cesvi.eu/wp-content/uploads//2019/12/SWM-in-Palestine-report-Thoni-and-Matar-2019_compressed-1.pdf

Transfer Stations

There are 7 transfer stations in Governorates relevant to the project; of which 1 in Nablus, 2 in Ramallah, 3 in Hebron and 1 in Gaza municipalities. Transferring distance varies considerably from 10 km in Gaza municipality to 120 km in Ramallah municipality.

Table 4.2.7-4: List of Transfer Stations within the Governorates relevant to the project

Governorate	Name of TS	Transferred Quantity (tons/day)	Transferring Distance (km)	Final Disposal	Management Responsibility
Nablus	Al Sayrafi	180	10	Zahret Al Fenjan	Nablus Municipality
Ramallah and Al Bireh	Ramallah	100	120	Zahret Al Fenjan	Ramallah Municipality
	Al Bireh	100	80	Zahret Al Fenjan	Al Bireh Municipality
Hebron	Tarqumia	100	39	Al Menya	Hebron & Bethlehem Higher Council
	Yatta	200	35	Al Menya	Hebron & Bethlehem Higher Council
	Al Fahs	350	33	Al Menya	Hebron & Bethlehem Higher Council
Gaza	El Yarmouk	700	15	Juhr Eldik	Gaza Municipality and JSC North

Source: JICA, MoLG, Data Book Solid Waste Management of Joint Services Councils West Bank and Gaza, JSC Data for the year 2019 in West Bank & Gaza, July, 2019, 2nd Edition, https://openjicareport.jica.go.jp/pdf/1000041684_05.pdf (p. 144/298)

[190] *FTFP is "fixed time fixed place", referring to container disposal and HtH means "house-to-house" or door to door collection.*

In Gaza city There are 20 also temporary sub-transfer stations. [191]

4.2.7.4 Waste management disposal

One challenge with municipal solid waste in Palestine is the disposal process. The principal methods of disposal are landfilling and random dumping. In addition, illegal and spontaneous fires take place in random dumpsites or in containers. Taking into account the information available one estimates that in 2018 about 65% is disposed in controlled landfills, 3% is recovered/recycled and about 32% is illegally dumped.[192]

Landfills

There is a limited number of sanitary landfills in Palestine. There are three main landfill sites in the West Bank. In addition to these, there is a small landfill located in North-West Jerusalem (Beit Anan), and one Israeli landfill (Tovlan in the Jericho area, which takes waste from Israeli settlements). In Gaza, there are three sanitary landfills. The environmental performance of sanitary landfills is poor, and all of them require immediate interventions. Because available land is very limited in Palestine, the development of new landfills poses huge challenges.[193]

Table 4.2.7-5 below presents all landfills in Palestine. The location of landfills is presented in Figure 4.2.7-8. It must be noted that Johr Al-Diek Landfill (JAD) is the only hazardous waste disposal site in Palestine.

Table 4.2.7-5: List of Sanitary Landfills in Palestine

Sanitary Landfill	Location	Targeted Area	Served Area	Management Responsibility	Received Quantity (tons/day)	Amounts of waste received	SW composition
Zahret Al Fenjan (ZAF) (2007)	Jenin Governorate (area B)	North of West Bank	Jenin Area, Tubas Area, Tulkarem Area, Qalqelia Area, **Nablus Area** and **Parts of Ramallah Area (Ramallah City, Al Bireh City, and Beitunia City)**	Jenin JSC	1,200	ALMOST FULL	55% mainly organic; 12% paper and cardboard; 14% plastic and rubber; 1,5% glass and 2% metals
Jericho (2007)	Jericho Governorate (area A)	Jericho Governorate	Jericho Area, and **part of Nablus governorate**	Jericho JSC	55	ALMOST FULL	46 % Organic; 26 % Plastic; 11 % Paper / Cardboard; 1 % Glass; 5 % Metal; 11 % Other
Al Menya (2014)	**Bethlehem Governorate (area C)**	South of West Bank	**Hebron Area, Bethlehem Area** and NE&SE Jer. Area	Hebron & Bethlehem Higher Council	1,000	ALMOST FULL	45-50% organic/ biodegradable; 11% paper/ cardboard; 14-18% plastic; 3-5% glass; 1-2% metals; 15-20% others (sludges from slaughter houses, tanneries or dairy plants)
Biet Anan (2018)	Jerusalem Governorate (area C)	North and North west Jerusalem	North and North west Jerusalem & **part of Ramallah**	N&NW Jerusalem JSC	90	-	NO DATA

[191] *Spatial and Sectoral Assessment Report, 2020, World Bank, Integrated Cities and Urban Development Project Gaza City - Improving Resilience of Urban Service Systems*
[192] *CESVI, September 2019, Solid Waste Management in the occupied Palestinian territory, West Bank including East Jerusalem & Gaza Strip, Overview Report, http://www.cesvi.eu/wp-content/uploads//2019/12/SWM-in-Palestine-report-Thoni-and-Matar-2019_compressed-1.pdf*
[193] *State of Environment and Outlook Report for the occupied Palestinian territory 2020, UNEP 2020, https://reliefweb.int/sites/reliefweb.int/files/resources/SEORP.pdf*

Sanitary Landfill	Location	Targeted Area	Served Area	Management Responsibility	Received Quantity (tons/day)	Amounts of waste received	SW composition
			LGUs				
Johr El-Diek (1986)	**Gaza Governorate**	Gaza & North Governorates	North Gaza Governorate & **Gaza Governorate**	Gaza Municipality	700	ALMOST FULL	56.6 % Organic; 13.9 % Plastic; 7.6 % Paper / Cardboard; 2 % Glass; 2.9 % Metal; 17.7 % Other
Dier El Balah (1995)	Al Wasta Governorate	Al Wasta & Khan Yonis Governorate	Al Wasta & Khan Yonis Governorate	JSC South Gaza	430	CLOSED	NO DATA
Old Sofa (1996)	Khan Yonis	Rafah Governorate	Rafah Governorate	JSC South Gaza	170	CLOSED	NO DATA
New Sofa (2019)	Khan Yonis	Al Wasta , Khan Yonis & Rafa	Al Wasta, Khan Yonis & Rafah	JSC South Gaza	Inaugurated on 12 June 2019, will be functional on July	NEW	NO DATA

Note: Landfills that are either located within the Governorates relevant to the project, or serve these Governorates, have been highlighted in bold.
Sources:
JICA, MoLG, Data Book Solid Waste Management of Joint Services Councils West Bank and Gaza, JSC Data for the year 2019 in West Bank & Gaza, July, 2019, 2nd Edition, https://openjicareport.jica.go.jp/pdf/1000041684_05.pdf (p. 144/298)
CESVI, September 2019, Solid Waste Management in the Occupied Palestinian Territory, West Bank including East Jerusalem & Gaza Strip, Overview Report, http://www.cesvi.eu/wp-content/uploads//2019/12/SWM-in-Palestine-report-Thoni-and-Matar-2019_compressed-1.pdf
Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf

Al Minya sanitary landfill was designed originally for 630 tonnes/day, but in November 2018 it was receiving 1,100 tonnes/ day: all the waste from the southern governorates, Bethlehem (220t/day) and Hebron (700 t/day), as well as from East Jerusalem (115 t/day) and settlements (65t/day). At Al Minya, leachate management is an issue, as the only method to reduce it is evaporation. There is a treatment unit with an aeration tank, which is out of order; an odour repellent is sprayed regularly on the leachate ponds and over the landfill itself, in order to limit the inconvenience to nearby residents. The ponds face the risk of overflow during certain seasons and the reduction of the leachate by evaporation is very low.

There is another proposed sanitary landfill, which is Rammun Sanitary LF, in area C, which will be established to serve all the localities (68 localities) from Ramallah and Al Bireh governorates, with a total area of 208,000 m² and a total capacity is 2.75 Mm³. More importantly, it would allow the closure of about 50 random dumpsites and would relieve the burden currently put on ZAF and Al Minya. This controversial project is put on hold for the moment: after several years it received the Israeli's construction permission (which seems conditioned by the possibility for Israeli settlers to dump their waste there), but it faces a strong opposition from the Palestinians living in the area, as well as from some settlers' communities who put the case to the Supreme Court.[194]

As a result of the obstacles in the establishment of a sanitary landfill in the central area (Rammun) there are many random dumpsites especially in Ramallah and Al Bireh Governorate (see Table 4.2.7-6 and Figure 4.2.7-8 below).

[194] *CESVI, September 2019, Solid Waste Management in the Occupied Palestinian Territory, West Bank including East Jerusalem & Gaza Strip, Overview Report, http://www.cesvi.eu/wp-content/uploads//2019/12/SWM-in-Palestine-report-Thoni-and-Matar-2019_compressed-1.pdf*



Figure 4.2.7-4: Landfill East of Nablus

Source: local project team

According to the UNDP 2012 Feasibility Study of the Gaza Solid Waste Management Project, the following points were agreed: [195]

- The short-term upgrade of the landfills (Johr Al-Diek and Al-Fukhary)
- Two landfills up to 2040. Both landfills shall be realized at a depth of 20 m below surface.
- After 2032, there will be two options:
    - all municipal waste, except the waste streams that will be recycled or composted, will be disposed of at one central landfill located in Rafah (Al-Fukhary). This implies that from 2033 onwards a bulk transfer station shall be established at Johr Al-Deek on the waste reception area. It must be noted that the Waste Transfer Station facility in Al Fukhary includes a treatment unit for healthcare waste. Two Joint Service Councils will be established in the Gaza Strip: one for Northern Gaza (including Gaza City and the existing JSC for Northern Gaza), the second one for Southern Gaza (including Beir al Balah JSC and Rafah City)
    - if agreement can be reached with the Israelis to expand the landfill towards the 300 m border line, Johr Al-Deek landfill will remain in operation after 2032.
- It may be expected that during the next 30 years alternative waste treatment technologies requiring less space will also become feasible for the Gaza Strip, including digestion and incineration. However, much will depend on the economic developments within Gaza in the next 30 years, as well as further improvement of waste management services and related enforcement of operational and financial regulations.

Dumpsites

Waste disposal in the West Bank and Gaza is generally unsanitary, with garbage being disposed in open, unregulated sites, thus presenting a serious public health threat and environmental hazard such as water pollution through leachate formation by rainfall on dumping sites. Leachate can have detrimental accumulative effect on the food chains and ecology. Contamination of surface and ground water is likely to occur with the possibility of the pathogens being carried some distance and causing the spread of diseases. Fire hazards are also associated with uncontrolled dumping.

People dispose of their waste randomly wherever possible (Random open waste dumping sites), for example, by the roadside, in small unpopulated land areas, public parks, behind building fences, on farmlands, etc. Random dumping includes construction and demolition debris, used tires or

[195] *CESVI, September 2019, Solid Waste Management in the Occupied Palestinian Territory, West Bank including East Jerusalem & Gaza Strip, Overview Report, http://www.cesvi.eu/wp-content/uploads//2019/12/SWM-in-Palestine-report-Thoni-and-Matar-2019_compressed-1.pdf*

agricultural waste. Eventually, most of this waste is spread out as litter by wind, animals, children playing and waste pickers.[196]

Waste littering is a frequent problem in refugee camps and the major cause of clogging of drainages.

Sensitive areas like Ramallah & Al Bireh, Salfit, Qalqilya, and Nablus, because of the lack of sanitary disposal areas and long distance to the existing ones, accommodate the most non-sanitary dumping sites, whereas southern governorates have a better situation.

The following Table 4.2.7-6 illustrates in detail the quantities and locations of the Random Dumpsites. The location of Random Dumpsites is also presented in Figure 4.2.7-8 below.

Table 4.2.7-6: Random Dumpsites in Palestine

Location (Governorate)	No. of random Dumpsites	No. of LGUs using Dumpsites	Quantities (ton/day)
Salfit	9	20	66
Nablus	12 (1)	20	77
Ramallah & Al Bireh	50	67	200
North Gaza	3	4	390
South Gaza	3	3	53
TOTAL	**77**	**114**	**786**

(1) Beita; Beit Fureek; Jamma'in; Doma; Al Lubban, Al Sharquyah; Al Sawyah; Qusra; Talfit; Aqraba; Aseera; Al Shamaliyah
Sources:
JICA, MoLG, Data Book Solid Waste Management of Joint Services Councils West Bank and Gaza, JSC Data for the year 2019 in West Bank & Gaza, July, 2019, 2nd Edition, https://openjicareport.jica.go.jp/pdf/1000041684_05.pdf (p. 144/298)
CESVI, September 2019, Solid Waste Management in the Occupied Palestinian Territory, West Bank including East Jerusalem & Gaza Strip, Overview Report, http://www.cesvi.eu/wp-content/uploads//2019/12/SWM-in-Palestine-report-Thoni-and-Matar-2019_compressed-1.pdf

In 2018, MoLG has recorded 20 dumpsites in the four West Bank targeted urban areas. Based on recent data[197], in Gaza Urban Area there are 2 dumping sites.

In 2019, it is estimated that about 343 tons/day in the West Bank and 443 tons/day in the Gaza Strip are disposed in dumpsites.

Burning is the standard practice used for waste volume reduction in dumpsites, especially near refugee camps' collection points, where all the waste not collected by the UNRWA (some municipal waste, bulky waste or old vehicles for example) is regularly burnt. Uncontrolled incineration of waste results in several adverse environmental and health effects due to the production of a number of atmospheric pollutants, such as particulate matter, sulphur dioxide, oxides of nitrogen, various hydrocarbons and other noxious gases and offensive odours.

There is evidence that hazardous products and electronic waste ("e-waste"), is transported from Israel into the West Bank for illegal dumping and treatment; burning is used for waste volume reduction in these dumpsites. Dispersed burn sites generate multiple sources of contamination. Smoke from burning cables, which includes smoke from plastics and rubber, contains significant amounts of carcinogens. Runoff from the area contains soluble substances from the waste, as well as solid particles, heavy metals, and various pollutants which enter into the local soil and aquifers. This pollution is also harmful to local flora and fauna, and is detrimental to the health of residents.

[196] *Issam A. Al-Khatib, Hassan A. Arafat, A review of residential solid waste management in the occupied Palestinian Territory: a window for improvement?, Waste Management and Research, 2010*
[197] *Studies for Optimization of Waste Collection in Gaza Strip – Gaza, Eco Con Serv, June 2016*

When active, burning sites release toxic black smoke that lingers for several hours, with the chemicals released including benzene, dioxins, mercury and polychlorinated biphenyls. This pollution can be blown by the wind for some distance and adversely impact human health. [198]

E-waste also contains substances that can be directly toxic upon release. In particular, heavy metals and organic compounds such as dioxins, furans, and brominated flame retardants can negatively affect the environment and human health if they are not disposed of properly.



Figure 4.2.7-5: Left: Burning has been the typical method of obtaining valuable copper from recycled appliances in West Bank villages, Right: The burning of electronic waste at the West Bank village of Idhna

Sources:
https://www.cbc.ca/news/palestine-west-bank-israel-newfoundland-electronic-waste-environment-pollution-1.4215998
https://www.haaretz.com/israel-news/.premium-israelis-and-palestinians-fed-up-as-bid-to-end-burning-of-e-waste-fails-1.7044385

In addition to the above-mentioned figures, it is important to mention that there are also dumpsites for Construction and Demolition waste. CDW is usually not accepted in municipal landfills, and is randomly disposed along roads, in wadis or on private lands. (see Figure 4.2.7-6 and Figure 4.2.7-7 below).



Figure 4.2.7-6: Left: Random dumping C&D on roadsides, (Tulkarem-Nablus str.), Right: Construction waste disposed of on land owned by private entity

Source: Jica, 2017, Study on C&D Waste in West Bank, Palestine, https://openjicareport.jica.go.jp/pdf/1000041684_02.pdf



Figure 4.2.7-7: Left: C&D Waste at Wadi Zomar Nablus West, Right: C&D Waste at Wadi Sajur Nablus East

Source: local project team

[198] *https://www.hindawi.com/journals/jeph/2020/3780431/*

There are at least fifteen Israeli waste treatment facilities in the West Bank. Most of the waste they process is produced in Israel. Six of the facilities handle hazardous waste which requires special processes and regulatory supervision due to the dangers it poses. Israel regards the facilities built in the West Bank as part of its local waste management system, yet it applies less rigorous regulatory standards there than it does inside its own territory. [199]

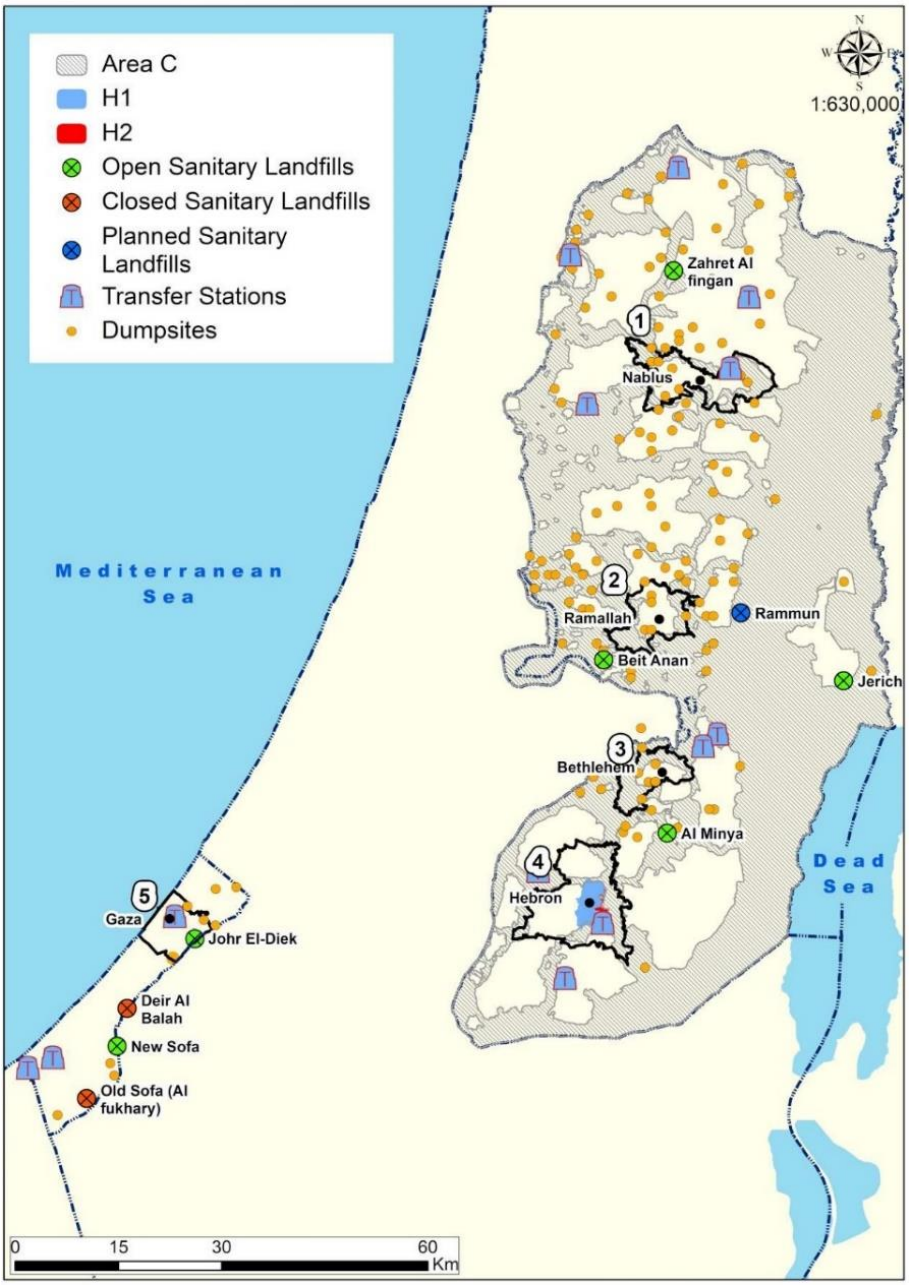


Figure 4.2.7-8: Solid Waste Management facilities in West Bank & Gaza Strip

Sources:
MoLG - ICUD GIS database, https://geomolg.ps/
JICA, MoLG, Data Book Solid Waste Management of Joint Services Councils West Bank and Gaza, JSC Data for the year 2019 in West Bank & Gaza, July, 2019, 2nd Edition, https://openjicareport.jica.go.jp/pdf/1000041684_05.pdf (p. 144/298)

[199] *https://www.btselem.org/sites/default/files/publications/201712_made_in_israel_summary_eng.pdf*

4.3 Development

4.3.1 Urban and Strategic Planning

4.3.1.1 Land Cover [200]

The Landcover area (1,000 Ha) and percentages of Palestine, 1992-2015, is presented in Table 4.3.1-1 below. From 1992-2015 the percentage of area under cultivation decreased by 12%.

Table 4.3.1-1: Landcover area (1,000 Ha) and percentage of Palestine, 1992-2015

Land cover	1992		2015		Change 1992-2015	Average annual change (1992-2015)
	1,000 Ha	%	1,000 Ha	%	1,000 Ha	1,000 Ha
Artificial surfaces (including urban and associated areas)	8.14	1.4	25.77	4.3	+17.63	+0.77
Grassland	41.32	6.9	42.46	7.1	+1.14	+0.05
Herbaceous crops	108.69	18.1	94.64	15.7	-14.05	-0.61
Shrub-covered areas	39.50	6.6	38.46	6.4	-1.04	-0.04
Sparsely natural vegetated areas	121.27	20.1	117.20	19.5	-4.07	-0.18
Terrestrial barren land	121.82	20.2	116.66	19.4	-5.16	-0.22
Tree-covered areas	40.03	6.6	42.59	7.1	+2.56	+0.11
Woody crops	121.23	20.1	124.21	20.6	+2.98	+0.13
Total land area	**~ 602**					

Source: State of Environment and Outlook Report for the occupied Palestinian territory, UNEP 2020

The average annual increase of artificial surfaces, about 766 ha per year, leads to decrease of natural areas (herbaceous crops, shrub-covered areas etc.).

The dominant (top-3) land cover classification per Urban Area is summarized in Table 4.3.1-2 below. Land cover categories for the five (5) targeted urban areas are presented in detail in Annex I "Land Cover".

Table 4.3.1-2: Dominant land cover classification per Urban Area (cover area (km²) and percentage of total urban area (%))

Urban area		Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza
Total Area (km²)		108.19	72.04	55.07	162.78	55.59
Agricultural Land with Natural Vegetation	**(km²)**	-	17.53	10.95	32.62	10.09
	%	-	24.3%	19.0%	20.0%	18.14%
Natural Grass	**(km²)**	35.43	26.75	-	-	-
	%	32.7%	37%	-	-	-
Olive Groves	**(km²)**	23.59	-	-	-	-
	%	21.8%	-	-	-	-
Vineyards	**(km²)**	-	-	9.07	38.34	-
	%	-	-	16.5%	23.6%	-
Urban Fabric (Continuous and Discontinuous)	**(km²)**	19.28	18.70	16.29	51.00	41.8
	%	17.8%	26.0%	29.6%	31.3%	75.2%

Sources:
MoLG - ICUD GIS database, https://geomolg.ps/
Spatial and Sectoral Assessment Report, 2020, World Bank, Integrated Cities and Urban Development Project Gaza City - Improving Resilience of Urban Service Systems

[200] *www.geomolg.ps*

4.3.1.2 Land Use [201]

4.3.1.2.1 Land uses according to Master Plans

LGU masterplan boundaries do not cover the full land area of the LGUs in the West Bank. This is because the majority of proposed municipal and Village Council expansions partially include Area C. Most require coordination and approval from the Israeli Civil Administration, and LGUs wait years for approval to expand. Implementation of regional planning, which could govern the lands outside of LGU masterplans is weak. According to MoLG, the Master Plans cover:

- 47.4% of the total Nablus Urban Area;
- 53.7% of the total Ramallah and Al Bireh Urban Area;
- 29.5% of the total Bethlehem Urban Area;
- 31.7% of the total Hebron Urban Area;
- 100% of the total Gaza Urban Area.

Land uses according to Master Plans (Approved and Objections[202]) in the five targeted Urban Areas in details are presented in Annex I "Land Uses according to Master Plans".

The dominant (top-3) land use classification per Urban Area, as mentioned in the approved Master Plans is summarized in Table 4.3.1-3 below.

Table 4.3.1-3: Dominant land use classification per Urban Area, as mentioned in the approved Master Plans

Urban Area		Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza
Total Area (km²)		108.19	72.04	55.07	162.78	55.59
Residential Area	Cover Area (km²)	32.76	23.43	10.55	36.00	33.00
	%	30.3%	32.5%	19.2%	22.1%	59.4%
Road Network (Existing and Proposed)	Cover Area (km²)	9.68	7.39	2.19	5.67	-
	%	8.9%	10.3%	4.0%	3.5%	-
Commercial	Cover Area (km²)	-	2.78	0.80	-	-
	%	-	3.9%	1.4%	-	-

Source: MoLG - ICUD GIS database, https://geomolg.ps/

Other land uses (Agricultural Area, Antiquities Zone, Camps, Cemetery, Green areas, Offices Zone, Public Buildings, Public Gardens, Public Parkings, Public Services, Public squares, Quarries, Sports and leisure facilities, State Land and Tourism Zone), when added up, cover approximately 50-60% in Nablus and Ramallah & Al Bireh and approximately 75% in Bethlehem and Hebron Urban Areas, while in Gaza Urban Area this percentage is approximately 41%.

4.3.1.2.2 Built-up areas

Because Palestinians have, in effect, been prevented from using a large proportion of the West Bank (Area C), they use the remaining available land areas intensively. In Areas A and B, rapid urbanization

[201] *MoLG-ICUD GIS database*
[202] *Master plan under objection phase regards the phase that follows the master plan initial endorsement to let the population object on the land use classification*

has led to construction over areas of fertile land. From 1992-2015 the percentage of area under cultivation decreased by 12%.

Green spaces remain minimal, due in part to urban expansion.

The built-up areas in the five targeted Urban Areas are presented in Table 4.3.1-4 and

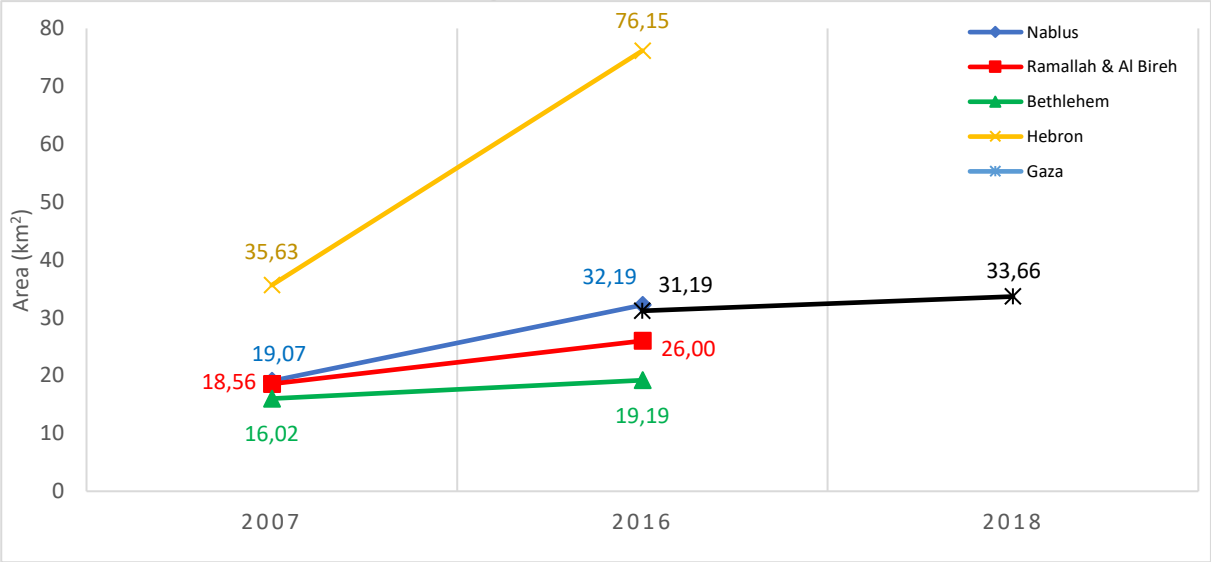


Figure 4.3.1-1 below. Built-up areas within the five targeted Urban Areas are presented in detail in Annex I "Built-up areas".

Table 4.3.1-4: Built up areas in the five targeted Urban Areas

Urban Area	Total Area (km²)	Year	Built up area		Built up area within area C	
			(km²)	% of the Total Urban area	(km²)	(%)
Nablus	108.19	2007	19.07	17.6%	0.86	4.5%
		2016	32.19	29.8%	2.54	7.9%
Ramallah & Al Bireh	72.04	2007	18.56	25.8%	2.35	12.3%
		2016	26.00	36.1%	3.20	12.7%
Bethlehem	55.07	2007	16.02	29.1%	2.04	12.3%
		2016	19.19	34.8%	3.04	19.8%
Hebron	162.78	2007	35.63	21.9%	4.39	7.9%
		2016	76.15	46.8%	15.06	12.7%
Gaza	55.59	2016	30.52	54.9%	-	-
		2018	30.56	55.0%	-	-

Source: MoLG - ICUD GIS database, https://geomolg.ps/

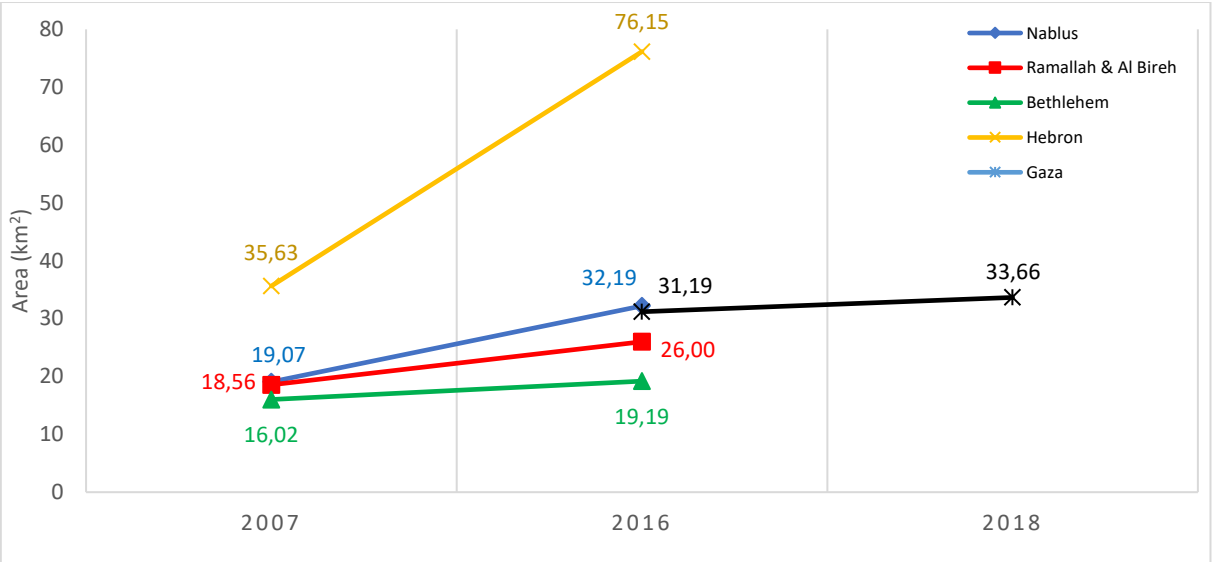


Figure 4.3.1-1: Built-up area trends in the five (5) targeted Urban Areas (km²)

Source: MoLG - ICUD GIS database, https://geomolg.ps/

4.3.1.2.3 Recreation - Public Open Space

The rapid urbanization and population growth in West Bank and Gaza Strip have impacted negatively on the availability and quality of public spaces within Palestinian cities. The planning regulations in Palestine have not been successful in facilitating the provision of public spaces in Palestinian cities, because most consideration is given to building design, elevation, heights, setbacks and parking, with little focus on the design and integration of urban public space. Furthermore, no planning policies are currently mainstreamed within the Palestinian spatial-planning systems. A second major challenge to the development of public open spaces in Palestine is land ownerships. The majority of land parcels in cities are privately owned, making it very difficult to extract land for public space usage. Nevertheless, a few municipal efforts to utilize lands owned by the municipality have succeeded in creating public open spaces in the neighborhoods of their cities, and they have come in the form of small parks and gardens. Although the number of these initiatives is still small, they have succeeded to meet some of the respective communities' basic needs for public spaces. [203]

According to Master Plans, the recreation areas in the five targeted Urban Areas are presented in Table 4.3.1-5 below. Recreation areas within the five targeted Urban Areas are presented in detail in Annex I "Land uses according to Master Plans".

Table 4.3.1-5: Recreation areas in the five targeted Urban Areas according to Master Plans

Urban Area		Nablus	Ramallah and Al Bireh	Bethlehem	Hebron	Gaza
Total Urban Area	**km²**	108.19	72.04	55.07	162.78	55.59
Sports and leisure facilities	**m²**	16,421	-	-	-	-
	%	0.02%	-	-	-	-
Stadium	**m²**	-	-	-	14,907	-
	%	-	-	-	0.01%	-
Green areas	**m²**	80,852	13,159	54,729	104,900	-

[203] *https://unhabitat.org/sites/default/files/documents/2019-05/state_of_palestine_cities_report.pdf*

Urban Area		Nablus	Ramallah and Al Bireh	Bethlehem	Hebron	Gaza
	%	0.07%	0.02%	0.10%	0.06%	-
Open Green Areas	m²	36,868	34,765	59,574	-	-
	%	0.03%	0.05%	0.11%	-	-
Public Gardens	m²	438,510	89,168	122,349	206,199	-
	%	0.41%	0.12%	0.22%	0.13%	-
Public squares	m²	-	121,420	-	-	-
	%	-	0.17%	-	-	-
Pedestrian Road Network	m²	31,979	10,369	72,814	83,173	-
	%	0.03%	0.14%	1.32%	0.51%	-

Source: MoLG - ICUD GIS database, https://geomolg.ps/

According to recent data[204], there are some green and open spaces in Gaza city such as Barcelona Park, Al Shujaya Park, and Al Jundi in Al Rimal. The total area of the green spaces is about 270,430 m² in addition to the Sea beach which is a popular destination for most of Gaza's people. However, the city still needs a number of parks to serve population and to provide a fair geographical distribution of these open spaces. Seven sports clubs also are located in Gaza City, such as Gaza Sport Club and Sadaka club in the center of the city.

4.3.1.2.4 Land Use Analysis

By overlapping the Built-up areas with the land uses of existing Master plans (approved and objections), the following Land Use (LU) categories are identified by the Consultant, for the purposes of this project:

A. **Built-up areas within approved Master Plan Land Uses (LU1):** These areas refer to the Built-up areas until 2016 that are located within the limits of existing Master Plans (approved and objections[205]); these are categorized as **Land Use 1 (LU1)**.

B. **Built-up areas outside approved Master Plan Land Uses (LU2):** These areas refer to the built-up areas that are located outside the limits of existing Master Plans (approved and objections) and are categorized as **Land Use 2 (LU2).** These built-up areas may or not be licensed and approved by MoLG regional offices.

C. **Approved Master Plan Land Uses without Built-up areas (LU3):** These are areas that are within the limits of existing Master plans (approved and objections) but have not been recorded as built-up areas until 2016; these are categorized as **Land Use 3 (LU3)**. *The total area within the limits of existing Master Plans is the sum of areas LU1 and LU3*.

D. **Rest of the Urban Area (LU4):** These areas are outside the limits of existing Master Plans, where no Built-Up Areas have been recorded until 2016; these are categorized as **Land Use 4 (LU4)** and are the remaining surfaces, excluding categories LU1, LU2 and LU3.

The results of the land use analysis per Urban Area are presented in detail in Annex I "Land Use Analysis".

[204] *Spatial and Sectoral Assessment Report, 2020, World Bank, Integrated Cities and Urban Development Project Gaza City - Improving Resilience of Urban Service Systems*
[205] *Master plan under objection phase regards the phase that follows the master plan initial endorsement to let the population object on the land use classification.*

The above mentioned categories **LU1, LU2, LU3** and **LU4** in the five (5) targeted Urban Areas are presented in the Table and Figures below.

Table 4.3.1-6: LU1, LU2, LU3 and LU4 categories in five (5) targeted Urban Areas (cover area (km²) and percentage of total urban area (%))

Urban Area		Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza
Total Area (km²)		108.19	72.04	55.07	162.78	55.59
LU1	(km²)	30.18	24.04	13.98	30.73	30.52
	%	27.9%	33.4%	25.4%	18.9%	54.9%
LU2	(km²)	2.74	2.02	5.59	46.00	0
	%	2.5%	2.8%	10.1%	28.3%	0%
LU3	(km²)	21.06	14.63	2.25	16.80	25.07
	%	19.5%	20.3%	4.1%	10.3%	45.1%
LU4	(km²)	54.22	31.35	33.24	69.25	0
	%	50.1%	43.5%	60.4%	42.5%	0%

As a result of the Land use analysis based on the land uses of existing Master Plans and the Built-up areas per urban area, categories **LU3** and **LU4** have some potential for further exploitation.

Preliminary land use analysis based on available GIS data showed that the estimated remaining area for potential development, taking into consideration protected/Key Biodiversity Areas, land use restrictions and access restrictions (i.e. Area C, Area H2, No-go zone and restricted area in Gaza (300m)) per urban area is presented in Table 4.3.1-7 below.

Sites of archaeological importance have not been taken into consideration in these calculations, as no GIS data were available.

Table 4.3.1-7: Potential area for further development in five (5) targeted urban areas (cover area (km²) and percentage of total urban area (%))

Land Use Calculations		Nablus		Ramallah and Al Bireh		Bethlehem		Hebron		Gaza	
		LU3	LU4	LU3	LU4	LU3	LU4	LU3	LU4	LU3	LU4
LU total surface	(km²)	21.05	54.22	14.62	31.35	2.25	33.24	16.80	69.25	25.07	0
	%	19.46%	50.12%	20.3%	43.5%	4.1%	60.4%	10.3%	42.5%	45.1%	0%
LU within area C	(km²)	3.37	39.85	2.22	29.44	0.82	31.35	0.16	40.48	-	-
	%	3.11%	36.83%	3.1%	40.9%	1.5%	56.9%	0.1%	24.9%	-	-
LU within H2 area	(km²)	-	-	-	-	-	-	0.01	0.10	-	-
	%	-	-	-	-	-	-	0.0%	0.1%	-	-
LU within restricted area (300m) Gaza	(km²)	-	-	-	-	-	-	-	-	2.41	0
	%	-	-	-	-	-	-	-	-	4.3%	0%
LU outside Areas C and within Protected/Key Biodiversity areas	(km²)	1.8	9.1	0.56	0.69	0.43	0.2	1.37	7.39	-	-
	%	1.67%	8.39%	0.78%	0.95%	0.78%	0.36%	0.84%	4.54%	-	-
Remaining area	(km²)	15.88	5.27	11.84	1.22	1.0	1.69	15.26	21.28	22.66	0
	%	14.68%	4.87%	16.44%	1.69%	1.82%	3.07%	9.37%	13.07%	40.76%	0%
Overall remaining area	(km²)	21.15		13.06		2.69		36.54		22.66	

Land Use Calculations		Nablus		Ramallah and Al Bireh		Bethlehem		Hebron		Gaza	
		LU3	LU4	LU3	LU4	LU3	LU4	LU3	LU4	LU3	LU4
	%	19.55%		18.13%		4.88%		22.45%		40.76%	

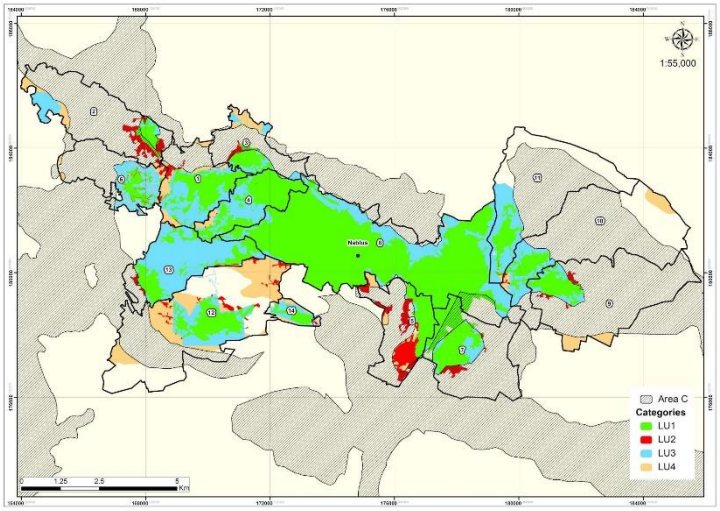


Figure 4.3.1-2: Categories LU1, LU2, LU3 and LU4 in Nablus Urban Area,

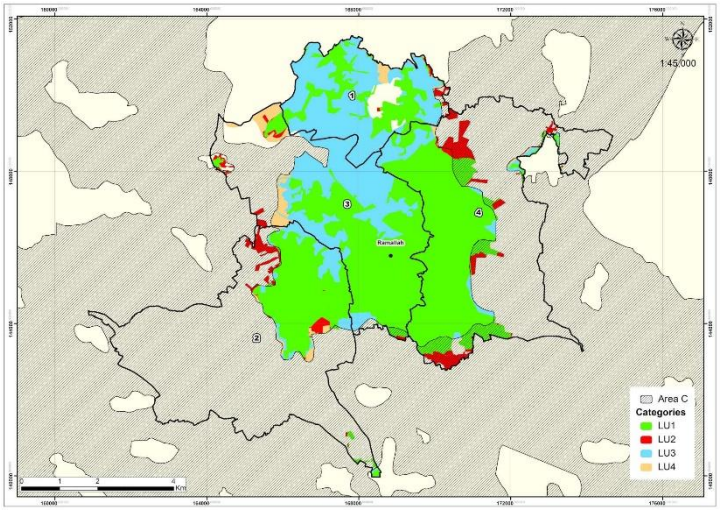


Figure 4.3.1-3: Categories LU1, LU2, LU3 and LU4 in Ramallah and Al Bireh Urban Area

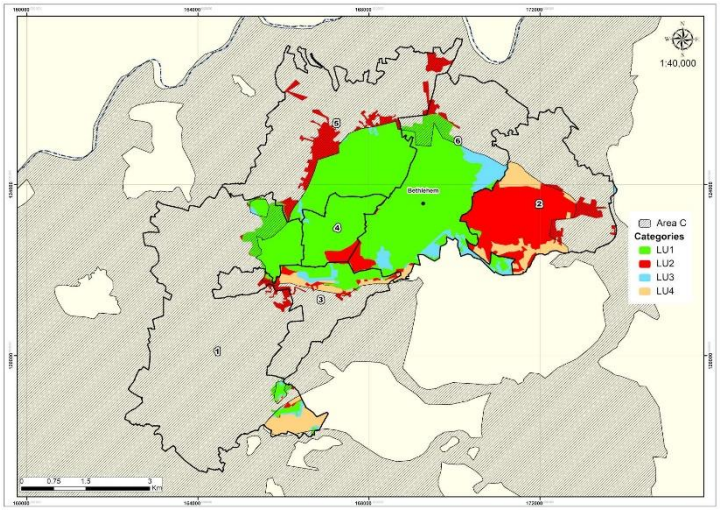


Figure 4.3.1-4: Categories LU1, LU2, LU3 and LU4 in Bethlehem Urban Area

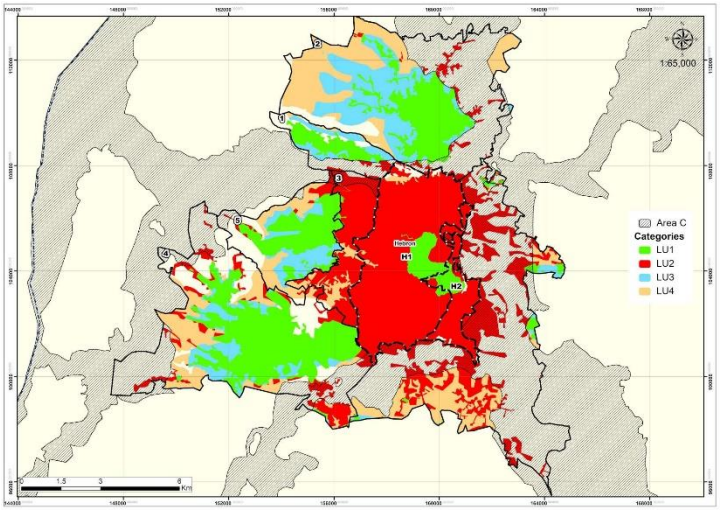


Figure 4.3.1-5: Categories LU1, LU2, LU3 and LU4 in Hebron Urban Area

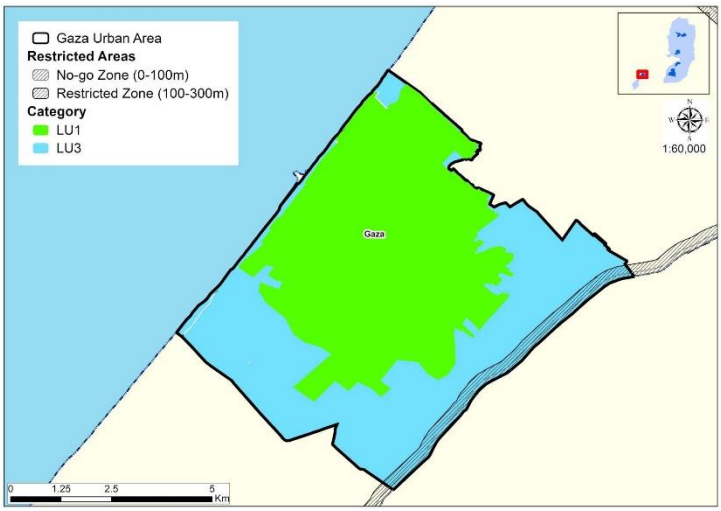


Figure 4.3.1-6: Categories LU1 and LU3 in Gaza Urban Area

Sources:
MoLG - ICUD GIS database, https://geomolg.ps/
UNCTAD, 2015, The Besieged Palestinian Agricultural Sector, https://unctad.org/en/PublicationsLibrary/gdsapp2015d1_en.pdf
Spatial and Sectoral Assessment Report, 2020, World Bank, Integrated Cities and Urban Development Project Gaza City - Improving Resilience of Urban Service Systems

4.3.2 Agriculture, Forestry, Fishing

4.3.2.1 Agriculture

4.3.2.1.1 Agricultural Land [206]

Approximately 20% of the total area of Palestine is used for agricultural purposes (1.2 million dunums). 90% of agricultural lands is located in the West Bank, while only 10% is located in the Gaza Strip.

The total area of agricultural land currently used by Palestinians doesn't exceed half of the Palestinian agricultural land area available for cultivation, while the remaining areas are distributed to lands that can be cultivated but are not used for such purposes, or lands that need rehabilitation, lands that cannot be rehabilitated (often used for grazing of ruminants), lands used for industrial and urban expansion, as well as areas confiscated by the Israeli authorities for settlement expansion, building the separation wall and the construction of bypass roads.

The percentage of total country area cultivated has decreased by 12% between 1997-2016. Trends in agricultural areas 1997-2015/2016 are presented in Table 4.3.2-1 below.

Table 4.3.2-1: Trends in agricultural areas in Palestine 1997-2015/2016

Attribute	1997	2015-2016	Change	Change per year
The total area of the country (1,000 ha)	602	602 (2016)	0	0
Arable land area (1,000 ha)	105	50.82 (2016)	-54.18	-2.85
Permanent crops area (1,000 ha)	115	96.1 (2016)	-18.90	-0.99
Cultivated area (arable land + permanent crops) (1,000 ha)	220	146.9(2016)	-73.10	-3.85
Percent of total country area cultivated	36.54	24.4 (2016)	-12.14	-0.64

Note: Number in () indicate the year of the estimate

[206] *National Agricultural Sector Strategy (2017-2022) "Resilience and Sustainable Development" MoLG-ICUD GIS database*

Source: State of Environment and Outlook Report for the occupied Palestinian territory, UNEP 2020

The dominant (top-3) land cover categories for agricultural purposes in the five targeted Urban areas are presented in Table 4.3.2-2 below.

Table 4.3.2-2: Dominant Land cover categories for agricultural purposes per Urban area in the five (5) targeted Urban areas

Urban Area		Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza**
Total Area (km²)		108.19	72.04	55.07	162.78	55.59
Agricultural Land with Natural Vegetation	Cover Area (km²)	3.82	17.53	10.95	32.62	10.15
	% of total area	4%	24%	20%	20%	18.3%
	Within Area C or restricted area* (km²)	2.19	9.60	9.38	13.58	2.29
	% Within Area C or restricted area	57%	55%	86%	42%	22.6%
Olive Groves	Cover Area (km²)	23.59	2.65	5.31	2.05	-
	% of total area	22%	4%	10%	1%	-
	Within Area C or restricted area * (km²)	7.96	0.74	3.01	1.60	-
	% Within Area C or restricted area	34%	28%	57%	73%	-
Vineyards	Cover Area (km²)	-	-	9.07	38.34	-
	% of total area	-	-	16%	24%	-
	Within Area C or restricted area * (km²)	-	-	8.83	16.80	-
	% Within Area C or restricted area	-	-	97%	44%	-

** Area C in West Bank & no-go and restricted area (300m) in Gaza*
***Data for Gaza are from the Gaza Master Plan*
Source: MoLG - ICUD GIS database, https://geomolg.ps/ (Land Cover)

Residential agriculture

According to PCBS, 93% of farmers have less than 40 dunams of land (4 hectares)[207]; 87.7% of agricultural land holdings in Palestine are less than 20 dunums; those with less than 10 dunums represent 75.3% of the total number. However, large holdings (20 dunums or more) constitute 64.2% of the total land area of all holdings.

Small holdings tend to produce for household consumption. This kind of agricultural production meets part of the household's consumption needs, which is key to improving their consumption levels and food security. An average of 27.4% (33% in WB, 16.8% in Gaza) of Palestinian households own a home garden, and 91.9% of households with a home garden use these for agricultural activities[208]. Moreover, 10% of Palestinian households raise livestock. Home gardens and domestic livestock are critical in improving household consumption and food security.

As the size of the holding increases, production tends to shift from household consumption to market distribution. Only the biggest ones (more than 8 ha) are predominantly market-oriented. This percentage is higher in the West Bank (77.3%) than in the Gaza Strip (61.5%)[209].

Small-scale family farms are characterized by high flexibility and efficiency due to family work and ability to assimilate certain modern techniques which can increase income. According to recent studies, 2 dunums of irrigated land can be more productive and yield higher than a rain-fed farm of 80 dunums.

[207] *ibid*
[208] *PCBS, 2016. Family farming survey in 2015: main findings. Page 15*
[209] *PCBS, 2011. Agricultural Census Data –Final Results, Palestinian Territories.*

Table 4.3.2-3: Residential agriculture per Urban Area according to existing Master Plans

Urban Area		Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza
Total Area (km²)		108.19	72.04	55.07	162.78	55.59
Residential agriculture	Cover Area (km²)	-	0.51	0.04	3.27	1.97
	%	-	0.7 %	0.05%	2 %	3.55%

Source: MoLG - ICUD GIS database, https://geomolg.ps/ (Master Plan)

Figure 4.3.2-1 - Figure 4.3.2-5 below present all agricultural land types per Urban Area. The analytical results for Agricultural Land types in each LGU are presented in Annex I "Agricultural Land".

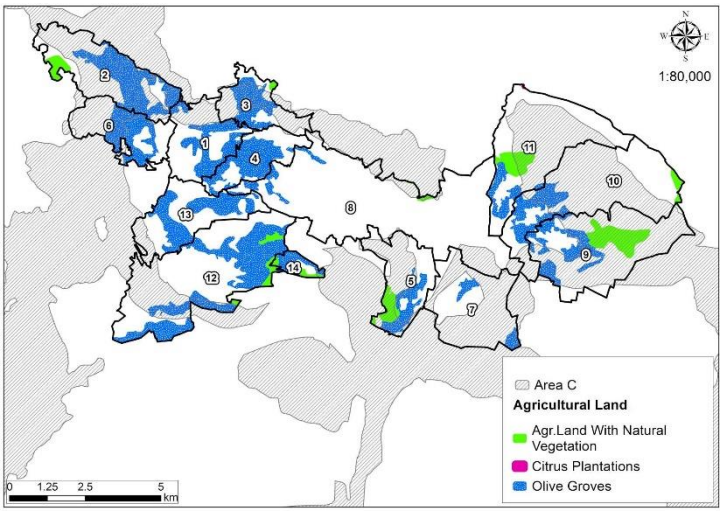


Figure 4.3.2-1: Agricultural Land in Nablus Urban Area

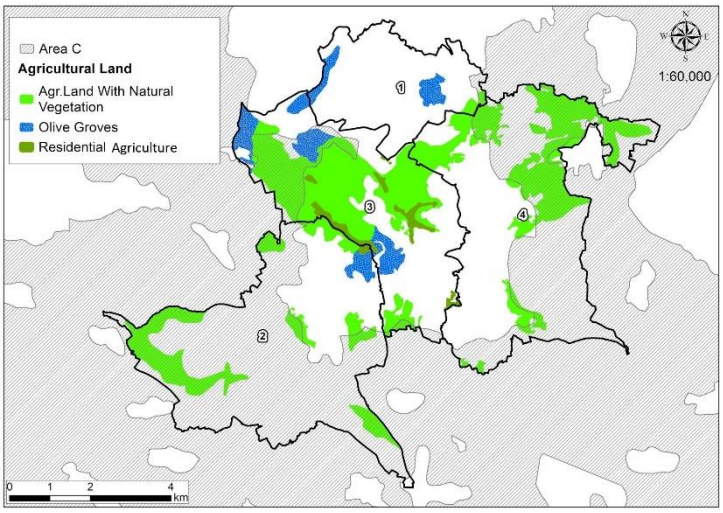


Figure 4.3.2-2: Agricultural Land in Ramallah and Al Bireh Urban Area

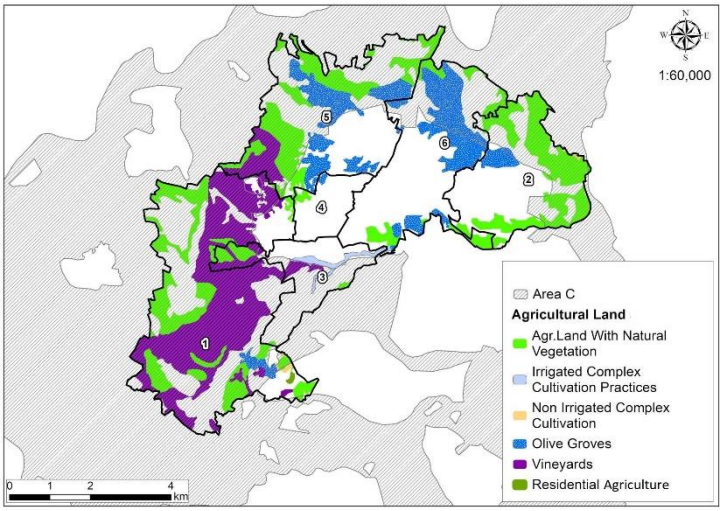


Figure 4.3.2-3: Agricultural Land in Bethlehem Urban Area

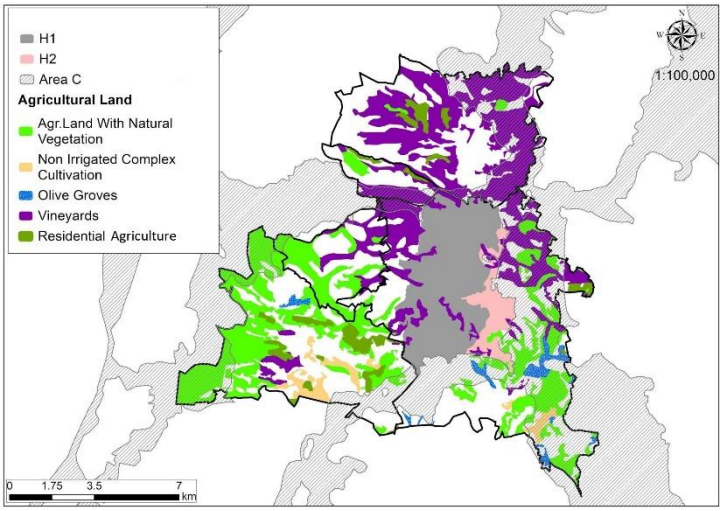


Figure 4.3.2-4: Agricultural Land in Hebron Urban Area



Figure 4.3.2-5: Agricultural Land in Gaza Urban Area

Source: MoLG - ICUD GIS database, https://geomolg.ps/

Livestock

Livestock production is an integral part of Palestine's agricultural sector, and is of economic and social importance both at the household and national levels. Livestock in Palestine is dominated by cattle, poultry, sheep, goats and beekeeping. It provides the main source of income and food security for thousands of Palestinian households in rural areas and Bedouin communities in the West Bank and Gaza Strip.[210]

According to PCBS data (2013), Table 4.3.2-4 below presents all types of livestock production in Governorates relevant to the project. The five (5) Governorates relevant to the project account the 41.5% of the total Palestinian livestock production; more specifically:

- Nablus has the 14% of total Palestinian livestock production
- Ramallah and Al Bireh has the 6% of total Palestinian livestock production
- Bethlehem has the 5% of total Palestinian livestock production
- Hebron has the 15% of total Palestinian livestock production
- Gaza has the 1.5% of total Palestinian livestock production

Table 4.3.2-4: Numbers of livestock in Palestine by Type and Governorate relevant to the project, 2013

Region / Governorate	Type of livestock								
	Cattles	Sheep	Goats	Camels	Broilers	Layers	Broilers Mothers	Turkey	Beehives
Palestine	**31,718**	**620,407**	**232,033**	**2,165**	**3,610,579**	**1,241,535**	**504,820**	**148,448**	**30,361**
West Bank	**26,324**	**583,130**	**221,456**	**1,486**	**2,791,688**	**1,114,493**	**504,820**	**147,953**	**26,543**
Nablus	4,470	87,308	15,265	56	557,290	197,907	33,333	10,000	2,001
Ramallah and Al Bireh	290	39,049	31,206	21	165,135	160,208	-	-	1,623
Bethlehem	1,742	43,981	30,469	468	117,339	110,500	-	-	571
Hebron	7,625	172,238	49,095	449	582,002	166,996	-	-	3,208
Gaza Strip	**5,394**	**37,277**	**10,577**	**679**	**818,891**	**127,042**	**-**	**495**	**3,818**
Gaza	931	9,869	2,542	285	40,532	31,286	-	262	1,347

Source: PCBS: Livestock Survey 2013 – Palestine, http://www.pcbs.gov.ps/Downloads/book2042.pdf

[210] *Livestock Sector Strategy, 2015-2019, http://extwprlegs1.fao.org/docs/pdf/pal165804.pdf*

Rangeland and natural grassland are negatively affected in the last three decades due to the political situation. According to recent studies, the areas of the land suitable for rangeland within the five targeted Urban Areas are shown in Table 4.3.2-5 below.

Table 4.3.2-5: Land Suitable for Rangeland within the five targeted urban areas

	Nablus		Ramallah and Al Bireh		Bethlehem		Hebron		Gaza	
	km²	%	km²	%	km²	%	km²	%	km²	%
Land Suitable for Rangeland	12.52	11.57%	3.83	5.32%	0.34	0.62%	2.73	1.68%	-	

Source: Land Suitability for Reclamation and Development in WB, 2010, http://rec.lrcj.org/Other_Files/Land_Suitability.pdf & http://rec.lrcj.org/Maps/

4.3.2.1.2 Agricultural Production

The Palestinian agriculture sector is characterized by its diversity in terms of agricultural production. According to the Agricultural Law 2003, agricultural land is classified as:

- "High Value": Land that the soil tendencies level is less than 5%, and used as agricultural;
- "Medium Value": Semi-flat land or hills, suitable for all the crops cultivation, in particular tree horticulture;
- "Low Value": Land that is unsuitable for agriculture due to soil determinants, rock cover and topographic and climatic determinants;
- "Forests and forest areas": The forest trees and plants growing on land owned by the state, in addition to the plants which grow on the precinct of roads, streets, valley watercourses and major streams.

According to Table 4.3.2-6 below:

- Most of the "*Agricultural Land of High Value*" is located in Gaza and Hebron Urban Areas covering 15.3% and 10% of the total area respectively.
- "*Agricultural Land of* Medium Value" covers approximately 30% of Nablus, Bethlehem and Hebron Urban Areas while in Ramallah and Al Bireh and Gaza Urban Areas, coverage is approximately halved. Approximately half of this area is located within Area C for Nablus and Hebron, whereas in Bethlehem Urban Area, approximately 92% of this area is located within Area C.
- "*Agricultural Land of* Low value" covers most of the total area for all targeted Urban Areas in West Bank. "Low Value" Land covers a percentage of 64%, 63% and 59% of the total area of Nablus, Bethlehem and Hebron Urban areas respectively while in Ramallah and Al Bireh Urban Area "Low Values" agricultural land covers 83%. Approximately 40-50% of these areas are located within Area C for Nablus, Ramallah & Al Bireh and Bethlehem Urban Areas, whereas in Hebron this percentage is approximately 20%. In Gaza Urban Area "Low Values" agricultural land cover 9.4%.
- "Forest areas" cover the smallest part of the Urban Areas, not exceeding 2% of the total Hebron Urban Area; while in Ramallah and Al Bireh and Gaza Urban Areas there are no forest areas.

Table 4.3.2-6 presents the Agricultural Land Classification in the five (5) targeted Urban Areas. Agricultural Land Classification per LGU in the targeted urban areas is presented in Annex I "Agricultural Land".

Table 4.3.2-6: Agricultural Land Classification in five (5) targeted Urban Areas

Agricultural Land Classification	Parameter	Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza
Total Area (km²)		108.19	72.04	55.07	162.78	55.59
High value	**% of total urban area**	3%	1%	6%	10%	15.3%
	% of which within Area C or restricted area *	71%	98%	98%	55%	2.6 %
Medium value	**% of total urban area**	32%	16%	29%	29%	14%
	% of which within Area C or restricted area *	47%	81%	92%	55%	-
Low value	**% of total urban area**	64%	83%	63%	59%	9.4%
	% of which within Area C or restricted area *	38%	42%	48%	21%	1%
Forests and forest areas	**% of total urban area**	1%	-	1%	2%	-
	% of which within Area C or restricted area *	50%	-	95%	26%	-

** Area C in West Bank & no-go and restricted area (300m) in Gaza*
Source: MoLG - ICUD GIS database, https://geomolg.ps/

Figure 4.3.2-6 - Figure 4.3.2-10 present agricultural use classification and dominant land cover categories for West Bank and Gaza, including areas of residential agriculture.

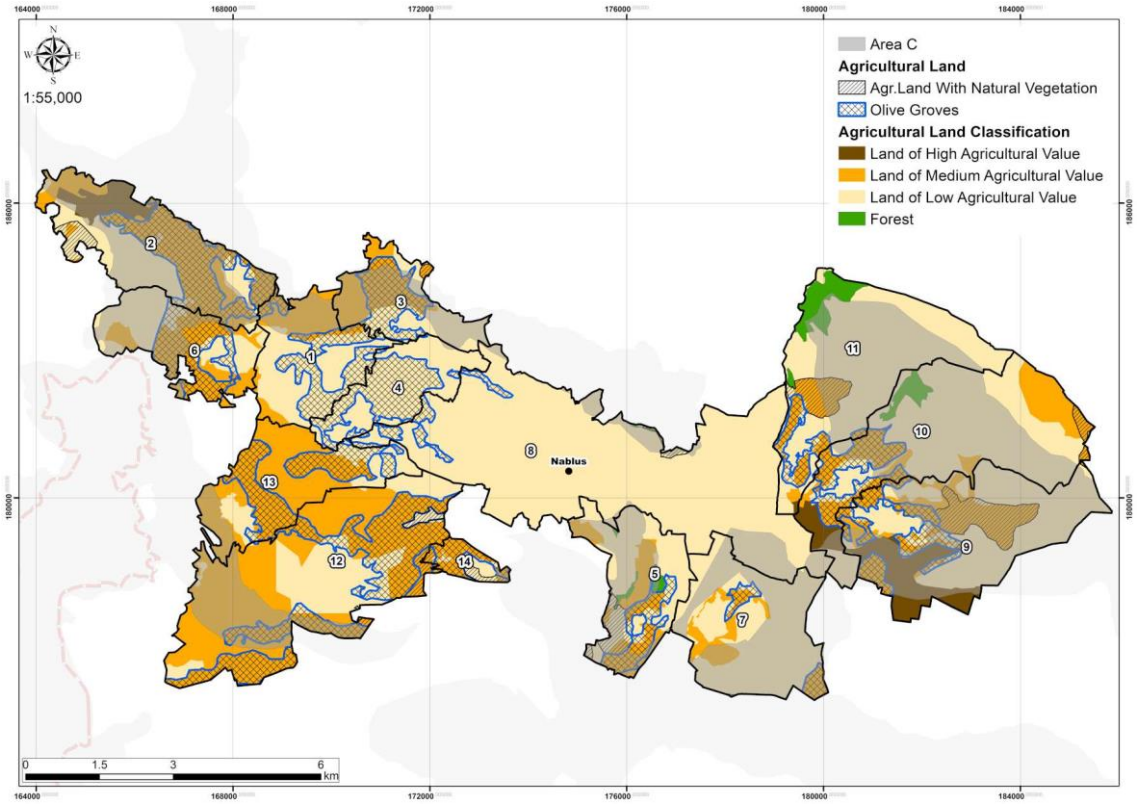


Figure 4.3.2-6: Agricultural Land and Agricultural Land Classification in Nablus Urban Area

Sources:
MoLG - ICUD GIS database, https://geomolg.ps/
UNCTAD, 2015, The Besieged Palestinian Agricultural Sector, https://unctad.org/en/PublicationsLibrary/gdsapp2015d1_en.pdf

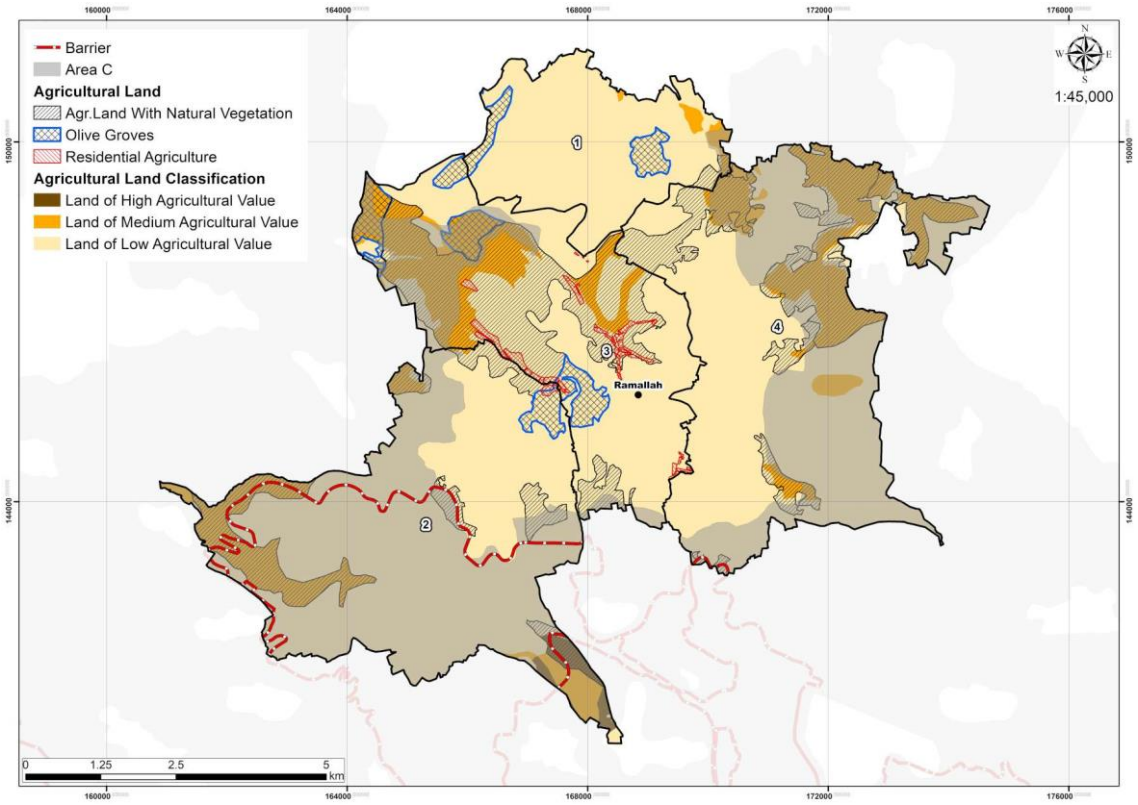


Figure 4.3.2-7: Agricultural Land and Agricultural Land Classification in Ramallah and Al Bireh Urban Area

Sources:
MoLG - ICUD GIS database, https://geomolg.ps/
UNCTAD, 2015, The Besieged Palestinian Agricultural Sector, https://unctad.org/en/PublicationsLibrary/gdsapp2015d1_en.pdf

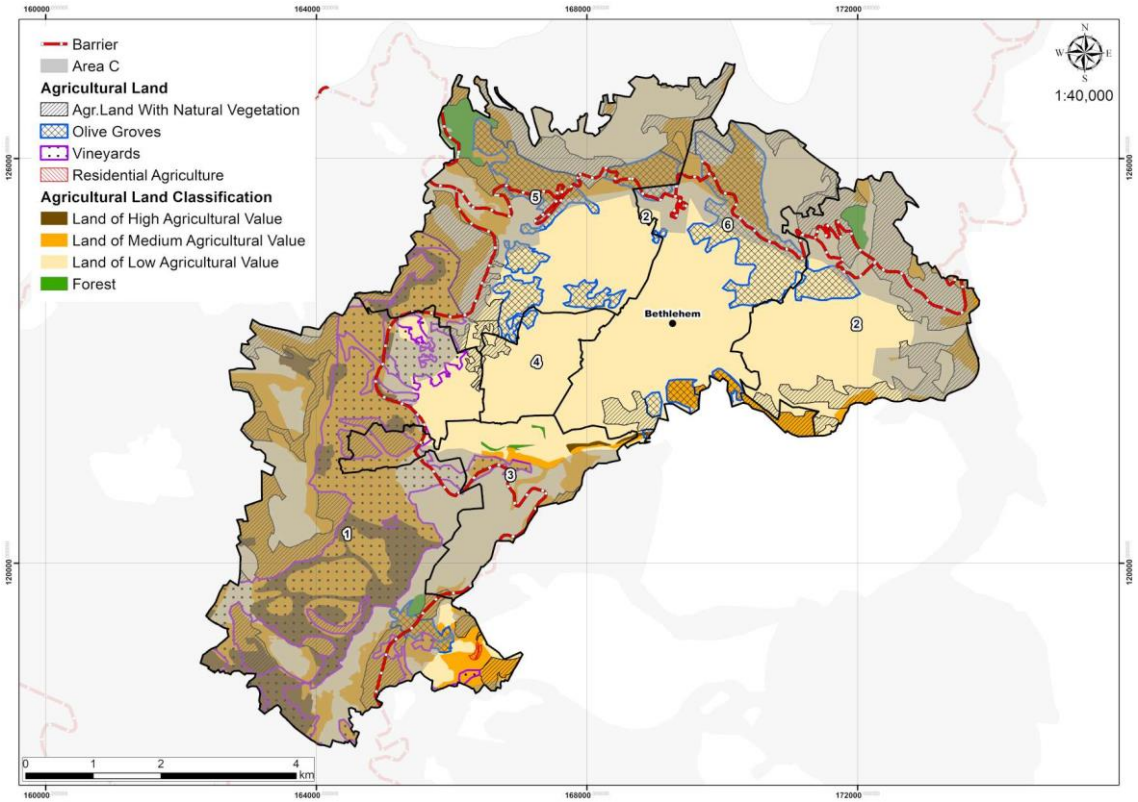


Figure 4.3.2-8: Agricultural Land and Agricultural Land Classification in Bethlehem Urban Area

Sources:
MoLG - ICUD GIS database, https://geomolg.ps/
UNCTAD, 2015, The Besieged Palestinian Agricultural Sector, https://unctad.org/en/PublicationsLibrary/gdsapp2015d1_en.pdf

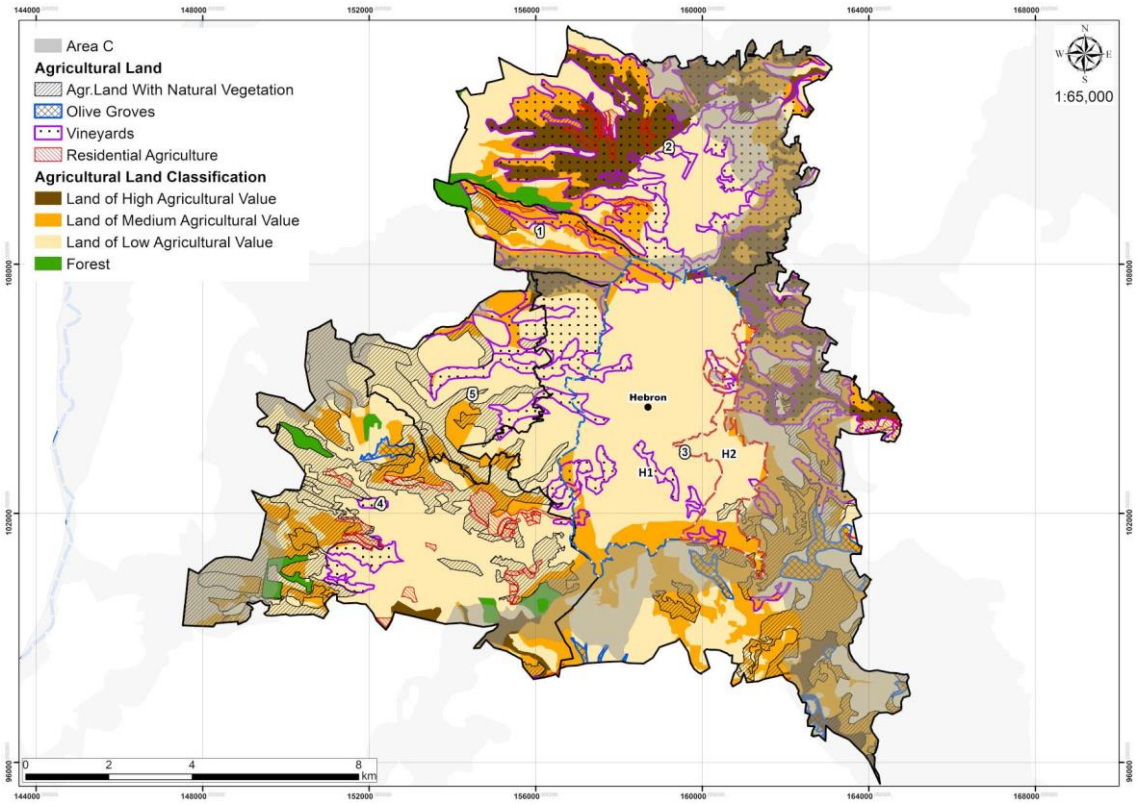


Figure 4.3.2-9: Agricultural Land and Agricultural Land Classification in Hebron Urban Area

Sources:
MoLG - ICUD GIS database, https://geomolg.ps/
UNCTAD, 2015, The Besieged Palestinian Agricultural Sector, https://unctad.org/en/PublicationsLibrary/gdsapp2015d1_en.pdf

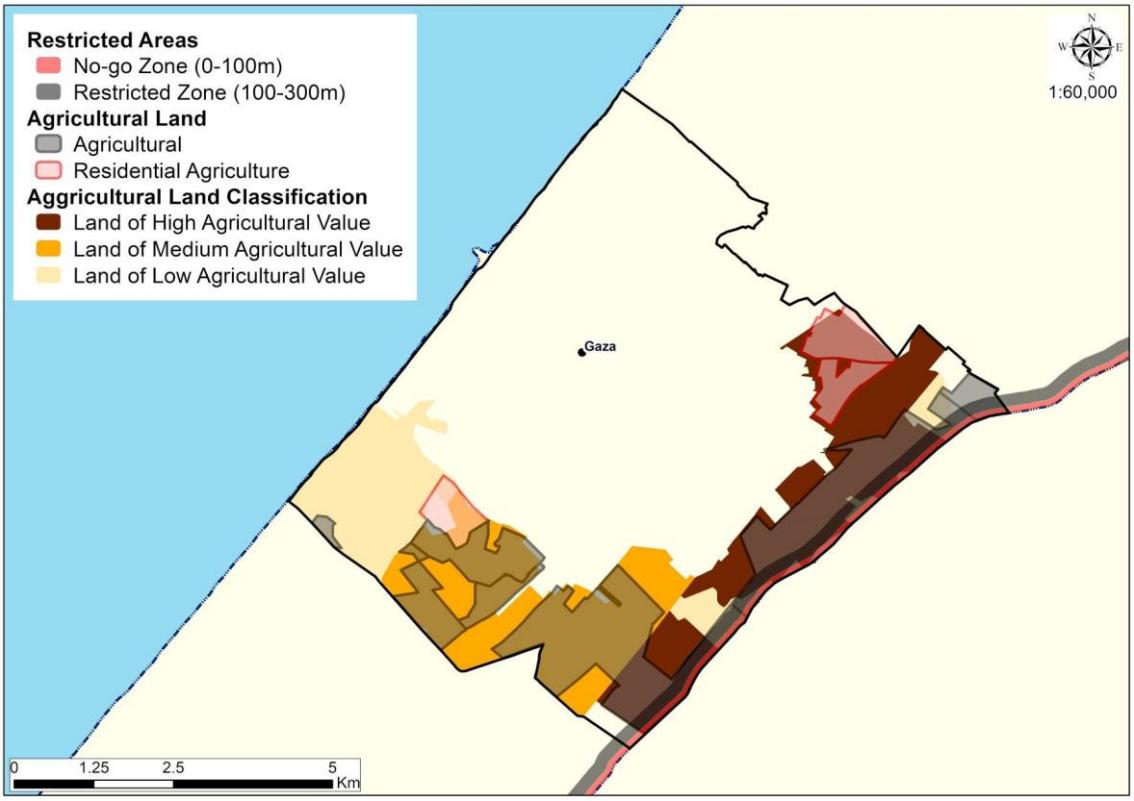


Figure 4.3.2-10: Agricultural Land and Agricultural Land Classification in Gaza Urban Area

Sources:
MoLG - ICUD GIS database, https://geomolg.ps/
UNCTAD, 2015, The Besieged Palestinian Agricultural Sector, https://unctad.org/en/PublicationsLibrary/gdsapp2015d1_en.pdf
Spatial and Sectoral Assessment Report, 2020, World Bank, Integrated Cities and Urban Development Project Gaza City - Improving Resilience of Urban Service Systems

4.3.2.1.3 Access to Agricultural Land [211]

The main constraints that the agricultural sector is facing in Palestine are briefly discussed below.

- **Restrictions on access to land, water and markets**. Restrictions on water use and the limited amount of space available for agriculture have pushed Palestinian farmers in both the West Bank and Gaza to the following:
    - Intensive use of chemical fertilizers and pesticides, which in turn has contaminated soils and groundwater; one of the main sources of chemical contamination (from chlorides, nitrites and nitrates) is runoff from fertilizer in agricultural areas.
    - Overgrazing of the limited available pastures accessible to Palestinian herders, thus contributing to the degradation of land and to soil erosion
    - Intensive use of remaining available land; in Areas A and B, rapid urbanization has led to construction over areas of fertile land. From 1992-2015 the percentage of area under cultivation decreased by 12%.

- **Loss of land to settlements and the separation barrier**. The area cultivated by the settlements in the West Bank has expanded rapidly (by 35%) from 1997-2012. Limitations on access have forced some permit holders to stop cultivation altogether or shift from labour-intensive to rain-fed, low-value crops. Agricultural checkpoints in the separation barrier provide farmers limited access to their lands. The area between the Barrier and the Green line (Seam Zone) intersects with Ramallah and Al Bireh and Bethlehem Urban Areas.

- **Demolition of structures and infrastructure and the uprooting of trees from Israeli attacks**.
  Palestinian agricultural structures and assets such as water wells, village roads and irrigation systems have been subjected to recurrent demolition by Israelis.
  The uprooting of trees undermines the economy and livelihood of the Palestinian people. In total, Israel has uprooted more than 1.5 million Palestinian olive trees.

- **Restrictions on access to essential agricultural inputs such as fertilizers etc**. Restrictions on the import of materials and technologies, have affected farming practices: use of irrigation is limited, and farmers use excessive chemical fertilizers and pesticides to increase crop yield, thus contributing to chemical contamination of soils and groundwater.

- **Palestinian agriculture is extremely fragmented.** Palestinian farmers currently work on very small land-holdings. 93% of farmers have less than 40 dunams of land (4 hectares)[212].

- **Flooding of Palestinian markets with agricultural imports from Israel and settlements** and blocking of Palestinian agricultural exports
  Exports originate almost entirely from the West Bank, as Gaza remains under a blockade. Restrictions and the high costs of trade with the rest of the world have left Israel as the only viable source of imports and foreign market for Palestinian exports.
  The practice of flooding the Palestinian market with Israeli products puts competing Palestinian products at a disadvantage, especially in light of the additional production costs borne by Palestinian farmers as a result of occupation.

[211] *The Besieged Palestinian Agricultural Sector, United Nations Conference On Trade And Development, 2015*
[212] *ibid*

- **Sensitivity to climate change**. Agriculture is the sector most sensitive to climate variability and change in the West Bank. The West Bank produces 85.6 per cent of Palestinian agricultural goods. Climate-sensitive crops include olives, grapes, stone fruit and rain-fed vegetables. The Gaza Strip supports 14.4 per cent of all agriculture. The cost of agricultural production is expected to be impacted due to shortages of water for irrigation, which in turn will have implications for vegetable, oil and citrus production. These changes will also impact employment in the agriculture sector.

4.3.2.2 Forestry

According to resent data[213], the proportion of forest area in Palestine is considered low with 111km² (108km² in West Bank and 3km² in Gaza Strip) or 1.77% of total Palestinian land area. Data about the forested Areas within the five (5) targeted Urban Areas are presented in sections 4.2.4.2 and 4.3.2.1.2 above; and are summarized in Table 4.3.2-7 below.

Table 4.3.2-7: Forests and forests areas in five (5) targeted Urban Areas

		Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza
Total Area (km²)		108.19	72.04	55.07	162.78	55.59
Forests and forest areas	**Surface area (km²)**	1.39	-	0.63	2.73	-
	% of total urban area	1%	-	1%	2%	-
	% of which within Area C or restricted area *	50%	-	95%	26%	-

Source: MoLG - ICUD GIS database, https://geomolg.ps/

Between 1970 and 2020, Palestine lost two-thirds of its forest area, as presented in Figure 4.3.2-11. Forests in Palestine suffered several episodes of destruction in the last fifty years. Most of forest destruction (approximately 80%) is attributed to Israeli occupation through the construction of settlements[214].

The past decade witnessed increased protection of forest land in Palestine, which resulted in slow but steady growth in forests.

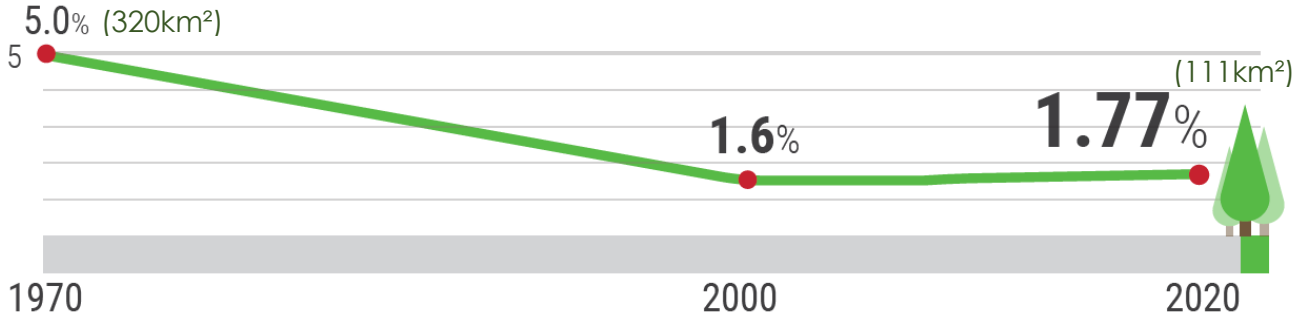


Figure 4.3.2-11: Change of forest land area (1970-2020)

Source: Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf

It is of great importance to optimize the utilization of natural resources in a sustainable way by responding to the human and natural induced factors (i.e. land degradation, poverty, inappropriate

[213] *Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf*
[214] *http://www.arij.org/files/admin/2006/2006%20forests%20in%20palestine.pdf*

practices, etc.). Land Reclamation is one of the most important responses that tackle the negative impacts of land degradation.

According to recent studies, the areas of land suitable for forestry within the five targeted Urban Areas are shown in Table 4.3.2-8 below.

Table 4.3.2-8: Land Suitable for Forestry within the five targeted urban areas

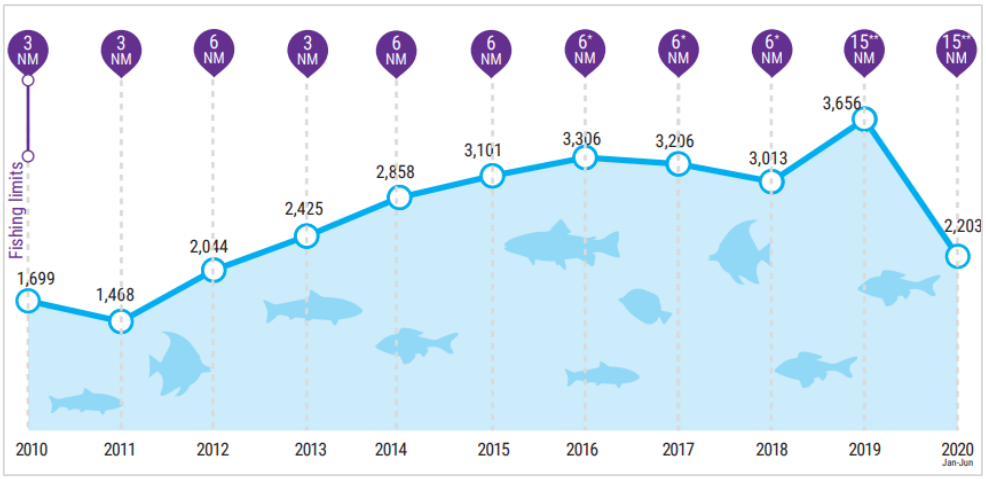
	Nablus		Ramallah and Al Bireh		Bethlehem		Hebron		Gaza	
	km²	%	km²	%	km²	%	km²	%	km²	%
Land Suitable for Forestry	6.5	6.01%	11.04	15.32%	0.29	0.53%	7.08	4.35%	-	

Source: Land Suitability for Reclamation and Development in WB, 2010, http://rec.lrcj.org/Other_Files/Land_Suitability.pdf & http://rec.lrcj.org/Maps/

4.3.2.3 Fishing

Israel controls Gaza's sea-space; the Oslo Accords set 20 nautical miles off the Gaza coast (about 37 km) as the outside limit beyond which fishermen may not go[215]. Over the years, and based solely on its own considerations, Israel is imposing further restrictions of the fishing zone to varying extents. In 2019 alone, Israel reduced the "fishing zone" it enforces in Gaza's Sea space. In four of these instances, Israel barred access to the sea completely. Throughout 2019, Gaza's fishermen were notified of changes to Israel's demarcation of the zone where they are allowed to fish 19 times[216] (see Annex I "Gaza's Fishing Zone (2019)").

Forcing Gaza fishermen and women into shallow waters has dangerous implications for Gaza's coastal ecosystem, depleting fish stocks by increasing the exploitation of immature fish that have yet to reach breeding age.



Notes:
** For limited periods between 2016 and 2018, Israel expanded the fishing area along the southern Gaza coast up to a distance of 9 nautical miles off shore, while retaining 6 nautical mile fishing limit along the northern coast.*
*** For 2019 and 2020, Israel expanded and reduced the fishing area multiple times. The figures reflect the maximum nautical miles frequently allowed in the southern area.*

Figure 4.3.2-12: Sea Area accessible To Fishermen vs Catch Fish (in tons)
Sources: https://www.ochaopt.org/sites/default/files/gaza_access_and_movement_october_2020.pdf

[215] https://conquer-and-divide.btselem.org/map-en.html
[216] https://gisha.org/publication/10931

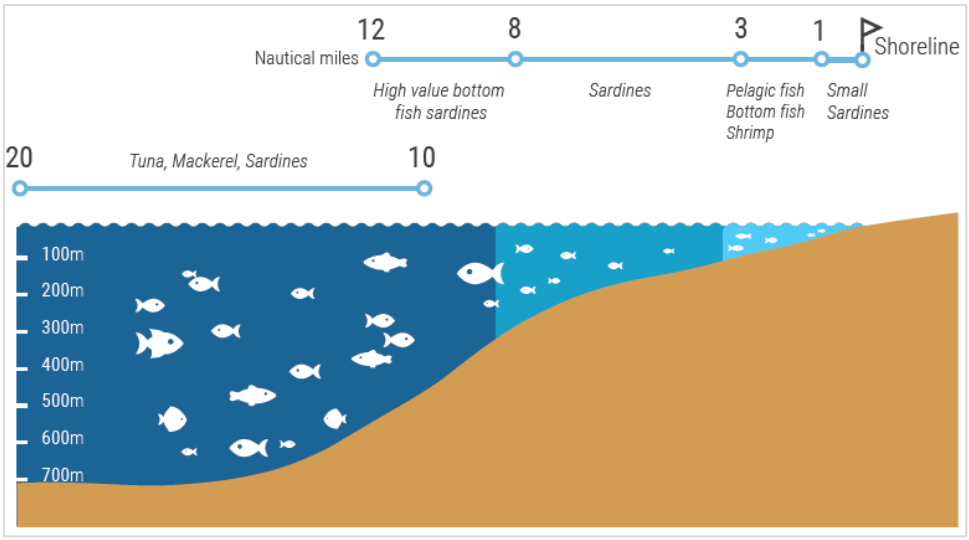


Figure 4.3.2-13: Type of fish catch by sea depth and distance from the coast

Source: Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf

Fishing is affected by marine pollution, caused by partially treated and raw wastewater released daily into the Mediterranean Sea; organic matter causes toxic algal blooms in the marine environment, which increases fish mortality. Of particular concern are the highly concentrated levels of heavy metals, threatening water sources for consumption alongside the sustainability of fish stocks. Chemicals from sewage have reduced the reproductive success of fish, further threatening fish stocks, which are also vulnerable to overfishing.

The amount of fishing boats is largely disproportional compared to the fish production. According to PCBS data (2018)[217], in Gaza Governorate there were 1,888 or 53% of the total Gaza Strip fishermen and 692 or 55% of the total Gaza Strip boats.

As a result of climate change, higher temperatures near the shores, combined with ocean acidification due to increasing levels of dissolved CO_2 in the oceans are expected to have negative implications for the quality and quantity of the fish catch.

Aquaculture

Aquaculture is a relatively new business that started on a small scale with government support after the establishment of the Palestinian Authority (PA). Commercial production began only in 2005. In 2011, West Bank had more than 40 freshwater-based farms (irrigation tanks) using semi-intensive production systems, farming Nile tilapia and, to a minor extent, red tilapia. In Gaza Strip, there were 13 intensive fish farms and about 90 extensive freshwater irrigation-based farms (integrated with agriculture). Most of the intensive farms operated using brackish water along the beachfront and have greenhouse facilities to control the temperature and light. [218]

Table 4.3.2-9 below presents the trends in aquaculture production in Governorates relevant to the project.

[217] *PCBS, 2019, http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/Fish-2018-E-5.html*
[218] *Context analysis for the country programming framework for Palestine 2018-2022, "Making the food system more inclusive, sustainable and resilient for the wellbeing of the Palestinian people", Food and Agriculture Organization of the United Nations (FAO), Jerusalem, 2019, http://www.fao.org/3/ca0627en/CA0627EN.pdf*

Table 4.3.2-9: Quantity of Aquaculture of Fish in Palestine by Region and Governorate relevant to the project, 2014-2019 (Quantity: Metric Tons)

Region / Governorate	2014	2015	2016	2017	2018	2019
Palestine	**184**	**256**	**280**	**500**	**599**	**630**
West Bank	**34**	**36**	**30**	**35**	**29**	**31**
Nablus	2	6	6	6	6	4
Ramallah & Al Bireh	-	-	-	-	-	-
Bethlehem	-	3	2	-	-	-
Hebron	-	3	2	6	4	3
Gaza Strip	**150**	**220**	**250**	**465**	**570**	**599**
Gaza	20	80	90	100	140	264

Sources:
PCBS data, 2017, http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/Fish-2017-E-4.html
PCBS data, 2018, http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/Fish-2018-E-4.html
PCBS data, 2019, http://www.pcbs.gov.ps/statisticsIndicatorsTables.aspx?lang=en&table_id=541

The fisheries and aquaculture/mariculture sector face many challenges, including technology risks (restriction on gaining knowledge, dependency on neighboring countries for farm inputs), freshwater scarcity, and unfavorable coastal sea conditions (heavy wave actions, high pollution levels). [219] Despite various challenges, the sector has some promising characteristics. These include: (i) a relatively well-organized fishing industry, (ii) existing and emerging entrepreneurship in aquaculture, and (iii) a local knowledge base within the academic community.[220]

4.3.2.4 Food security [221]

An estimated 1.6 million Palestinians across Palestine, or 31.5 % of households, are food insecure (as of the end of 2017). This results from high unemployment, low household incomes and a high cost of living. The former two are the result of the protracted conflict, repeated shocks and continued restrictions on freedom of movement, constrained productive capacities and a lack of economic opportunities. Although food is available, it is priced out of reach for many. Numerous households are food insecure even though they already receive food and other assistance[222].

Israeli restrictions contribute to the overuse of available resources, depleting soil nutrients and fresh water resources thus reducing current and future resilience. Despite the differences in the nature and intensity of restrictions to the freedom of movement in the West Bank and the Gaza Strip, these restrictions have a significant impact on food security status and demonstrate a similar pattern in both regions: the fewer (or more) the limitations on freedom of movement and access, the greater the likelihood of being food secure (or insecure).

Based on a 2018 survey, in the Gaza Strip, 68.5% of individuals were identified as moderately or severely food insecure[223], compared with 59.1% in 2014, when the previous survey was conducted.

[219] *Context analysis for the country programming framework for Palestine 2018-2022, "Making the food system more inclusive, sustainable and resilient for the wellbeing of the Palestinian people", Food and Agriculture Organization of the United Nations (FAO), Jerusalem, 2019, http://www.fao.org/3/ca0627en/CA0627EN.pdf*
[220] *https://openknowledge.worldbank.org/bitstream/handle/10986/33839/Rapid-Fishery-and-Aquaculture-Sector-Diagnosis-Using-Fishery-Performance-Indicators-in-the-Gaza-Strip.pdf?sequence=1&isAllowed=y*
[221] *Palestine Food Security Sector, 2016, Socio-Economic & Food Security Survey 2014, https://unispal.un.org/pdfs/FSS__Survey2014.pdf*
[222] *https://www.ochaopt.org/theme/food-security*
[223] *The four categories according to different food security levels are the following:*
Food Secure: Households that have sufficient food consumption, which they will be able to maintain without use of coping strategies while meeting their essential food and non-food needs;

In contrast, food insecurity in the West Bank decreased to 11.6%, down from 15% in 2014. This is due to the humanitarian and socioeconomic conditions deterioration in Gaza. The indiscriminate and poor use and abuse of chemical inputs in agricultural products and the poor water quality are having harmful effects on food safety.

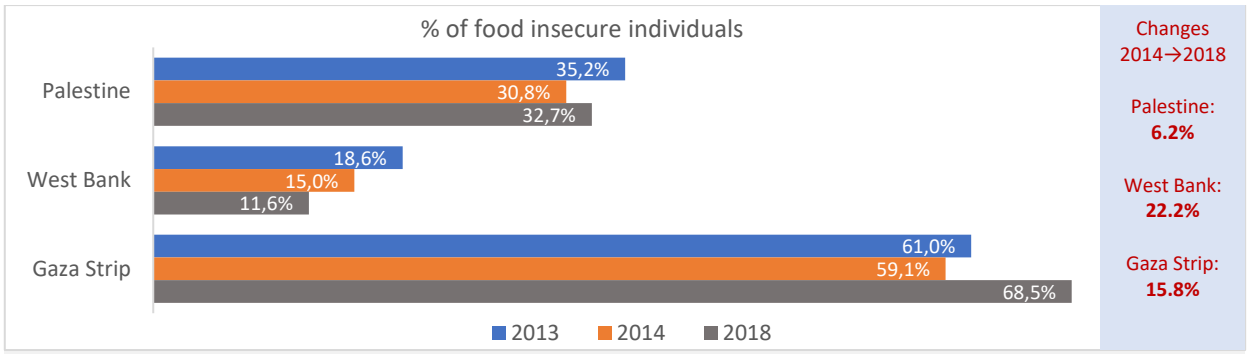


Figure 4.3.2-14: Food insecurity in Palestine, West Bank and Gaza Strip

Source: https://fscluster.org/sites/default/files/documents/sefsec_2018_-_food_security_analysis_preliminary_results.pdf

The households indicating the greatest share of food insecurity are those that receive their major source of income from assistance (either from international organizations or social assistance). Vice versa, the households that have access to more stable and higher income sources among others the Israeli labour market or insurance, and those whose major source of income comes from international organizations jobs are those that indicate an improved food security performance. [224]

Obtaining a livelihood from the primary sector (agriculture, animal breeding and fishing) is usually associated with relatively worse performance in terms of food security.[225]

4.3.3 Housing

Challenges facing the housing sector include the expanding population, deterioration of older buildings and limitations on new construction imposed by Israel in the West Bank. [226] In Gaza, citizens are crammed in a small living space. This is mainly due to high population growth, lack of adequate access to building materials, restrictions on building on land close to the border with Israel (ranging in size from 300 to 1,000 m from the border fence), and destruction inflicted by previous wars.

Though Palestine has a relatively low percentage of unsuitable housing units, the housing sector has not been well integrated into urban policies. Inadequate urban planning and weak regulatory frameworks have left little room for government to maneuver against speculation over land, urban sprawl and spatial segregation.

Marginally Food Secure: Households that risk not being able to maintain sufficient food consumption, and households that have adequate financial means but did not adapt their diet to an acceptable level;
Moderately Food Insecure: Households that face issues with either the quantity or quality of food consumed, which they cannot address due to their limited financial means or without resorting to irreversible coping options;
Severely Food Insecure: Households with a severe or significant consumption gap that they cannot counter through economic means or coping mechanisms.

[224] *https://fscluster.org/sites/default/files/documents/sefsec_2018_-_food_security_analysis_preliminary_results.pdf*
[225] *https://fscluster.org/sites/default/files/documents/sefsec_2018_-_food_security_analysis_preliminary_results.pdf*
[226] *State of Environment and Outlook Report for the occupied Palestinian territory 2020, https://reliefweb.int/sites/reliefweb.int/files/resources/SEORP.pdf*

Table 4.3.3-1: Unsuitable and Overcrowded housing units in Governorates relevant to the project

Governorate	Proportion of unsuitable housing units out of the overall housing stock in Palestine	Proportion of overcrowded housing units out of the overall housing stock in Palestine
Palestine	**3.2%**	**7.4%**
Nablus	4.2%	4.4%
Ramallah and Al Bireh	2.9%	2.7%
Bethlehem	3.8%	3.9%
Hebron	3.5%	7.9%
Gaza	2.9%	12.6%

Source: Atlas of Sustainable Development 2020

Different forms of informal housing in Palestine exist leading to harsh living conditions for many communities. The most significant form of such irregular housing is the unresolved status of the Palestinian refugee camps. Over time, these camps have become permanent, overcrowded, poorly-serviced neighborhoods, with unclear tenure rights. [227] There is no zoning or planning regime for refugee camps, which in the context of severe overcrowding in some camps has contributed to unauthorized "vertical" construction.

Housing adequacy in Palestine has been also severely affected by the Israeli occupation including settlement expansion and housing demolition.[228] Between 2009 and 2020, the Israeli authorities issued demolition orders relating to over 6,770 structures in West Bank; data per West Bank Governorate relevant to the project are presented in Table 4.3.3-2 below.

Table 4.3.3-2: Data on Demolition and Displacement in the West Bank Governorates relevant to the project, 2009-2020

Governorate	Demolished structures	Displaced people
Nablus	727	1,210
Ramallah and Al Bireh	320	420
Bethlehem	397	507
Hebron	992	1,656

Source: https://app.powerbi.com/view?r=eyJrIjoiMmJkZGRhYWQtODk0MS00MWJkLWI2NTktMDg1NGJlMGNiY2Y3IiwidCI6IjBmOWUzNWRiLTU0NGYtNGY2MC1iZGNjLTVlYTQxNmU2ZGM3MCIsImMiOjh9 (July 2020)

In 2019, 280 structures were demolished within Governorates relevant to the project: this represents a 93 % increase compared with 145 in 2018.

[227] *Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf*

[228] *Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf*

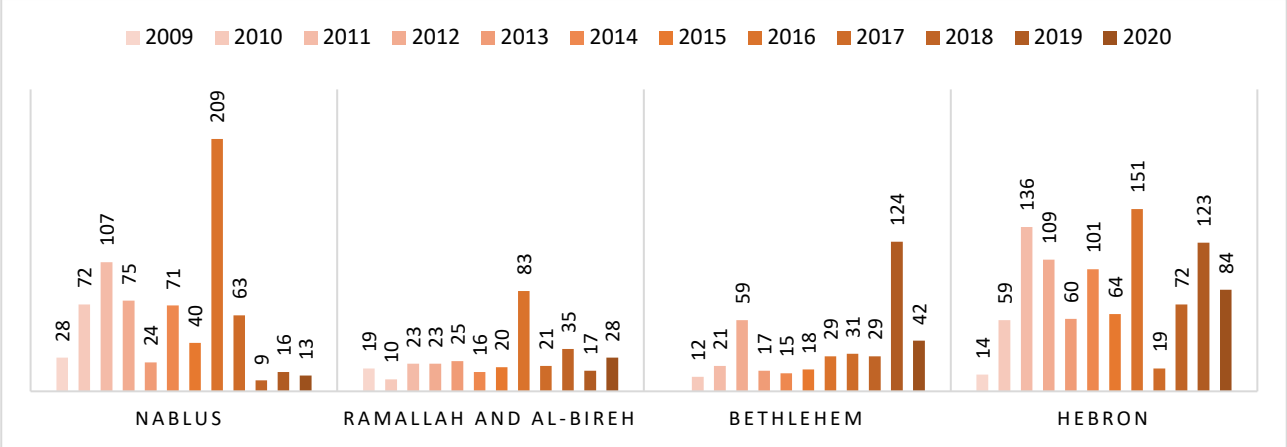


Figure 4.3.3-1: Demolished structures by year within Governorates relevant to the project

Source: https://app.powerbi.com/view?r=eyJrIjoiMmJkZGRhYWQtODk0MS00MWJkLWI2NTktMDg1NGJlMGNiY2Y3IiwidCI6IjBmOWUzNWRiLTU0NGYtNGY2MC1iZGNjLTVlYTQxNmU2ZGM3MCIsImMiOjh9 (July 2020)

In Gaza, the housing shortage significantly increased after the 2014 war which resulted in the destruction or severe damage of about 17,800 housing units.[229] In September 2018, the United Nations reported that 'the reconstruction of damages from 2014 is not yet complete. Significantly, nearly 80 % of the 17,800 houses, which were so badly damaged that people could no longer live in them, have now been rebuilt'. As a result of this damage and delays in reconstruction, 16,500 people remain internally displaced in Gaza. [230]

The total housing needs estimated for 2020 in Palestine was calculated as some 46,188 units; of which 7,024 units (15%) estimated in Hebron Governorate and 6,106 units (13%) estimated in Gaza Governorate. The scope of the housing deficit problem goes beyond a lack of housing units and is also related to cost. The units provided are beyond the reach of the majority of the Palestinian families who belong to the low-income and low-middle-income groups. [231] This demand for housing is obviously linked with a similar need for increased services (sewage treatment, waste management, water etc.).[232]

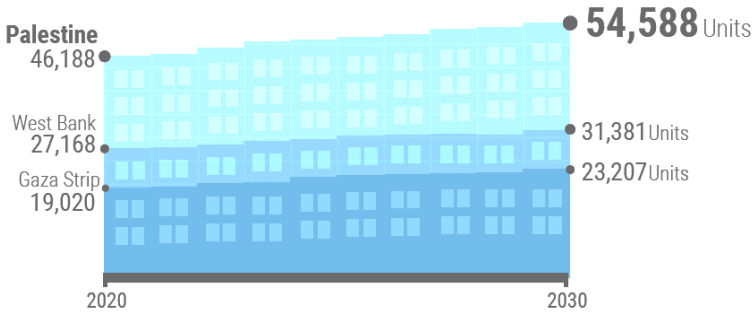


Figure 4.3.3-2: Projected housing needs in Palestine

Source: Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf

[229] http://documents1.worldbank.org/curated/en/324951520906690830/pdf/124205-WP-PUBLIC-MAR14-5PM-March-2018-AHLC-Report.pdf

[230] State of Environment and Outlook Report for the occupied Palestinian territory 2020, https://reliefweb.int/sites/reliefweb.int/files/resources/SEORP.pdf

[231] State of Environment and Outlook Report for the occupied Palestinian territory 2020, https://reliefweb.int/sites/reliefweb.int/files/resources/SEORP.pdf

[232] http://documents1.worldbank.org/curated/en/324951520906690830/pdf/124205-WP-PUBLIC-MAR14-5PM-March-2018-AHLC-Report.pdf

Despite the strong demand, private investments to fill the housing gap remain limited. The main reasons include land access restrictions in the West Bank, low levels of land registration, few available sites suitable for new housing development, and time consuming and overly complex permitting procedure that drive-up costs for private developers, as well as weak urban and spatial planning practices and lack of basic infrastructure. The administrative difficulties of obtaining permission to build new houses in Area C of the West Bank and East Jerusalem have major negative impacts on Palestinian housing. In Area C, less than 1 % of the land has been planned for Palestinian development. [233]

4.3.4 Industry

The industrial sector includes mainly food and beverage, mining and quarrying, textile, paper and printing, furniture, chemical, metal, pharmaceutical and construction industries. The economic activities with highest number of enterprises and/or employed persons are manufacturing activities (mostly metal and non-metallic mineral products, furniture and food products). Main indicators for Industrial Activities in 2018 are presented in Annex I "Industry". [234]

Restrictions on access to resources, inadequate infrastructure and pricing distortions in the water and energy sectors have severely constrained economic activity in the West Bank. According to a recent paper[235], 87% of the West Bank industries are totally dependent on imported raw materials. This fact increases in a significant way the production costs to almost all West Bank industries, especially by the high importation taxes for the use of Israel ports and harbours; and the frequent delays in the reception of raw materials imported from other countries caused by Israel verification and standards testing.

West Bank firms face problems to sell their products to foreign markets, as more than 83% of the West Bank industry production in being sold only inside the West Bank. The reduced exportation share in the West Bank production is a direct consequence of Israeli control over West Bank international trade. A great proportion of West Bank firms only explores the local market around the firm location, a consequence of the checkpoints between villages and cities, which hamper the owners' will to sell their productions in more distant cities inside West Bank.

According to the Palestinian Federation of Industries (PFI)[236], over twenty-one days of the war on Gaza in January of 2009, the industrial sector was hard hit with great losses in many businesses. Losses were shared in most sectors: construction, metals and engineering, chemicals and cosmetics, pharmaceutical, food and beverage, plastics and rubber, paper and carton, textile and garments, sewing and furniture.

Companies that have survived in Gaza's private sector are mainly businesses involved in consumables and/or commodities admitted via crossing points with Israel and, in some cases, light industry. There are also a few companies which are involved in infrastructure or public service projects such as sewage treatment.[237]

[233] *State of Environment and Outlook Report for the occupied Palestinian territory 2020, https://reliefweb.int/sites/reliefweb.int/files/resources/SEORP.pdf*
[234] *PCBS, 2018, http://www.pcbs.gov.ps/site/lang__en/798/default.aspx*
[235] *http://repositorium.sdum.uminho.pt/bitstream/1822/65353/1/DC12_8.pdf*
[236] *PFI, 2009, The Need for a Post War Development Strategy in the Gaza Strip, Overview & Analysis of Industrial Damage and Its Grave Consequences, http://www.lacs.ps/documentsShow.aspx?ATT_ID=2080*

The location of industries is diverse but, in general, industries and industrial zones are close to residential or commercial areas, thus making the pollution and health risks greater.

Industrial estates and free zones (IEFZs) are drivers of economic development worldwide, contributing significantly to GDP, employment, exports, and structural transformations. Some industrial zones have been developed in the recent years in Palestine: Jenin Industrial Estate and Free Zone, Kufor Sur Techno Park, Jericho Agro-Industrial Park, Jericho National Logistics Hub, Bethlehem Industrial Estate, Tarqumia Industrial Zone and Gaza Industrial Estate. Projects of the Palestine Techno Park in Tulkarem and Hebron Innovation Techno Park are under development [238]. These are presented in Figure 4.3.4-1 below.

Largely non-residential, Israeli West Bank Industrial Zones are the economic engines of the Israeli settlements. In the best of cases, they provide an industrial base for Israel's development in the West Bank, exploiting cheap Palestinian labour. In the worst of cases, they offer a particular attraction to industries considered toxic or otherwise undesirable in Israel. [239]

Israeli West Bank Industrial Zones are presented in Figure 4.3.4-1 below. While some of their products can be identified, detailed information on industrial output, labour required, and waste generated is not readily available. The major industries within these industrial zones include: aluminium, leather tanning, textile dyeing, batteries, fibreglass, plastics, and other chemical industries. [240]

Corporations which operate in the Israeli Industrial Zones are in violation of the UN Guiding Principles on Business and Human Rights (UNGP). These principles reaffirm corporate responsibility to respect human rights and standards of humanitarian law in conflict affected areas. In addition, corporate actors operating in Israeli Industrial Zones in Palestine also violate the 1998 International Labor Organization's (ILO) Declaration on Fundamental Principles and Rights at Work, which includes a commitment to protect worker's rights.[241]

[238] *Atlas of Sustainable Development 2020,* https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf
[239] https://www.cjpme.org/fs_010
[240] https://www.cjpme.org/fs_010
[241] https://whoprofits.org/dynamic-report/industrial-zones/#collapse-liz



Figure 4.3.4-1: Industrial Estates and Free Zones & Israeli Industrial Zones in Palestine

Sources:
https://whoprofits.org/dynamic-report/industrial-zones/#collapse-liz
Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf

Table 4.3.4-1 presents the cover area of planned industrial areas within the five (5) targeted urban areas, according to existing Master Plans. The location of these areas is presented in Figures of Annex I "Land Uses according to Master Plans".

Table 4.3.4-1: Industrial areas within the five (5) targeted urban areas according to existing Master Plans

Intustrial Area	Nablus	Ramallah and Al Bireh	Bethlehem	Hebron	Gaza
Cover area (km²)	2.13	1.54	0.34	0.86	3. 74
% of total Urban Area	2.0%	2.1%	0.6%	0.5%	6.7%

Source: MoLG - ICUD GIS database, https://geomolg.ps/

In Palestine there are approximately 20,000 dunums of quarries with more than half located in Area C. There are approximately 300 quarries and 1,000 stone cutting factories and workshops distributed all over the West Bank, with concentrations in the areas of Hebron, Bethlehem, Ramallah and Nablus Governorates. The Hebron Governorate has the highest number of quarries with 40-50% of the total

quarries area. The Governorates of Bethlehem, Nablus, Ramallah and Jenin, each have 10-20% of the total area. It is estimated that approximately 75% of quarries products are exported to Israel. In Gaza Strip there are no quarries, while there is only a very small number of stone factories. [242]

Despite the importance of the stone and marble industry, it can be considered one of the industrial sectors that negatively affects the Palestinian environment. In Palestine the environmental impact of stone slurry waste resulted from quarries and stone processing industry is significant; affecting air quality, surface and groundwater, and contaminated agricultural soil.

The main environmental problems associated with the stone industry are:

1. Physical hazards, as stone slurry is constituting risk on the life of humans and animals, given that many stone facilities are located near populated areas where the material is collected in open holes without taking the suitable safety measures and controls.
2. Soil pollution as the stone slurry is highly alkali material, thus it affects the fertility of the soil particularly when dumped in or near agricultural lands.
3. Water pollution, as this material reduces soil permeability, thus affecting underground water recharge, and amplifies the storm water drainage problem.
4. Air pollution, as this slurry becomes dry powder which may cause several harms to the human being, animals, and plants such as reduction of tree cover, degradation of productive agricultural land, and adverse consequences on ecosystem services and the biodiversity of an area. [243]

Despite the evident empirical progress achieved in the stone slurry recycling industry worldwide, the emergence of this industry in Palestine is yet to be seen.

4.3.5 Energy

4.3.5.1 Energy demand and consumption

Electricity accounts for 29.8% of Palestinian energy consumption, which is dominated by the residential sector (60 %), indicating the importance of concentrating energy efficiency measures in the residential sector. It is unusual for the share of nonresidential consumption to be so low, and this illustrates the underdeveloped nature of the economy. It also represents a disadvantage for the utilities, which typically count on large industries as anchor customers.[244] The industrial sector consumes only 13 % of electricity, though industrial demand for electricity has increased by almost 400 % since 2010. [245]

[242] http://www.lacs.ps/documentsShow.aspx?ATT_ID=4618

[243] *Tahseen Sayara, Yamen Hamdan, Rezq Basheer-Salimia, Impact of Air Pollution from Quarrying and Stone Cutting Industries on Agriculture and Plant Biodiversity, Resources and Environment 2016*
Nabil Al-Joulani1, Nidal Salah2, The Stone Slurry in Palestine from Environmental Burden to Economic Opportunities—Feasibility Analysis, Journal of Environmental Protection, 2014

[244] *Badiei,Sara; Foster,Vivien; Ewuah Ogua, Samuel Kwesi; Coma Cunill,Roger.2017. Securing Energy for Development in the West Bank and Gaza : Main report (English). Washington, D.C. : World Bank Group.* http://documents.worldbank.org/curated/en/351061505722970487/Main-report

[245] *Atlas of Sustainable Development 2020,* https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf

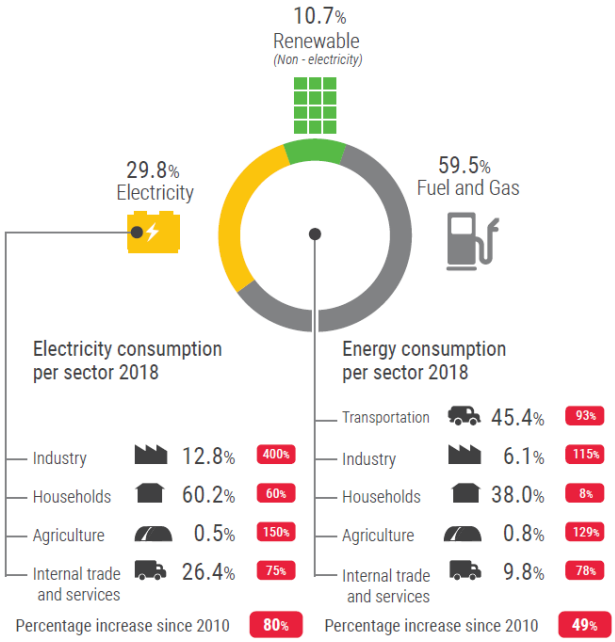


Figure 4.3.5-1: Energy mix in Palestine

Source: Atlas of Sustainable Development 2020

While nonresidential energy consumption almost entirely takes the form of electricity, Palestinian households meet their energy needs through a mixture of electricity, liquefied petroleum gas (LPG) and solar water heaters. While enjoying diversified energy sources, Palestinian households increasingly rely on electricity.

The total demand for energy in the West Bank and Gaza is expected to increase with increasing population and economic growth. Low, central, and high demand forecasts for Palestine take into account the evolution of different sectors and projected real GDP growth, in addition to humanitarian needs, especially water and wastewater sector in Gaza.[246]

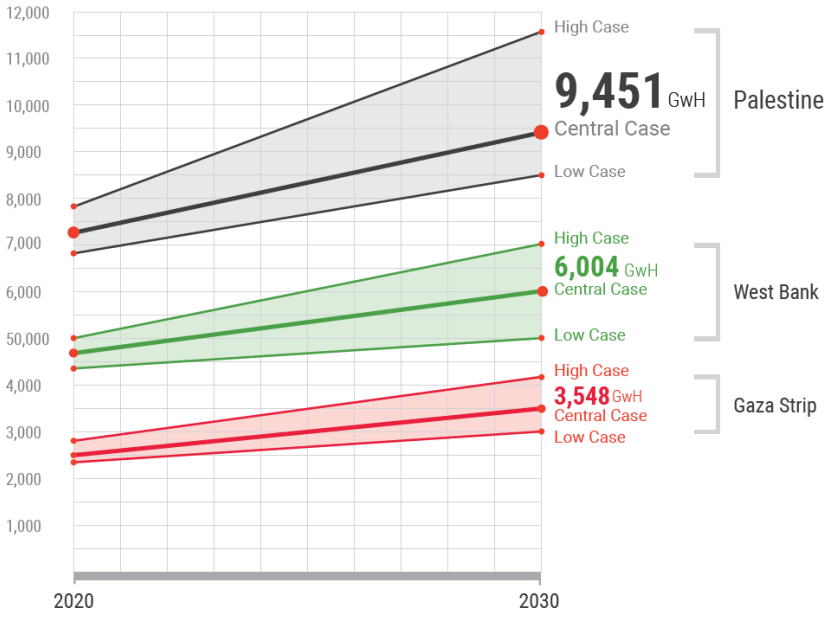


Figure 4.3.5-2: Electricity demand forecast by 2030 (GwH)

Source: Atlas of Sustainable Development 2020

246 *Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf*

4.3.5.2 Energy supply [247]

4.3.5.2.1 Energy Supply System

The West Bank and Gaza are highly dependent on energy imports from neighboring countries. [248] The majority (94%) is imported from the Israeli Electric Corporation, and much smaller amounts from Egypt and Jordan. The Israeli and Palestinian electricity sectors are closely intertwined. On the one hand, Palestine depends on the Israeli Electric Corporation (IEC) for most of the electricity supply; on the other hand, the West Bank and Gaza are the IEC's single largest customer.

Table 4.3.5-1: Quantity of Electricity Imported and Purchased by Region and Source, 2018

Source	Palestine		West Bank		Gaza Strip	
	(MWh)	(%)	(MWh)	(%)	(MWh)	(%)
Israeli Electricity Company	5,791,139	93.9%	4,776,511	98.2%	1,014,628	77.8%
Egypt	36,520	0.6%	-	-	36,520	2.8%
Jordan	88,099	1,4%	88,099	1.8%	-	-
Imported total	**5,915,758**	95.9%	**4,864,610**	100%	**1,051,148**	80.6%
Purchased from Palestine Electric Company	253,525	4.1%	-	-	253,525	19.4%
Total	**6,169,283**	100%	**4,864,610**	100%	**1,304,673**	100%

Source: PCBS, 2018

Gaza imports power from Egypt to the Gaza Strip during a limited number of hours per day. This restricted service is frequently interrupted due to lack of maintenance of the lines and security concerns in the Sinai Peninsula. In addition, the electricity supplied is of poor quality, with voltage and frequency deviations causing damage to sensitive electronic equipment, such as magnetic resonance imaging machines at hospitals.

The only large scale generation capacity in Palestine is the Gaza Power Plant, only producing around half of its total capacity (producing around 60 MW of its full 140 MW capacity), due to severe damages caused by rounds of hostilities between Israel and Hamas. Electricity produced by the Palestine Electric Company in the Gaza Strip is generated using imported diesel. The Palestine Electric Company generates approximately 4.1% of Palestine's total energy (Table 4.3.5-1).

It is planned to connect Gaza with natural gas. The availability of reliable and cost-efficient natural gas in Gaza will allow the Gaza Power Plant to be converted to gas operations, facilitating a significant increase in domestic generation and reduced dependence on electricity imports. Costs will be significantly reduced for both consumers and the Palestinian Authority (PA) once the pipeline is built and gas is flowing, since natural gas is approximately one third of the cost of diesel.

As of 2018, over 80% of the total electricity supply in West Bank has been consolidated into five distribution companies (DISCOs); the remaining 20% of the total electricity supply in West Bank is distributed by 150 municipalities and village councils. Electricity distribution services in Gaza are provided by one distribution company, GEDCO[249].

[247] *Badiei,Sara; Foster,Vivien; Ewuah Ogua, Samuel Kwesi; Coma Cunill,Roger.2017. Securing Energy for Development in the West Bank and Gaza : Main report (English). Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/351061505722970487/Main-report*
[248] *Ibid*
[249] *West Bank and Gaza: Electricity Sector Performance Improvement Project, World Bank 2017*

DISCOs' electricity bill collection rates increased from 52% (2007) to 84% (2015). Network losses (technical and nontechnical) remain a major source of concern, because 25% (2015) of the power purchased is lost and cannot be billed to the end customer (up from 19% in 2007). Overall electricity sector efficiency improved from 42% (2007) to 63% (2015) but still leaves significant room for improvement[250].

At present, there is no significant power transmission infrastructure in the West Bank and Gaza. Most power is simply absorbed and distributed from the Israeli grid at low voltage. Up to 26% of energy is lost in transit due to poor infrastructure and theft, and 15% could easily be saved if energy were transported and used more efficiently.

Overall, in West Bank and Gaza, an extensive new high-voltage energy transmission network is planned, including feed lines, transmission lines to the Israel Electric Corporation and substations. This network is expected to enable the distribution of additional power to consumers.

Establishing a high-voltage 161 kV line connection between Gaza and the Israel Electric Corporation, will allow for additional electricity imports to Gaza. The 161 kV line would help improve the sector's sustainability, by purchasing bulk electricity at the less costly high-voltage tariff and reducing technical losses.

The existing and planned Electricity Supply System in West Bank and Gaza is presented in Figure 4.3.5-3 below.

[250] *Ibid.*

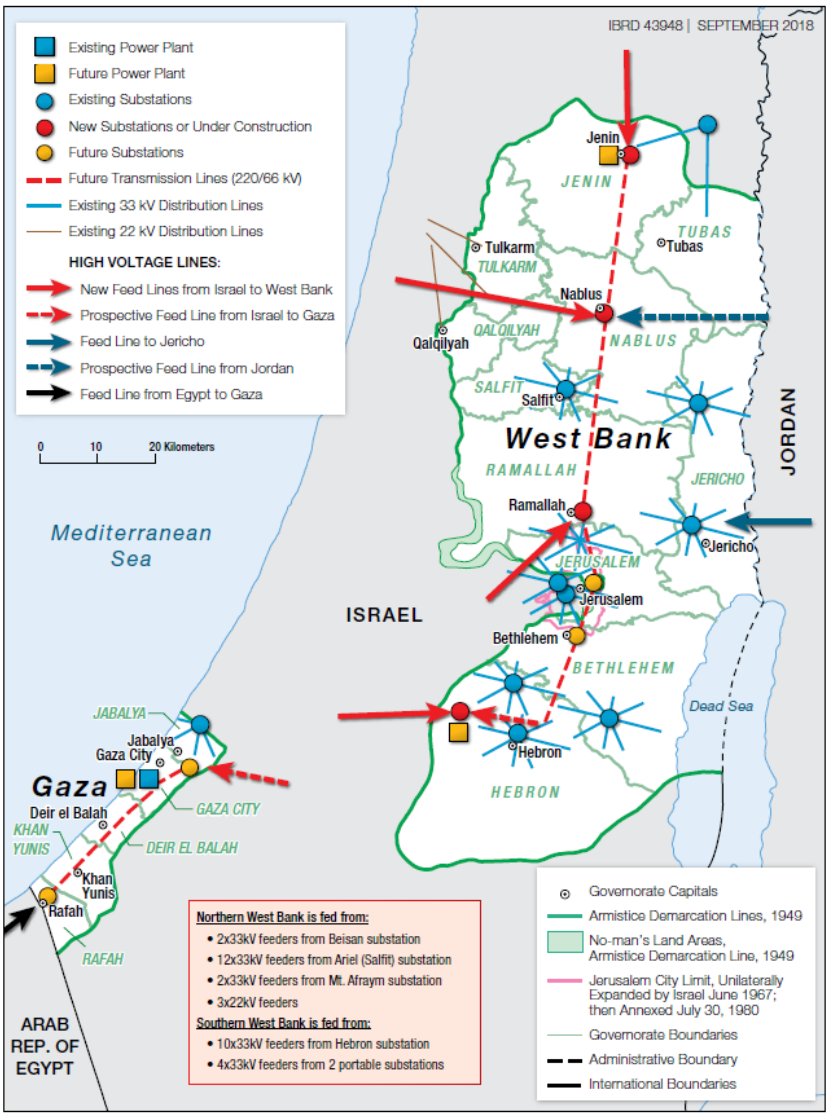


Figure 4.3.5-3: Existing and planned Electricity Supply System in West Bank and Gaza Strip

Source: Securing Energy for Development in the West Bank and Gaza, World Bank Group

4.3.5.2.2 Renewable Power Generation

Renewable energy represents the only truly independent form of power supply that does not rely on imports of electricity or fuel and can be independently produced on Palestinian soil. [251]

Renewable energy sources constitute about 10.7% of the total energy sources in 2020[252]; solar energy is one of the significant renewable resource in the Palestine. There is substantial potential for solar electricity in the West Bank, particularly in Area C; a vast solar potential of over 3,000 MW estimated is estimated in Area C, which would be suitable for both PV and CSP technologies. Nevertheless, the significant political challenges associated with securing Israeli approval for construction in Area C cast some doubt over the possibility of developing this resource. By contrast, extreme land constraints in the Gaza strip limit the available solar potential to 160 MW of rooftop solar. However, even this

[251] *Badiei,Sara; Foster,Vivien; Ewuah Ogua, Samuel Kwesi; Coma Cunill,Roger.2017. Securing Energy for Development in the West Bank and Gaza : Main report (English). Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/351061505722970487/Main-report*

[252] *Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf*

limited solar capacity could play a vital role in increasing energy security and acting as an electricity safety net. [253]

There are only a few large photovoltaic sites in Palestine despite the enormous solar potential of the area. The total installed PV capacity in the West Bank is estimated at less than 15 MW[254]; a technical potential of at least 100 MW of utility scale solar PV is estimated in Areas A and B. There is only limited but growing use of PV for electricity production at the household level; the technical potential in the West Bank is estimated to be around 530 MW of rooftop solar PV.

Solar energy for water heating is common and generally a cheaper alternative to electricity, with nearly 57% of households having access to a solar water heater. Hospitals and hotels also use solar energy for a large portion of their water heating needs. [255]

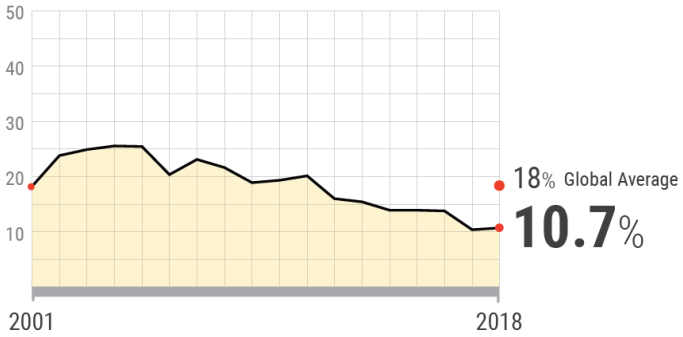


Figure 4.3.5-4: Renewable energy share in the total final energy consumption

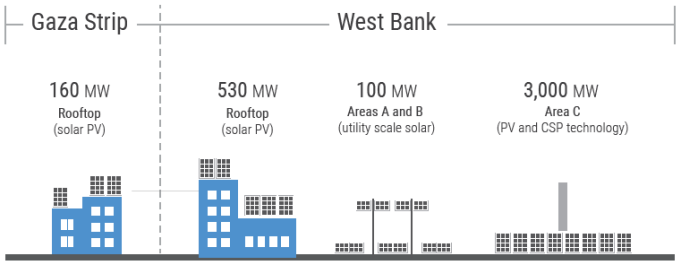


Figure 4.3.5-5: Solar energy potential in Palestine

Source: Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf

Modernization of the power grid will be vital to integrating new renewable energy sources. A modernized grid will be flexible enough to manage the variability of solar resources and to connect these supplies to high demand locations.

Figure 4.3.5-6 provides a summary of estimated solar photovoltaic (PV) power generation potential for the five targeted urban areas. It represents the average daily/yearly totals of electricity production from a 1 kW-peak grid- connected solar PV power plant, calculated for a period of 20 recent years (1999-2018).[256] Overall, photovoltaic power potential increases towards the urban areas located to the south of West Bank and is also high in Gaza Urban Area.

[253] *Badiei,Sara; Foster,Vivien; Ewuah Ogua, Samuel Kwesi; Coma Cunill,Roger.2017. Securing Energy for Development in the West Bank and Gaza : Main report (English). Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/351061505722970487/Main-report*

[254] *http://documents1.worldbank.org/curated/ar/297361501380046131/pdf/West-Bank-Gaza-PAD-PAD1608-June-30-2017-07102017.pdf*

[255] *Ives et.al, 2017, A Fast Track Analysis of Infrastructure Provision in Palestine, v2.1, www.itrc.org.uk*

[256] *https://solargis.com/maps-and-gis-data/download/west-bank-and-gaza*

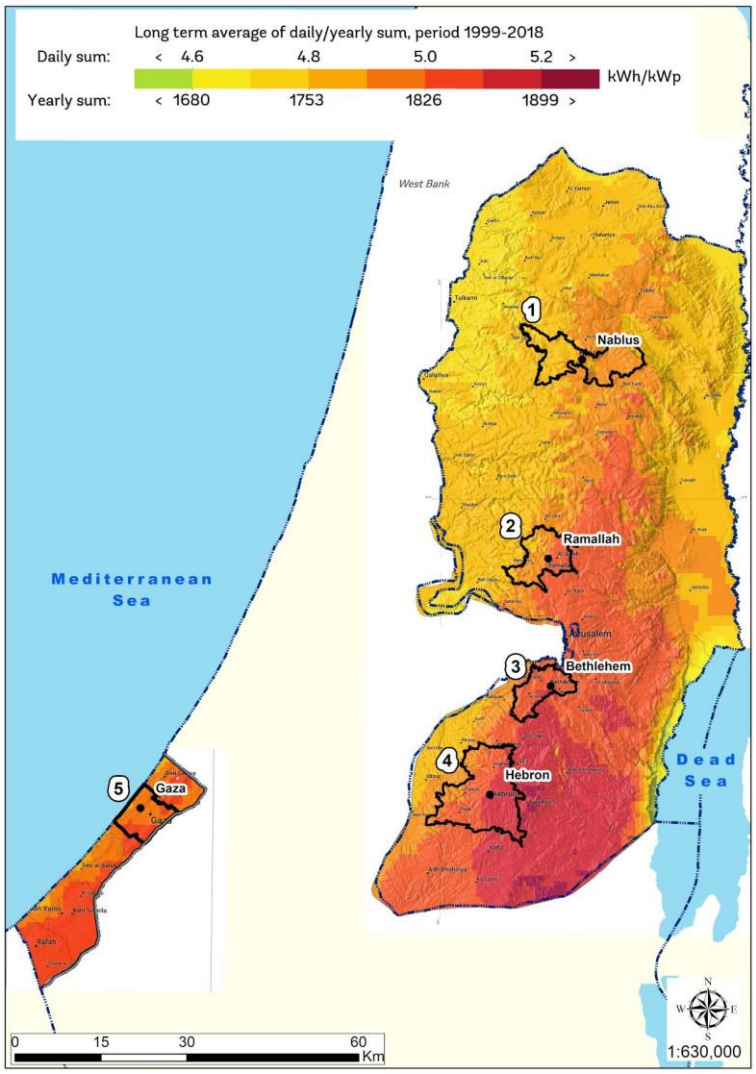


Figure 4.3.5-6: Photovoltaic power potential, West Bank and Gaza

Source: https://solargis.com/maps-and-gis-data/download/west-bank-and-gaza

4.3.5.2.3 Energy security

Palestine faces significant energy security challenges, already severe in Gaza, but also emerging in the West Bank. According to PCBS data (2018)[257], the percentage of households that live in housing units with daily cuts of power (a number of hours per day) in Palestine reached 36.0% (0.5% in the West Bank and 97.3% in Gaza Strip). Although the West Bank generally enjoys 24-hour power supply, there have been emerging power shortages during peak winter and summer months. [258]

In Gaza, the available power supply only meets half the demand leading to rolling blackouts, alternating between 8 hours on and 8 hours off.[259] For the past decade, the Gaza Strip has suffered from a chronic electricity deficit, which has undermined already fragile living conditions. In 2019, only 41% of Gaza's electricity needs were met. The ongoing power shortage has severely impacted the

[257] *Palestinian Central Bureau of Statistics, 2019, Socio-Economic Conditions Survey, 2018 - Main Findings. Ramallah - Palestine*
[258] *Badiei,Sara; Foster,Vivien; Ewuah Ogua, Samuel Kwesi; Coma Cunill,Roger.2017. Securing Energy for Development in the West Bank and Gaza : Main report (English). Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/351061505722970487/Main-report*
[259] *Badiei,Sara; Foster,Vivien; Ewuah Ogua, Samuel Kwesi; Coma Cunill,Roger.2017. Securing Energy for Development in the West Bank and Gaza : Main report (English). Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/351061505722970487/Main-report*

availability of essential services, particularly health, water and sanitation, and undermined Gaza's fragile economy. [260]

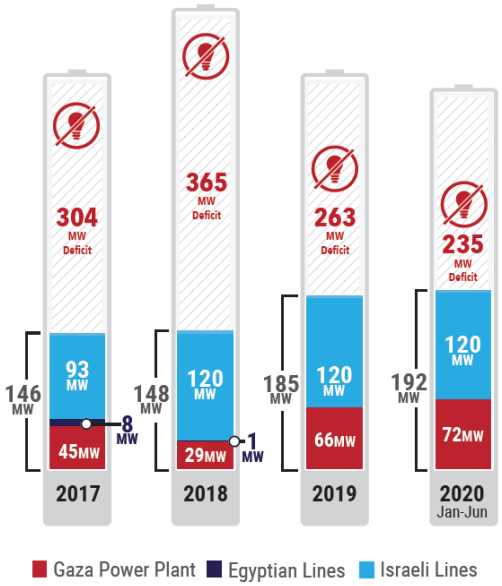


Figure 4.3.5-7: Electricity demand, supply and deficit in Gaza Strip (in megawatts MW)

Source: OCHA, 2020, https://www.ochaopt.org/sites/default/files/gaza_access_and_movement_october_2020.pdf

Because power rations are delivered to neighboring blocks on alternating schedules, customers connect illegally to neighboring networks to increase the number of hours of supply to their homes. In addition to these illegal connections, electricity is lost in the network because of the poor physical state of the infrastructure[261].

According to PCBS data (2015), 66.4% of the households in Gaza Strip used batteries/ LED networks to cope with the state of disruption in the service of the public electricity network. In addition, 12.9% of the households in Gaza Strip resort to dry batteries to cope with the disruption of the network service. For more details see Annex I "Energy data".

With Palestinian electricity demand projected to grow at an average annual rate of around 3.5% for the coming years – a little faster in Gaza and slower in the West Bank – energy shortages can be expected to deteriorate unless new supply options are found.

According to PCBS data (2015)[262], all localities in the five (5) targeted urban areas were served by an electricity network in 2015.

The Palestinian government has taken many measures to increase electricity bills collection rates, through the installation of pre-paid meters, national electricity debt remains an issue. In 2017, deductions from clearance revenues amounted to 9.2% of the Palestinian government's total

[260] *Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf*
[261] *West Bank and Gaza: Electricity Sector Performance Improvement Project, World Bank, 2017*
[262] *PCBS, 2015, Distribution of Localities in Nablus, Ramallah and Al Bireh, Bethlehem, Hebron and Gaza Governorates by Availability of Infrastructure Services, 2015,*
http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/LOC%20E16A%202015.htm
http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/LOC%20E8A%202015.htm
http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/LOC%20E4A%202015.htm
http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/LOC%20E2A%202015.htm
http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/LOC%20E14A%202015.htm

revenues. Moreover, high dependency on Israel for electricity makes Palestinians very vulnerable to arbitrary cuts of the power supply, especially in the case of unpaid electricity bills.

4.3.6 Transportation

4.3.6.1 Road transport

4.3.6.1.1 Road network

The road transport sector represents the backbone of Palestinian transportation; all types of movements – people/ goods, private/ public, systematic/ occasional – occur along the existing road network both in West Bank and Gaza Strip where no other modes of transport are supplied. [263]

The current road network is far from adequate in terms of responding to the accessibility and mobility needs of Palestinian society. A general lack of resources for land acquisition and infrastructure upgrades has resulted in outdated road networks and transport modalities, the absence of major infrastructure interventions (i.e. building of tunnels, bridges, bypass roads, ring roads etc.) and the absence of sustainable mobility solutions (i.e. city buses, trams, cycling routes, etc.)

The current Palestinian road network is composed of:

- Main Roads;
- Regional (arterial) Roads, and;
- Local Roads (Paved and Unpaved Roads).

The roadway condition varies from one targeted Urban Area to another. In general, main roads and regional roads are in fair to good condition, and local roads tend to be at a lower condition level. However, the rehabilitation and maintenance efforts in all the study areas are on-going and the roadway conditions are been upgraded continuously.

The four targeted Urban Areas of West Bank are connected through the Main Road 60 (see Figure 4.3.6-1 below), which extends from Jenin in the north, all the way to Hebron in the south, passing through the entire West Bank. Connection between Nablus and Ramallah study areas is also provided through other lower level roads (regional and local) (see Figure 4.3.6-2 - Figure 4.3.6-4 below).

[263] *National Road and Transportation Master Plan, 2016,* http://www.mot.gov.ps/ntmp/%D8%A7%D9%84%D8%AA%D9%82%D8%B1%D9%8A%D8%B1-%D8%A7%D9%84%D9%85%D8%AE%D8%B7%D8%B7-%D8%A7%D9%84%D8%B4%D9%85%D9%88%D9%84%D9%8A-%D9%88%D8%A7%D9%84%D9%85%D9%84%D8%A7%D8%AD%D9%82-%D8%A7%D9%84%D8%AE%D8%A7/



Figure 4.3.6-1: Interconnection roads - West Bank and Gaza Strip

Source: MoLG - ICUD GIS database, https://geomolg.ps/

Tight security measures make the transport network highly inefficient to Palestinian residents. Israel has installed permanent **checkpoints** along the boundary between its sovereign territory and Gaza; between its sovereign territory and the West Bank; and between annexed East Jerusalem and the rest of the West Bank. This policy split Palestinian land into three separate areas – the West Bank, East Jerusalem, and the Gaza Strip – and travel between them became entirely dependent on Israeli discretion. These measures make the transport network highly inefficient in the West Bank, where Israel restricts or prohibits Palestinian vehicles from using over 400 km of roads serving Israeli settlers. Road 60 is under the Israeli control. Regional and local roads are totally controlled by the Israelis, and Palestinians are generally prohibited from using them.

Israel has virtually complete control over the movement of people and goods into and out of Gaza; It controls all land crossings, apart from Rafah.[264] Furthermore, in Gaza, recent conflicts have caused extensive physical infrastructural damage.

According to MoLG data within the five (5) targeted urban areas there are: 12 checkpoints, 5 partial checkpoints, 25 road blocks, 29 road gates, 50 earthmounds and 2 flying checkpoints. All types of mobility restrictions are presented in Figure 4.3.6-2 - Figure 4.3.6-5 below and in details in Annex I "Mobility restriction".

[264] https://conquer-and-divide.btselem.org/map-en.html

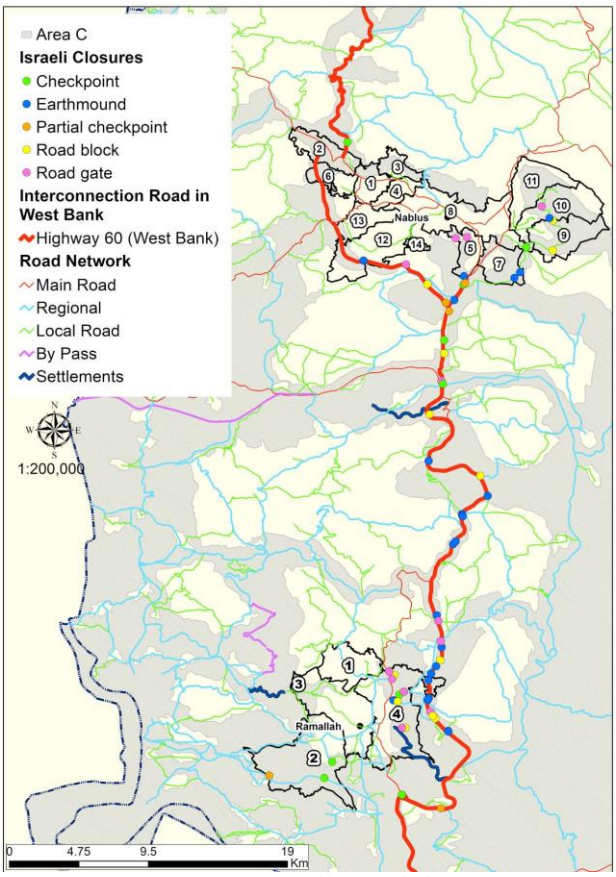


Figure 4.3.6-2: Road network, mobility restrictions and Connections between Nablus and Ramallah and Al Bireh urban areas

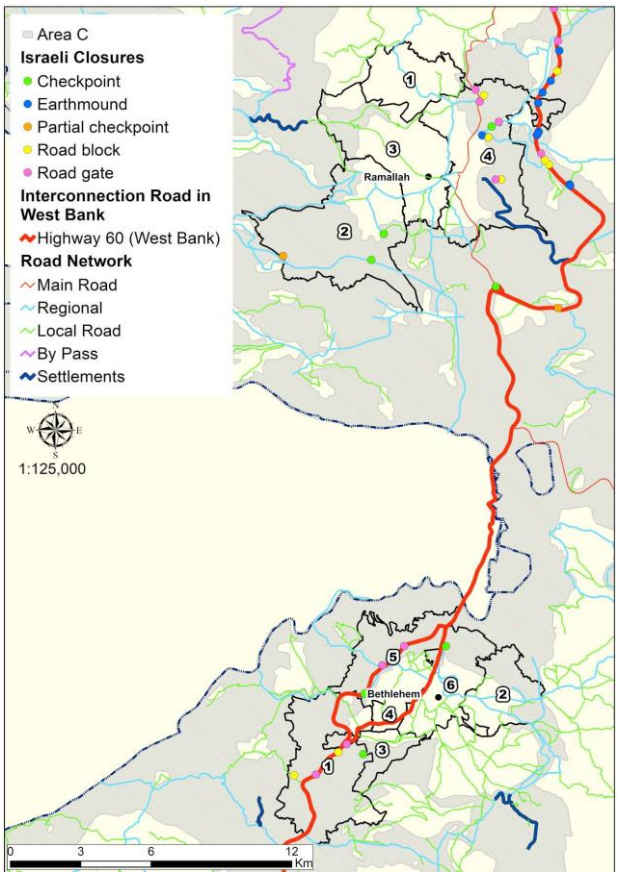


Figure 4.3.6-3: Road network, mobility restrictions and Connections between Ramallah and Al Bireh and Bethehem urban areas

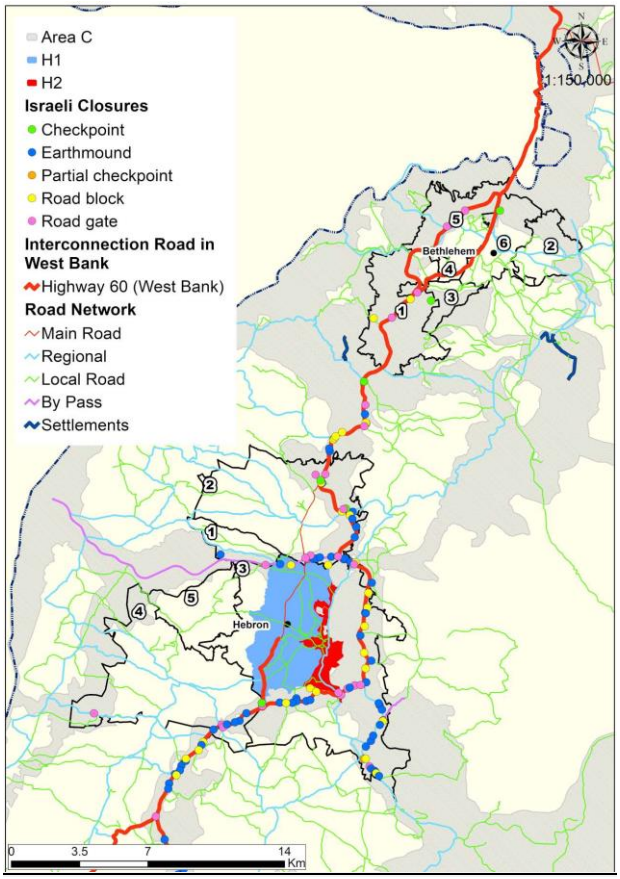


Figure 4.3.6-4: Road network, mobility restrictions and Connections between Bethehem and Hebron Urban Areas

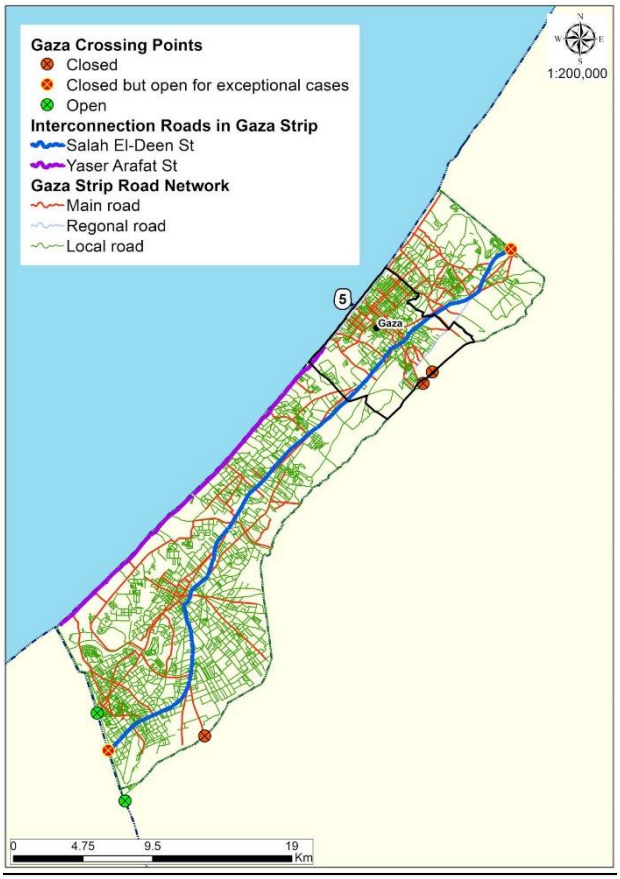


Figure 4.3.6-5: Road network and mobility restrictions in Gaza Strip

Source: MoLG - ICUD GIS database, https://geomolg.ps/

Palestinian cities and towns suffer from connectivity challenges. The four targeted urban areas of West Bank are the center of activities in their respective regions and experience fast development growth of various levels; therefore, they experience high traffic volumes with limited options for expanding the roadway network or increasing its capacity. As a result, the cores of each of the Urban Areas in West Bank experience high levels of congestion. The arterials within each of the four targeted urban areas in West Bank attract the highest traffic volume and therefore, experience a high congestion level.

- In Nablus, there is poor connectivity between LGUs (except the City of Nablus). New ring road segments along with other connecting roads can enhance connectivity among LGUs and with the surrounding areas.

- In Bethlehem, there is no external ring road (especially due to Israeli imposed restrictions of usage of highways and main roads) and internal, external and through traffic are using the same network. Five segments of the Bethlehem Ring road are planned to be constructed from 2021-2029. However, due to restrictions from the Israeli Authorities the northern Ring road segment is planned to be implemented after 2030.

- In Ramallah-Al Bireh, the initial two separate master plans of Surda and Abu-Qash were merged into one master plan without any study or evaluation of the land uses and road networks. This resulted in inconsistencies of linked roads with Ramallah master plan.

For more details about road network, roadway conditions, movements and level of congestion per urban area see Annex I "Road network".

4.3.6.1.2 Public transport

The public transport services in West Bank and Gaza Strip are perceived as poor; public transportation infrastructure is poor. The public transport system in the West Bank consists primarily of bus services, shared-taxis, and cab taxis, whereas shared-taxi is the most used and common mode. All public transit modes are privately owned and operated. The ratio of vehicles to inhabitants for inter-city transport is only 1.5/1,000 citizens; within cities, the ratio is 2.2/1,000 citizens[265].

Public transport buses and cab taxis operate on diesel fuel and are poorly maintained, thus contributing to air and noise pollution. The renewal and maintenance of public transport bus fleet is expected to improve air emissions from public transport buses. The renewal of public transportation fleet is restricted by Israeli policies on the purchase of upgraded buses and taxis.

Two main international border crossing points have public transport service, namely the Jordan River Bridge border crossing in the West Bank and the Rafah border crossing between the Gaza Strip and Egypt. Minimum public transport operations are also allowed at the border crossings between the West Bank and Israel, namely at Bayt Hanoun and Qalandiya check-point.

Due to the lack of ongoing and/or undergone studies investigating current demand for public transport in West Bank and Gaza Strip, at the moment there is not reliable related travel demand data.

[265] *State of Environment and Outlook Report for the occupied Palestinian territory, UNEP 2020*

4.3.6.2 Rail, air and maritime transportation [266]

Palestine lacks rail and air transport systems and a modern mass transport fleet for passengers. Maritime transportation is not operational either. These limitations affect local Palestinian communities in terms of social disintegration, environmental degradation, public health deterioration and pressure on land.

Rail transport

At present, in the West Bank and Gaza Strip no railway line is in operation, but it should be reminded that at the beginning of the last century some sections of the Hijaz Railway were opened in that area.

Some of these lines are still present, albeit in disuse, in the North of the West Bank (Jenin – Nablus, Tulkarm – Nablus) and along the Gaza Strip.

Air transport

Currently air transport passengers from West Bank and Gaza Strip can only rely on airports located in the neighboring countries. The biggest part of Palestinian inbound and outbound air passengers travel via Ben Gurion International Airport in Tel Aviv and via Queen Alia International Airport in Amman.

Maritime Transport

The only infrastructure for maritime transport is represented by the fishery port of Gaza that serves the fishing sector and accommodates approximately 750-800 fishing boats of various sizes; the fishery port of Gaza, is in poor condition, the main constraints being:

- Low water depth within the harbour basin;
- Poor conditions of breakwaters;
- Absence of piers for fishing vessels;
- Presence of a sewage outlet inside the harbour basin.

Israel has virtually complete control over Gaza's sea and air space.[267]

Marginal improvements could restore a satisfactory, although primary and emergency level of commercial and passenger traffic functionality, subject to easing restrictions.

[266] *National Road and Transportation Master Plan, 2016, http://www.mot.gov.ps/ntmp/%D8%A7%D9%84%D8%AA%D9%82%D8%B1%D9%8A%D8%B1-%D8%A7%D9%84%D9%85%D8%AE%D8%B7%D8%B7-%D8%A7%D9%84%D8%B4%D9%85%D9%88%D9%84%D9%8A-%D9%88%D8%A7%D9%84%D9%85%D9%84%D8%A7%D8%AD%D9%82-%D8%A7%D9%84%D8%AE%D8%A7/*

[267] *https://conquer-and-divide.btselem.org/map-en.html*



Figure 4.3.6-6: Fishery Port of Gaza

4.3.7 Tourism

The Palestine's unique history is often what attracts tourists but at the same time this history has been the cause of the unrest and perceived insecurity that has hindered the growth of the tourism sector. Although visitors that come for pilgrimages (which have been the industry's traditional focus and represent the vast majority of tourism services exports) are relatively less sensitive to security concerns, historical events have inhibited the sector's growth. Although there are many cultural, natural, archaeological and other tourist attractions in Palestine, the tourism sector's direct contribution to GDP is approximately 4%, which is less than the immediate region economies (6% in Israel, 20% in Jordan, 13% in Egypt and 37% in Lebanon). This weakness also applies to the contribution of the tourism sector to total employment which is approximately 2%. This is the lowest rate compared to the immediate region economies (8% in Israel, 19% in Jordan, 11% in Egypt, and about 4% in Lebanon.[268]

The country's tourist potential is closely intertwined with that of Israel. Most tourists visit Palestine while visiting Israel (and to a lesser extent Jordan). Except for the diaspora of Palestinians in Israel, very few tourists come to visit Palestine mainly or exclusively. However, tourism in Israel (and in Jordan) should not be seen as a rival destination but, on the contrary, as the main attracting force for tourists to visit the Palestine. There are variety trends of tourism in Palestine; one of them is the community based tourism. Ecotourism is under development; there is potential and it is considered a priority travel segment according to the National Tourism Strategy.

The number of arrivals for Palestine international tourism, was 606,000 in 2018, up from 503,000 in the previous year, this is a change of 20.48%[269]. However, the UN World Tourism Organization recognizes that '*trends in the Middle East are the hardest to forecast due to the volatile environment and the widely varying trends across countries*'[270]. Furthermore, the limited availability of reliable statistics makes it difficult to describe with accuracy the size and dynamics of the Palestine's tourism sector both in terms of volumes and value.

[268] *Al-Falah, Belal (2012). Tourism in the Palestinian Territory : Analysis of Significance and Impact. Palestine Economic Policy Research Institute.*
[269] *https://knoema.com/WBWDI2019Jan/world-development-indicators-wdi?country=1001650-west-bank-and-gaza*
[270] *World Travel and Tourism Council (2013). Travel & Tourism Economic Impact 2013 : Mediterranean.*

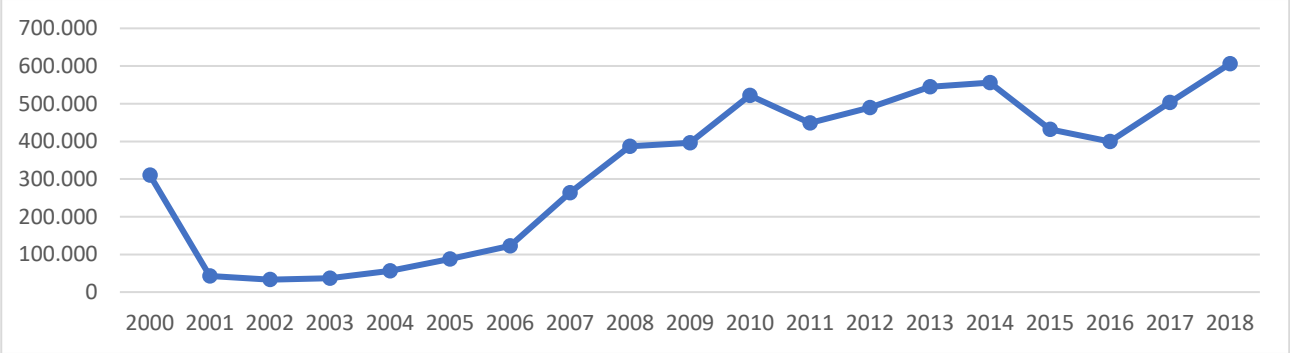


Figure 4.3.7-1: Number of international arrivals in Palestine 2000-2018

Source: https://knoema.com/WBWDI2019Jan/world-development-indicators-wdi?country=1001650-west-bank-and-gaza

Approximately 50 % of Palestine's tourism revenues come from international tourism, 85 % of which is from pilgrimage tourism. The other 50 % of Palestine's tourism revenues comes from domestic tourism, which is particularly supported by Palestinians living in Israel[271], who sustain the accommodation industry, through overnight stays in cities such as Jericho, Bethlehem and Jerusalem. It must be noted that accommodation occupancy rates are low due to high seasonality and there is a need to improve infrastructure and service quality.

The total number of guests was distributed in **West Bank** in 2018 by region as follows:

- 63.0% of total guests in South of West Bank hotels (Hebron and Bethlehem Governorates);
- 18.6% in Jerusalem Governorate;
- 9.3% in the Middle of West Bank (Ramallah, Salfit and Jericho Governorates) and
- 9.1% in the North of West Bank (Jenin, Tubas, Tulkarm, Qalqilya and Nablus Governorates).

The tourist potential of Ramallah, Nablus and Hebron is neglected; Ramallah is less visited as it is primarily a business destination and Nablus is rarely visited by foreigners at all.

The development of the Palestinian tourism potential is hindered by a number of factors. They include the fragile political and security situation, and the various restrictions imposed by Government of Israel (GoI) on movement, access, and physical development. Gaza and its Mediterranean coast, for instance, are in practice inaccessible to foreign tourists for several reasons. Perceived or real security issues in the West Bank undoubtedly discourage potential tourists.

Tourism in Area C [272]

Area C has large tourism growth potential but for Palestinians this remains largely unexploited due to a large degree to current restrictions on access and investment, in particular around the Dead Sea. Area C, excluding Jerusalem, is home to around 3,110 archeological sites registered by the Palestinian Ministry of Tourism and Antiquities. Many currently "forgotten" archaeological sites could become important tourist destinations in the future, and feature in UNESCO's "Inventory of Cultural and Natural Heritage Sites of Potential Outstanding Universal Value in Palestine."

Both Israel and Jordan have developed the Dead Sea as a tourist destination and are reaping significant economic benefits. Area C of the West Bank is suitable for resort development, a very

[271] *International Trade Center, The State of Palestine National Export Strategy – Tourism Sector 2014-2018*
[272] *Cali, Massimiliano; Nasser Eddin, Nur; Niksic, Orhan. 2014. Area C and the future of the Palestinian economy (English). A World Bank study. Washington, DC : World Bank Group. http://documents.worldbank.org/curated/en/257131468140639464/Area-C-and-the-future-of-the-Palestinian-economy*

conservative assumption would be that at least 6 kilometers (15 % of total length) could be developed into resorts similar to those in Israel and Jordan. The Dead Sea shore along the West Bank, currently designated as Area C, has similar characteristics (in terms of tourism potential) to those of the Dead Sea shore in Israel.

Tourism in Gaza

Gaza has been off-limits to tourists since siege started in 2007, which had dramatic impacts on the tourism sector. Since, 2007, Israel allows in international aid workers, journalists and diplomats, but tourists are prohibited. Despite this, Gaza city is the center of many touristic sites along with the beach and amusement parks. Gaza city is the place of the Cultural Center, Pasha's Palace, Old Town Antique Store, Tombs, mosques and churches, Samaritan bathhouse and lots of hotels and beach restaurants.[273]

4.4 Socio-economic characteristics

4.4.1 Demographics

4.4.1.1 Population and population density

Table 4.4.1-1 below presents population and population density in the five (5) targeted urban areas according to the PCBS Census data (2017). Population of refugee camps within the borders of each targeted urban area is also included. For more details see Annex I "Demographics".

It must be noted that there is a differentiation between the PCBS demographical data for Ramallah, Al Bireh and Beitunia and the population that has been agreed by the three municipalities' councils, which in 2017 was 65,000, 85,000 and 35,000 respectively; this population is on average 74% higher compared to the statistical data of PCBS for the same municipalities. In order to present the total population of Ramallah & Al Bireh Urban Area, the agreed population by the three above-mentioned municipalities has been added to the population of Surda-Abu Qash, as provided by PCBS, in addition to the population of Al Ama'ri Camp and Qaddura Camp, thus totalling 194,137 persons, which is on average 68% higher compared to the PCBS data. However, in order to reach conclusions on the population distribution of Ramallah & Al Bireh (population per age, gender, type of locality), as no demographical analytical data were available for the three municipalities' agreed population, PCBS data have been used under the assumption that the distribution of population is the same for the agreed population and the population provided by PCBS.

Table 4.4.1-1: Population and population density in five (5) urban areas

Urban Area	Population (2017 Census)	Area (km²)	Population density (pop./km²)
Nablus Urban Area	229,798	108.19	2,124.0
Ramallah & Al Bireh Urban Area	194,137 *	72.04	1,601.7
Bethlehem Urban Area	97,873	55.07	1,777.2
Hebron Urban Area	290,115	162.78	1,782.3

[273] *Spatial and Sectoral Assessment Report, 2020, World Bank, Integrated Cities and Urban Development Project Gaza City - Improving Resilience of Urban Service Systems*

Urban Area	Population (2017 Census)	Area (km²)	Population density (pop./km²)
Gaza Urban Area	620,027	55.59	11,153.6

*Note: *The no. of Population of Ramallah, Al Bireh and Beituna have been agreed on by the three municipalities*
Source: Palestinian Central Bureau of Statistics, 2019, Population, Housing and Establishments Census 2017: Census Final Results – Summary – Nablus, Ramallah & Al Bireh, Bethlehem, Hebron and Gaza Governorates

The Palestinian Central Bureau of Statistics (PCBS 2015) has formulated a single baseline central projection of the Palestinian population within Palestine to 2020 and extended to 2050. Low and high population growth projections were developed for Gaza and West Bank, based on the lowest and highest population growth rates from the Palestinian governorates within each of the regions. The low and high population growth rates are 1.8% and 3.4% respectively in West Bank, and 3.1% and 4.0% in Gaza (Figure 4.4.1-1), and the sum of these two projections give a range of between 10.7 and 16.3 million people living in Palestine in 2050 (equivalent to 2.3% and 3.6% annual growth).[274]

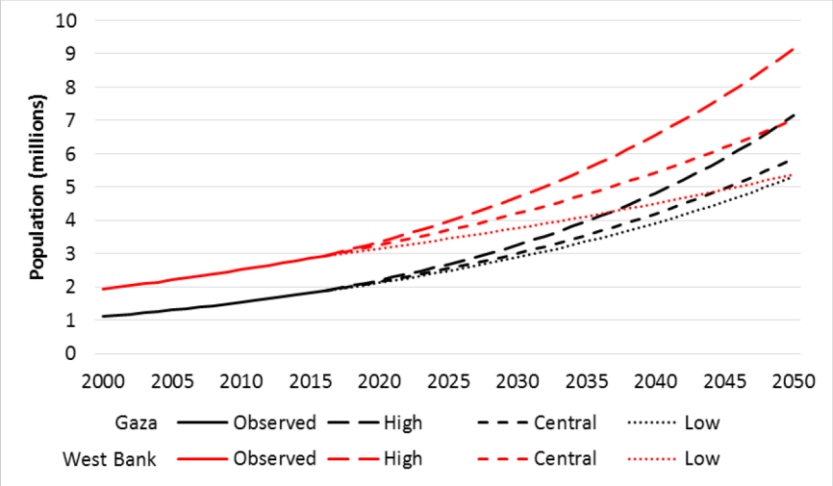


Figure 4.4.1-1: High, central and low population projections for Gaza and West Bank, to 2050

Source: Ives et.al, 2017, A Fast Track Analysis of Infrastructure Provision in Palestine, v2.1, www.itrc.org.uk

4.4.1.2 Age Structure

Population is very young in all targeted urban areas. Approximately 60% of population is under 30 years of age in Nablus, Ramallah & Al Bireh and Bethlehem Urban Areas; this percentage reaches approximately 70% for Hebron and Gaza Urban Areas. Children under 15 are approximately 30% of the total population in Nablus, Ramallah & Al Bireh and Bethlehem Urban Areas; this percentage reaches approximately 40% for Hebron and Gaza Urban Areas.

Figure 4.4.1-2 below presents population by age for the five (5) targeted urban areas according to the PCBS Census data (2017). For more details see Annex I "Demographics".

[274] *Ives et.al, 2017, A Fast Track Analysis of Infrastructure Provision in Palestine, v2.1, www.itrc.org.uk*

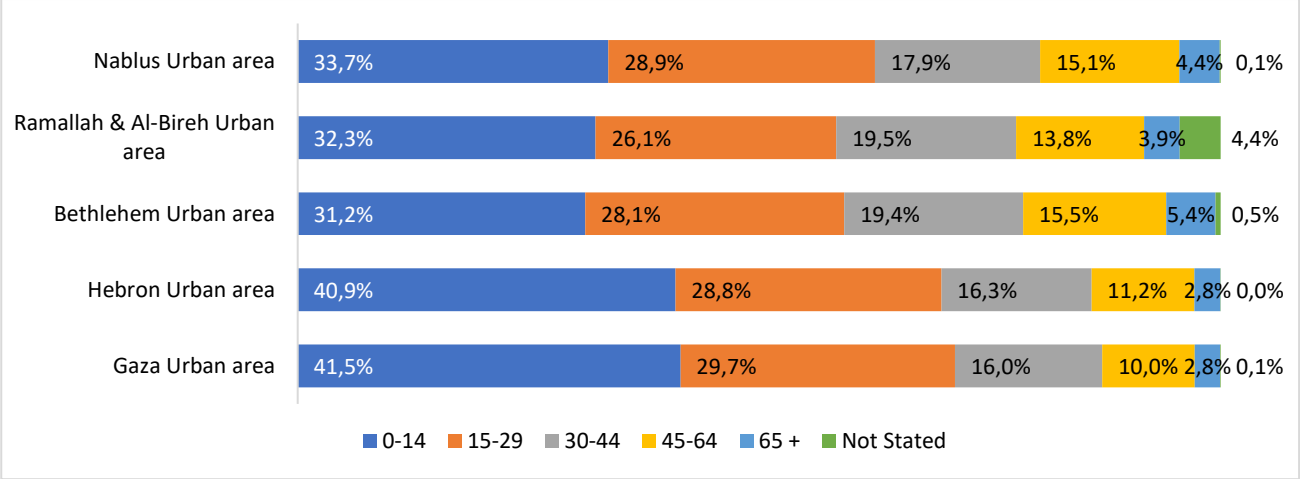


Figure 4.4.1-2: percentage of population by age in five (5) targeted urban areas

Source: Palestinian Central Bureau of Statistics, 2019, Population, Housing and Establishments Census 2017: Census Final Results – Summary – Nablus, Ramallah & Al Bireh, Bethlehem, Hebron and Gaza Governorates

4.4.1.3 Gender Structure

In most targeted urban areas, there is an even distribution of male and female population; slightly over 50% for males and slightly under 50% for females. Hebron Urban Area is the only exception, where 51.3% of population is male and 48.7% is female.

Figure 4.4.1-3 below presents population by gender in the five (5) targeted urban areas according to the PCBS Census data (2017). For more details see Annex I "Demographics".

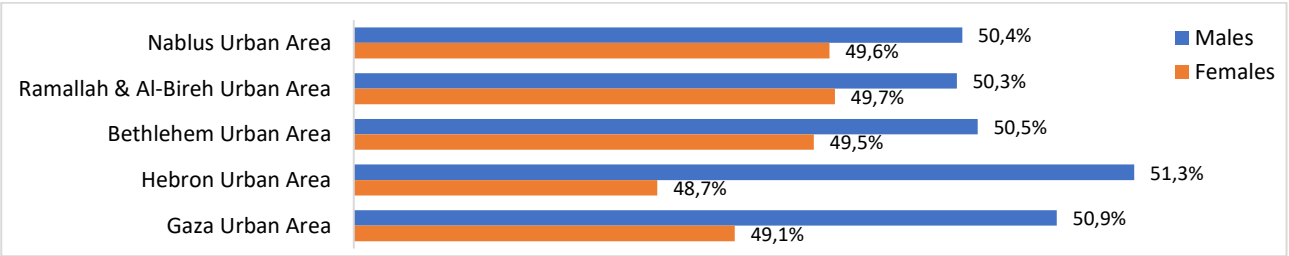


Figure 4.4.1-3: Percentage of population by gender in five (5) targeted urban areas

Source: Palestinian Central Bureau of Statistics, 2019, Population, Housing and Establishments Census 2017: Census Final Results – Summary – Nablus, Ramallah & Al Bireh, Bethlehem, Hebron and Gaza Governorates

4.4.1.4 Type of Locality

Over the last 50 years, rural population of Palestine was declining at a moderate rate from 45.7% of total population in 1970 to 23% in 2020.[275] Urbanization in Palestine has been growing steadily, fueled by high demographic growth rates and spatially concentrated development with limited space to expand. The urban population in Palestine is estimated at 77 % in 2020 (excluding urban refugee camps), among the highest in the region. It is expected that the population in Palestine will reach 6 million people by 2030 of which 5.3 million will be in urban areas. The land scarcity and spatial fragmentation, combined with rapid urban growth and uneven development within Palestine, have

[275] *Knoema data, https://knoema.com/WBWDI2019Jan/world-development-indicators-wdi#*

increased pressure on local authorities.[276] In the study area, percentages of population living in urban areas range from 80%-100%, with the exception of Nablus Urban Area where this percentage is 68%.

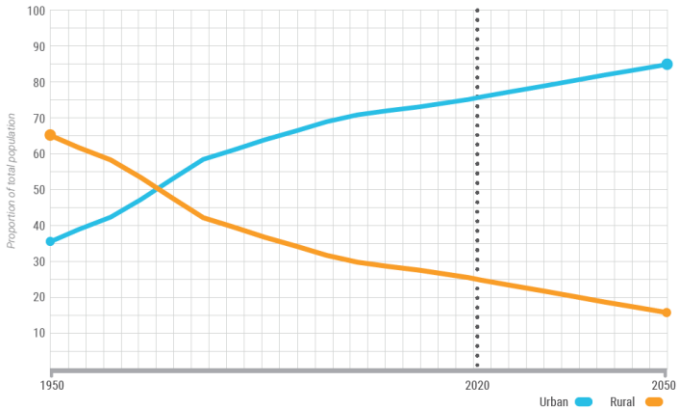


Figure 4.4.1-4: Percentage of population in urban and rural areas

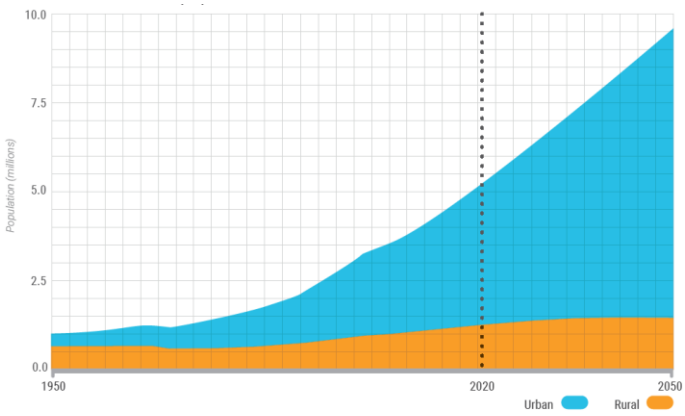


Figure 4.4.1-5: Urban and rural population

Source: Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf

Figure 4.4.1-6 below presents population in five (5) targeted urban areas by type of locality according to the PCBS Census data (2017)[277]. For more details see Annex I "Demographics".

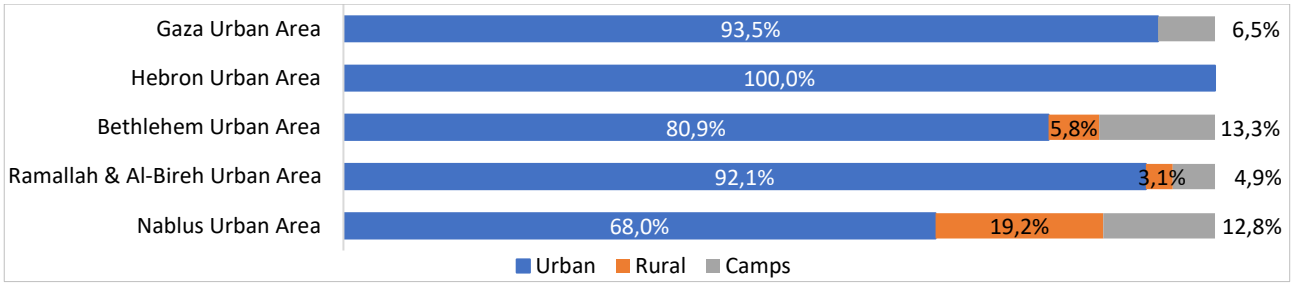


Figure 4.4.1-6: Percentage Population in five (5) targeted urban areas by Type of Locality, 2017

Source: Palestinian Central Bureau of Statistics, 2019. Population, Housing and Establishments Census 2017: Main Indicators by Type of Locality. Ramallah - Palestine.

Approximately 13 % of the population in Bethlehem and Nablus Urban Areas live in refugee camps; this percentage ranges from 5-6.5% for Ramallah and Al Bireh and Gaza Urban Areas respectively. There are no refugee camps within Hebron Urban Area. The refugee camps in the five (5) targeted urban areas have been presented in Figure 4.1.1-1.

4.4.2 Economy

4.4.2.1 Gross Domestic Product (GDP)

According to Knoema data[278] GDP (current US$) of Palestine increased from 4,271 million current US$ in 1999 to 14,615 million current US$ in 2018 growing at an average annual rate of 7.03% (Figure 4.4.2-1).

[276] *Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf*
[277] *Palestinian Central Bureau of Statistics, 2019. Population, Housing and Establishments Census 2017: Main Indicators by Type of Locality. Ramallah - Palestine*
[278] *Knoema data, https://knoema.com/WBWDI2019Jan/world-development-indicators-wdi#*

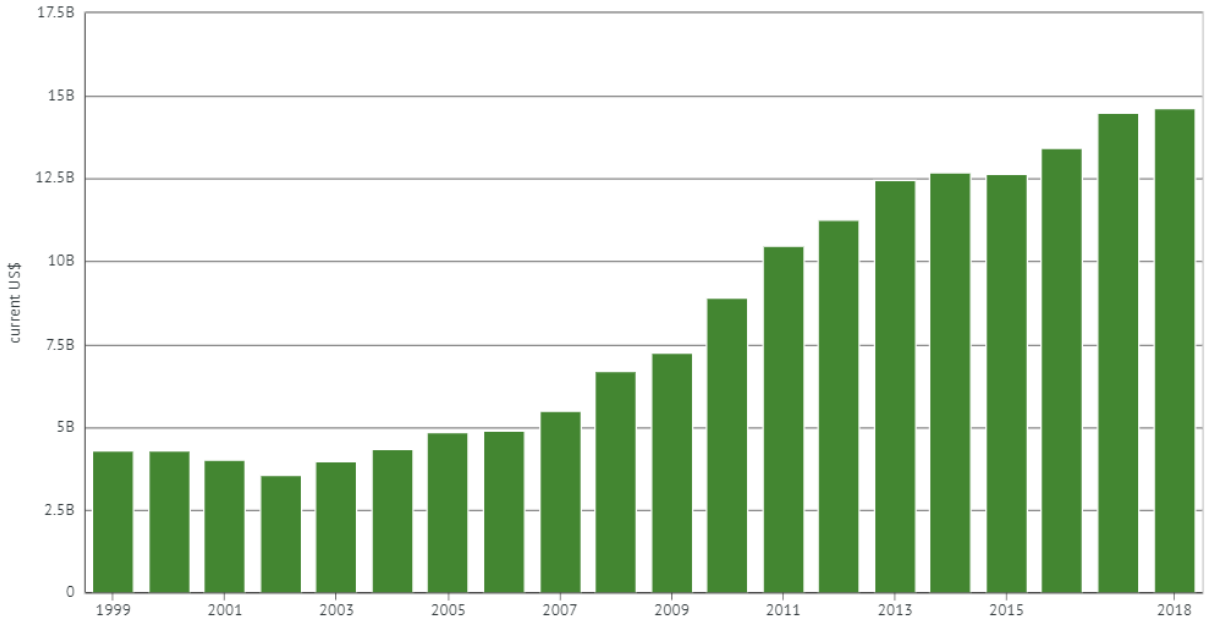


Figure 4.4.2-1: Gross Domestic Product (GDP) in Palestine, 1999-2018

Source: Knoema data, https://knoema.com/WBWDI2019Jan/world-development-indicators-wdi#

Based on recent reports[279], and taking into account Covid-19 outbreak, the economy in Palestine is projected to contract by about 7.6%-11.2% in 2020 and recovery is expected in 2021. Due to movement restrictions that cause the decline in income from Palestinian workers in Israel, the majority of whom are from the West Bank, West Bank is expected to face a larger economic impact than Gaza, where the majority of the poorest rely on aid and not on labour income.

Table 4.4.2-1: Real GDP - Palestine

Year	2016	2017	2018	Est	Forecast		
				2019	2020	2021	2022
Real GDP	8.9	1.4	1.2	0.9	-7.6	5.1	2.7

Source: http://documents1.worldbank.org/curated/en/844141590600764047/pdf/Economic-Monitoring-Report-to-the-Ad-Hoc-Liaison-Committee.pdf

The structure of the Palestinian economy has substantially deteriorated since the 1990s. The manufacturing sector has largely stagnated and its share in GDP has been in decline during the past 10 years, dropping from 16 % in 2010 to around 13 % in 2019. The share of the agriculture sector has also dropped in the recent years contributing 6.9 % to GDP in 2019. In the past two decades, most growth occurred in the various retail and service sectors, which account for more than half of the GDP in Palestine.[280]

[279] http://documents1.worldbank.org/curated/en/844141590600764047/pdf/Economic-Monitoring-Report-to-the-Ad-Hoc-Liaison-Committee.pdf

[280] *Atlas of Sustainable Development 2020,* https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf

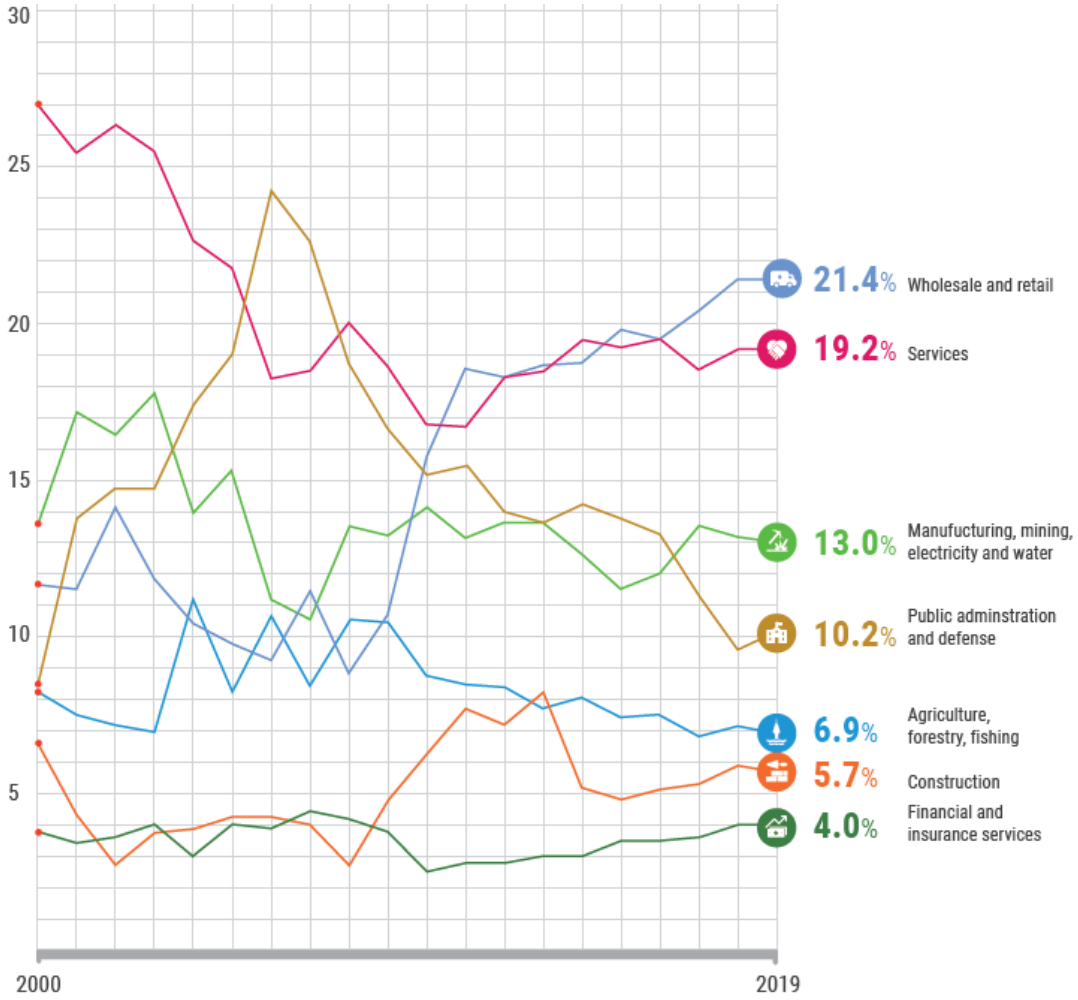


Figure 4.4.2-2: GDP by sector, 2000-2019

Source: Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf

In 2018 the value of tourism enterprises was USD 664.3 million; intermediate consumption totaled USD 256.4 million; and the value added was USD 407.7 million. [281]

4.4.2.2 Economic Activity

In 2018, 35.1% of employed individuals in Palestine worked in the services sector, while 21.7% worked in commerce, hotels and restaurants. Table 4.4.2-2 below presents the percentage distribution of employed individuals aged 15 years and above by economic activity and Governorate relevant to the project (2018).

Table 4.4.2-2: Percentage Distribution of Employed Individuals Aged 15 Years and Above by Economic Activity and Governorate relevant to the project, 2018

Region / Governorate	Percentage of employees out of total population	Economic Activity					
		Agriculture, Hunting & Fishing	Mining, Quarrying & Manufacturing	Construction	Commerce Hotels & Restaurants	Transportation, Storage & Communication	Services & Other Branches
West Bank	**82.1 %**	**6.5 %**	**15.6 %**	**22.9 %**	**21.6 %**	**5.3 %**	**28.1 %**
Nablus	92.6 %	6.7 %	17.2 %	18.5 %	22.9 %	6.3 %	28.4 %

[281] *PCBS, 2018, http://www.pcbs.gov.ps/site/lang__en/780/default.aspx*

Region / Governorate	Percentage of employees out of total population	Economic Activity					
		Agriculture, Hunting & Fishing	Mining, Quarrying & Manufacturing	Construction	Commerce Hotels & Restaurants	Transportation, Storage & Communication	Services & Other Branches
Ramallah & Al Bireh	84.6 %	2.2 %	13.6 %	25.1 %	18.6 %	6.8 %	33.7 %
Bethlehem	79.2 %	3.5 %	17.3 %	23.6 %	22.9 %	4.2 %	28.5 %
Hebron	80.1 %	5.3 %	17.5 %	27.2 %	21.8 %	4.0 %	24.2 %
Gaza Strip	**48.0 %**	**5.7 %**	**6.0 %**	**3.5 %**	**21.8 %**	**8.6 %**	**54.4 %**
Gaza	52.1 %	1.5 %	6.9 %	3.7 %	28.4 %	9.1 %	50.4 %

Source: Palestinian Central Bureau of Statistics, 2019. Palestinian Labour Force Survey: Annual Report: 2018

In 2018, according to place of work, 60.1% of employed individuals were employed in the West Bank, 26.6% were employed in Gaza Strip while 13.3% were employed in Israel and Israeli settlements. (See Table 4.4.2-3)

Table 4.4.2-3: Percentage Distribution of Employed Individuals Aged 15 Years and Above from Palestine by Region, Gender and Place of Work, 2018

Gender	Place of work	West Bank	Gaza Strip	Palestine
Males	West Bank	78.6	-	**57.4**
	Gaza Strip	-	100	**26.9**
	Israel and Settlements	21.4	-	**15.7**
	Total	**100**	**100**	**100**
Females	West Bank	98.9	-	**74.5**
	Gaza Strip	-	100	**24.7**
	Israel and Settlements	1.1	-	**0.8**
	Total	**100**	100	**100**
Both genders	West Bank	81.8	-	**60.1**
	Gaza Strip	-	100	**26.6**
	Israel and Settlements	18.2	-	**13.3**
	Total	**100**	**100**	**100**

Source: Palestinian Central Bureau of Statistics, 2019. Palestinian Labour Force Survey: Annual Report: 2018

4.4.2.3 Wages

According to ILO[282], in both West Bank and Gaza, weak bargaining power among labourers, low levels of output and competitiveness in productive sectors, and a large supply of unemployed are key factors that have been exerting downward pressure on wages, and thereby weakening the quality of employment. While nominal average wages in Palestine have increased in recent years (by 48.1 % over the period 2004–2016), growth rates between the West Bank and Gaza exhibit significant disparities.

Daily wages in Gaza grew only by 4.2 %, from 59.2 Israeli shekels (ILS) to 61.7 ILS per day over the period 2004–2016. In comparison, during the same period, the average daily wage in the West Bank grew by 56.9 % (from 81.6 to 128 ILS per day), reflecting the relatively more competitive labour market. Recent growth in wages in the West Bank has been mainly driven by increased employment levels

[282] *International Labour Organization (ILO), Regional Office for Arab States, 2018, The Occupied Palestinian Territory, An Employment Diagnostic Study*

in Israel and the settlements and the significantly higher average wages Palestinian workers receive there. Employment in Israel and the settlements has historically provided higher remuneration for workers than both the private and public sectors within Palestine. In 2016, labourers working in Israel and the settlements received an average of 218 ILS per day, more than 3.5 times the average wage in Gaza and more than 1.7 times the average wage in the West Bank.[283]

As Figure 4.4.2-3 shows, Construction is the highest paying sector overall in Palestine, with an average daily wage of 173.2 ILS. This average is heavily influenced by the higher wages in Israel, as around half of all Palestinian construction workers are employed in Israel and the settlements.

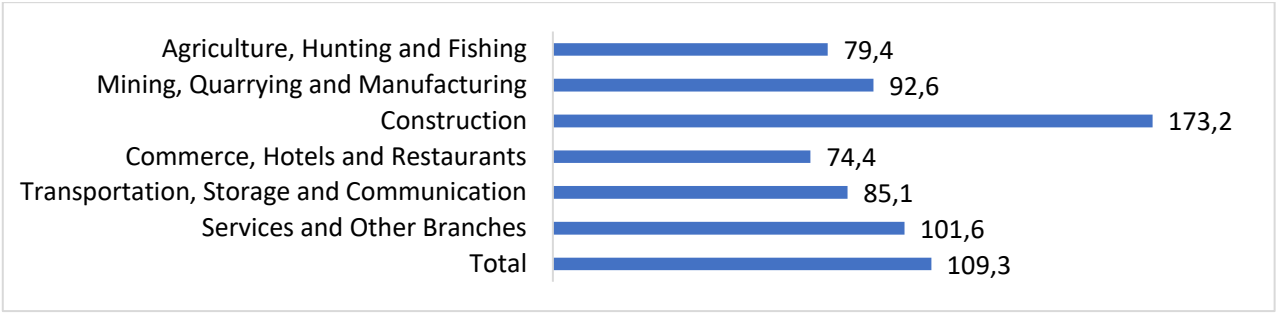


Figure 4.4.2-3: Average daily wage (ILS) in the Palestine by economic sector of activity, 2016

Source: International Labour Organization (ILO), Regional Office for Arab States, 2018, The Occupied Palestinian Territory, An Employment Diagnostic Study

With the minimum wage in Palestine set at 1,450ILS per month, the minimum wage compliance is not an issue. However, a considerable number of workers in the Palestine earn well below the statutory minimum wage. It was estimated that a total of 126,500 private sector workers (41,600 in the West Bank and 84,900 in Gaza), representing 34 % of the total labour force employed in the private sector (12.7 % in the West Bank and 73.1 % in Gaza), are paid less than the statutory minimum. [284]

4.4.2.4 Unemployment

The unemployment rate in Palestine is very high. It reached 30.8 % in 2018, 2.4 % higher than 2017. The increase is due to a strong jump in Gaza where 52 % of those in the labor force were unemployed in 2018. Unemployment amongst Gaza's youth exceeded 67 %. In the West Bank, unemployment has stagnated at around 18-19 % over recent years. [285]

[283] *International Labour Organization (ILO), Regional Office for Arab States, 2018, The Occupied Palestinian Territory, An Employment Diagnostic Study*
[284] *International Labour Organization (ILO), Regional Office for Arab States, 2018, The Occupied Palestinian Territory, An Employment Diagnostic Study*
[285] *http://pubdocs.worldbank.org/en/904261553672463064/Palestine-MEU-April-2019-Eng.pdf*

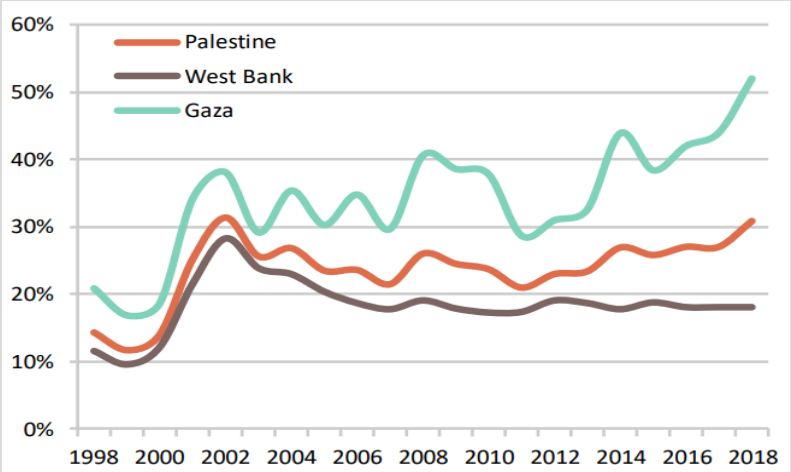


Figure 4.4.2-4: Unemployment rate in Palestine, 1998-2018

Source: http://pubdocs.worldbank.org/en/904261553672463064/Palestine-MEU-April-2019-Eng.pdf

According to the PCBS Census data (2017), unemployment in Nablus, Bethlehem and Hebron Urban Areas is approximately 12%. In Ramallah and Al Bireh the unemployed account for 7.4% of the total economic active Palestinian population. Gaza Urban Area where 42.3% of the total economic active Palestinian population is unemployed has the highest unemployment rate. Figure 4.4.2-5 below presents the percentage of employed and unemployed Palestinian population within the five (5) targeted Urban areas. For more details see Annex I "Employment / Unemployment".

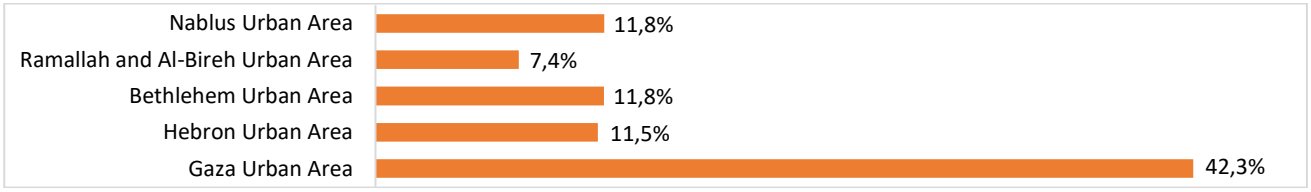


Figure 4.4.2-5: Percentage of Unemployed Palestinian Population (15 Years and over) within the five (5) targeted Urban Areas, 2017

Source: Palestinian Central Bureau of Statistics, 2019, Population, Housing and Establishments Census 2017: Census Final Results – Summary – Nablus, Ramallah & Al Bireh, Bethlehem, Hebron and Gaza Governorates

4.4.2.5 Poverty

Over the period 2011-2017, poverty, measured using the national poverty line [286] increased by 3.4 % in the Palestinee, from 25.8% to 29.2%. However, trends in the West Bank and Gaza regions diverged sharply. The proportion of the population living below the poverty line in the West Bank declined by 3.9 %, from 17.8 % to 13.9 %. Poverty in Gaza rose by 14.2 %, from 38.8% to 53 %.[287] This divergence in poverty trends at the regional level widened the gap in living standards between West Bank and Gaza Strip. While the average household in the West Bank had slightly higher living standards in 2017 than in 2011, this improvement remained fragile to a worsening political outlook; and the precipitous decline in living standards in Gaza was accompanied by an alarming fall in access to essential public services like water and electricity. Declining aid flows and a worsening outlook on conflict are

[286] *The poverty line by national standards for Palestine, as set by PCBS in 2011, is 2,293 NIS ($637) per month for a family of two adults and three children. This line is based on the average consumption of essential food, clothing, housing, housekeeping and personal supplies, health care, education, and transportation.*

[287] *https://databank.worldbank.org/data/download/poverty/33EF03BB-9722-4AE2-ABC7-AA2972D68AFE/Global_POVEQ_PSE.pdf*

therefore likely to place significant downward pressures on living standards in both West Bank and Gaza Strip.[288]

According to PCBS data[289], Figure 4.4.2-6 presents poverty percentages among Palestinian individuals in the five targeted urban areas. For more details see Annex I "Poverty".

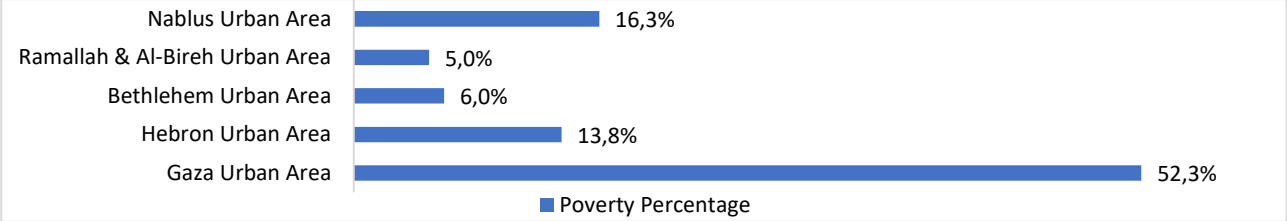


Figure 4.4.2-6: Poverty Percentages in five (5) targeted Urban Areas, 2017

Source: Palestinian Central Bureau of Statistics, 2019. Atlas of Poverty in Palestine 2017. Ramallah - Palestine.

According to preliminary estimates, it is expected that the share of poor households will increase to 30% in the West Bank and to 64% in Gaza, due to the Covid-19 pandemic. [290]

4.4.3 Education

4.4.3.1 Education system

Table 4.4.3-1 below presents education facilities within the five (5) targeted urban areas.

Table 4.4.3-1: Education facilities within the five (5) targeted urban areas

Urban Area	Pre-primary (Kindergarten)	Primary (Basic)	Secondary	Tertiary (Universities + Colleges)	Total education facilities
Nablus	33	106	61	6	206
Ramallah and Al Bireh	21	42	41	11	115
Bethlehem	9	35	31	2	77
Hebron	33	148	75	16	272
Gaza	26	234	45	17	322

Sources:
Palestinian Central Bureau of Statistics, 2019. Atlas of Poverty in Palestine 2017. Ramallah - Palestine.
MoLG - ICUD GIS database, https://geomolg.ps/
Spatial and Sectoral Assessment Report, 2020, World Bank, Integrated Cities and Urban Development Project Gaza City - Improving Resilience of Urban Service Systems

[288] http://www.pcbs.gov.ps/Portals/_Rainbow/documents/poverty-atlas-technical-report2.pdf
[289] Palestinian Central Bureau of Statistics, 2019. Atlas of Poverty in Palestine 2017. Ramallah - Palestine.
[290] http://documents1.worldbank.org/curated/en/844141590600764047/pdf/Economic-Monitoring-Report-to-the-Ad-Hoc-Liaison-Committee.pdf

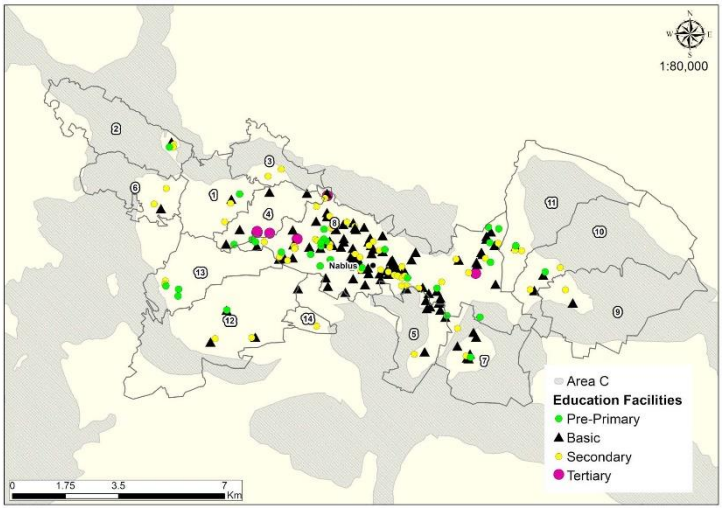


Figure 4.4.3-1: Education facilities in Nablus Urban Area

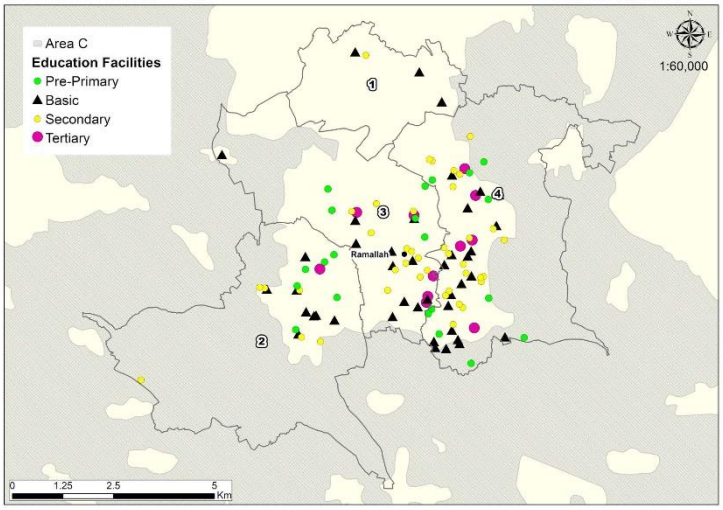


Figure 4.4.3-2: Education facilities in Ramallah and Al Bireh Urban Area

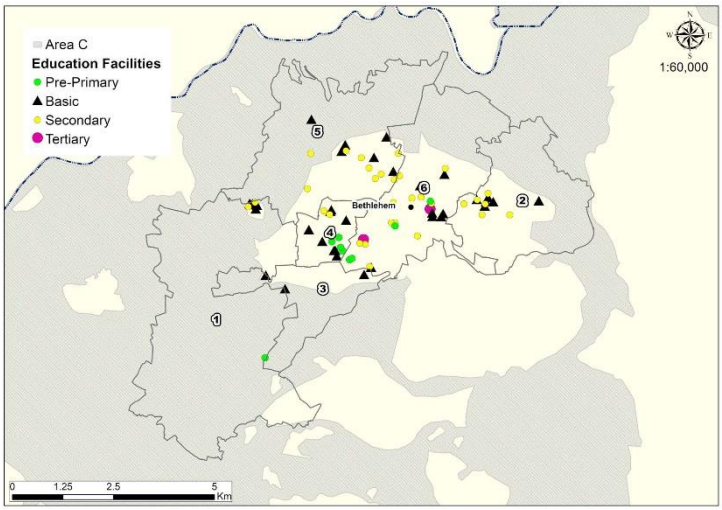


Figure 4.4.3-3: Education facilities in Bethlehem Urban Area

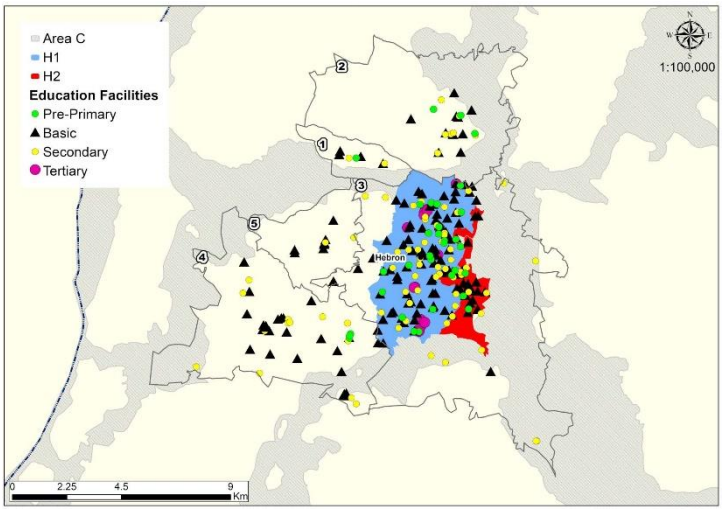


Figure 4.4.3-4: Education facilities in Hebron Urban Area

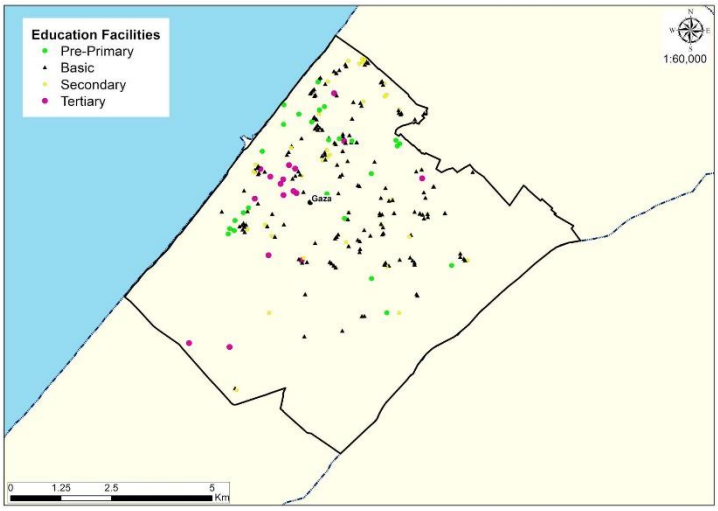


Figure 4.4.3-5: Education facilities in Gaza Urban Area

Sources:
Palestinian Central Bureau of Statistics, 2019. Atlas of Poverty in Palestine 2017. Ramallah - Palestine.
MoLG - ICUD GIS database, https://geomolg.ps/
Spatial and Sectoral Assessment Report, 2020, World Bank, Integrated Cities and Urban Development Project Gaza City - Improving Resilience of Urban Service Systems

In the West Bank UNRWA provides basic education, which covers grades 1- 9, and Grade 10 in two schools in East Jerusalem. In the 2018/2019 school year, UNRWA reached over 46,310 students in its 96 schools in West Bank. Two vocational training centres provide training for over 1,000 students in skilled trades and manufacturing[291].

Students study in the 274 UNRWA schools across the Gaza Strip, staffed by some 8,676 education personnel. In line with the trend in previous years, average class sizes in the 2018/2019 school year increased to 41.2 students compared to 39 students per class in the 2017/2018 school year[292].

4.4.3.2 Access to Education and School Infrastructure

Palestine has one of the highest enrolment rates in the region for students in elementary education, at 99 % in 2019. Enrolment rates for secondary education indicate that around 20 % of all students, 11 % of girls and 30 % of boys, drop out before the age of 15. The enrolment rate has increased by more than 40 % since the year 2010. [293]

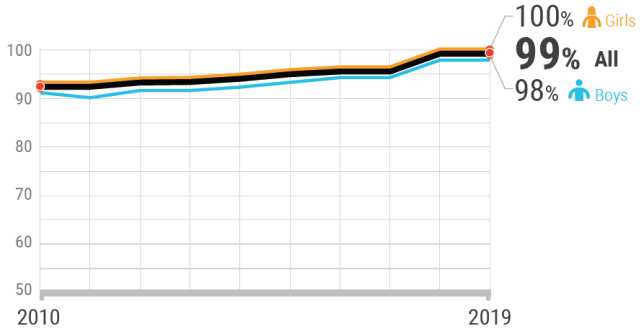


Figure 4.4.3-6: Enrolment rate in primary education

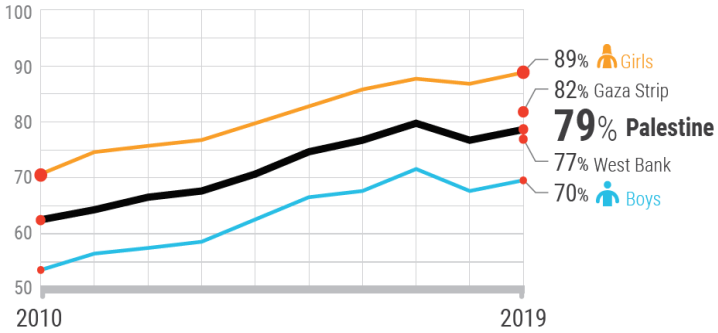


Figure 4.4.3-7: Enrolment rate in secondary education

Source: Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf

Out of school children are either children who have never been to school or children that dropped out of the education system. Children in detention and children who are impacted by forced displacement often drop out from the education system. In Palestine, approximately 5.4% of children of official school age are not enrolled in pre-primary, primary or secondary education.

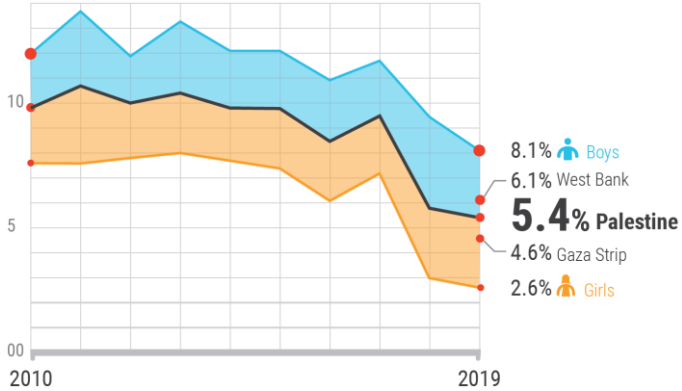


Figure 4.4.3-8: Percentage of children of official school age who are not enrolled in pre-primary, primary or secondary school

Source: Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf

[291] *https://www.unrwa.org/activity/education-west-bank*
[292] *https://www.unrwa.org/activity/education-gaza-strip*
[293] *Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf*

Drop-out rates have sharply declined in Palestine over the past two decades. [294] School dropout rates are higher for boys than for girls, primarily because adolescent boys are expected to contribute to household income during crises, and they are more likely to be subject to direct protection threats. Thus, many out of school children are either working children exposed to protection violations or children in the streets exposed to negative behaviours including violence, alcohol and drug abuse. These factors render out of school children more vulnerable than children in school. [295]As a direct consequence of security concerns, mobility restrictions, classroom shortages, substandard facilities and high poverty rates, many Palestinian families resort to engaging their children in labour. Working children are highly vulnerable to loss of education, exposure to hazardous conditions, violation of their rights, and a loss of their childhood. Current Palestinian law prohibits the employment of children before they reach the age of 15, though the law does not protect against children working for first-degree family members, nor those working in Israeli settlements. [296]

There are reports of child trafficking from the West Bank and Gaza Strip into Israel as well as within the West Bank for the purposes of agricultural work and/or to beg.

Children are exposed to various forms of violence at home, in school, in public places and by the Israeli occupation. In 2019, some 44.2% of children reported being exposed to psychological violence by their parents. Children exposed to or under threat of violence are at increased risk of having lower academic achievement and/or dropping out of school. Violence can also cause physical and psychological harm including bodily harm, low self-esteem, anxiety, fear, introversion, depression, bed-wetting, and nightmares. It can also affect their lifetime development trajectory. [297]

Table 4.4.3-2: Percentage of children (12-17 years) who experienced a type of violence by either parent at least once on an annual basis by region and abuser, 2011, 2019

Region	Abuser									
	Prevalenve of Violence		Father				Mother			
			Phychological violence		Physical violenve		Phychological violence		Physical violenve	
	2011	2019	2011	2019	2011	2019	2011	2019	2011	2019
Palestine	51.0	44.2	69.0	63.1	34.4	26.3	66.4	62.7	34.5	24.8
West Bank	45.8	36.1	64.6	54.4	28.7	15.5	61.9	56.8	27.7	17.7
Gaza Strip	59.4	55.9	75.9	75.7	43.2	41.9	73.3	71.1	45.2	35.0

Source: Palestinian Central Bureau of Statistics, 2019. Preliminary Results of the Violence Survey in the Palestinian Society, 2019

Many Palestinian children cannot exercise their right to quality education and a safe learning environment because of the obstacles they face in getting to school. In Area C, 50,000 children enrolled in 183 schools lack sufficient access to education, and over 1,700 children from 37 West Bank communities commute to schools more than 5 km away. Permits, closure and curfews mean journeys to and from school can take three to four times longer than it should. The vulnerability of children facing obstacles accessing schools is compounded by financial difficulties and the high cost of transportation, resulting in drop-outs, lack of attendance, decreased learning time in school, and

[294] *Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf*
[295] *United Nations Country Team Occupied Palestinian Territory, 2016, Common Country Analysis 2016, Leave No One Behind A Perspective on Vulnerability and Structural Disadvantage in Palestine*
[296] *United Nations Country Team Occupied Palestinian Territory, 2016, Common Country Analysis 2016, Leave No One Behind A Perspective on Vulnerability and Structural Disadvantage in Palestine*
[297] *United Nations Country Team Occupied Palestinian Territory, 2016, Common Country Analysis 2016, Leave No One Behind A Perspective on Vulnerability and Structural Disadvantage in Palestine*

deterioration in the quality of learning. Girls are affected disproportionally, as their families tend to pull them out of school due to harassment, violence and intimidation on their way to school. [298]

Children with disabilities face not only physical barriers to education, but gaps in school support for their special needs (for example only 54.6% of schools have appropriate toilets for persons with physical disabilities).[299] UNICEF estimates that 22 % of boys and 30 % of girls with disability, between 6 to 15 years have never enrolled in school.[300]

Quality of school infrastructure

The quality of school infrastructure and the availability of facilities remain a significant challenge for effective service provision, particularly in Gaza Strip and Area C. While school infrastructure has improved over the past two decades, children in Area C have not benefited equally from these improvements due to limitations imposed by the Israeli occupation. In Gaza Strip, the combined effects of the blockade, military incursions, and fiscal constraints, have hindered infrastructure upgrades. As a result, about two-thirds of all schools in Gaza currently implement a double-shift teaching model and the ratio of students to classrooms is much higher than the West Bank.[301]

Some other issues of education services are: lack of and limited technical and vocational schools; insufficient supportive educational facilities (laboratories, libraries, activities arenas, etc.); the absence of counseling and guidance centers for students in schools; and the geographical distribution of schools and their concentration in specific geographical regions. [302]

4.4.3.3 Levels of education – Illiteracy

According to the PCBS Census data (2017)[303], the levels of education and illiteracy in the five targeted urban areas are presented in Table 4.4.3-3 below. For more details see Annex I "Levels of education".

Table 4.4.3-3: Percentage of Palestinian Population (10 Years and over) by Levels of education – illiteracy within the five (5) targeted urban areas

Urban Area	Illiterate	Can Read and Write	Elementary	Preparatory	Secondary	Associate Diploma	Bachelor	Higher Diploma and above	Not Stated
Nablus	2.10%	10.13%	18.53%	28.27%	17.62%	5.99%	15.27%	1.94%	0.15%
Ramallah and Al Bireh	1.66%	8.26%	14.00%	21.40%	18.22%	7.37%	22.95%	5.66%	0.49%
Bethlehem	2.25%	9.20%	16.79%	26.75%	20.79%	5.54%	15.70%	2.80%	0.19%
Hebron	2.31%	11.32%	20.64%	30.10%	18.36%	5.36%	10.68%	1.21%	0.02%
Gaza	1.97%	10.63%	19.10%	27.43%	20.89%	5.33%	13.16%	1.48%	0.01%

[298] *United Nations Country Team Occupied Palestinian Territory, 2016, Common Country Analysis 2016, Leave No One Behind A Perspective on Vulnerability and Structural Disadvantage in Palestine*
[299] *United Nations Country Team Occupied Palestinian Territory, 2016, Common Country Analysis 2016, Leave No One Behind A Perspective on Vulnerability and Structural Disadvantage in Palestine*
[300] *Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf*
[301] *Atlas of Sustainable Development 2020, https://unsco.unmissions.org/sites/default/files/atlas_of_sustainable_development_2020.pdf*
[302] *Spatial and Sectoral Assessment Report, 2020, World Bank, Integrated Cities and Urban Development Project Gaza City - Improving Resilience of Urban Service Systems*
[303] *Palestinian Central Bureau of Statistics, 2019, Population, Housing and Establishments Census 2017: Census Final Results – Summary – Nablus, Ramallah & Al Bireh, Bethlehem, Hebron and Gaza Governorates*

Source: Palestinian Central Bureau of Statistics, 2019, Population, Housing and Establishments Census 2017: Census Final Results – Summary – Nablus, Ramallah & Al Bireh, Bethlehem, Hebron and Gaza Governorates

Approximately 2% of the total population (10 Years and over) is illiterate in most urban areas; in Ramallah and Al Bireh this percentage is slightly smaller. On average, there are no significant variations regarding education and illiteracy in the five targeted urban areas up to the secondary education level. For tertiary education (bachelors and higher diplomas or above), Ramallah and Al Bireh has approximately twice as many bachelor graduates and almost five times higher diploma graduates when compared to Hebron. Nablus, Bethlehem and Gaza Urban Areas show no significant variations for tertiary education.

4.4.4 Health

4.4.4.1 Health system

Health facilities

According to Health Annual Report Palestine 2018[304] Health Care facilities (Primary Health Care (PHC) and Hospitals) are provided by various health service providers including the Ministry of Health (MoH), non-governmental organizations, the United Nations Relief and Works Agency for Palestine Refugees (UNRWA) and military medical services. The number of PHC centers expanded from 454 in 1994 to 732 in 2018 (585 are in West Bank and 147 in Gaza Strip), with an increase of 61.2%. In 2018, the total number of hospitals in Palestine was 82, 52 (or 63.4%) of which in West Bank, including East Jerusalem; the rest are in Gaza Strip.

Table 4.4.4-1 and Figures (Figure 4.4.4-1 to Figure 4.4.4-5) below present Health Care facilities within the five (5) targeted urban areas, according to MoLG data.

Table 4.4.4-1: Health Care facilities (Primary Health Care & Hospitals) within the five (5) targeted urban areas

Urban Area	Primary Health Care (PHC)			Hospitals
	Clinic	Medical Center	Military Medical Services	
Nablus	17	10	2	7
Ramallah and Al Bireh	3	7	2	14
Bethlehem	8	6	1	6
Hebron	26	19	1	8
Gaza	71		-	15

Source: MoLG - ICUD GIS database, https://geomolg.ps/

[304] *Ministry of Health, Palestinian Health Information Center (PHIC), July 2019, Health Annual Report Palestine 2018*

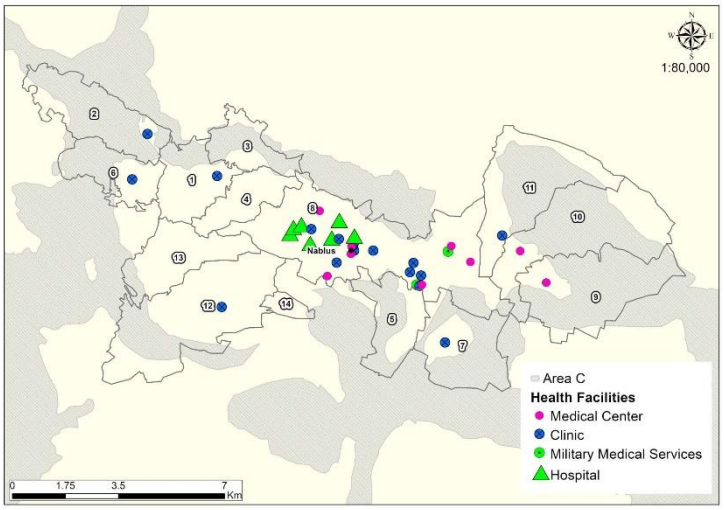


Figure 4.4.4-1: Health Care facilities in Nablus Urban Area

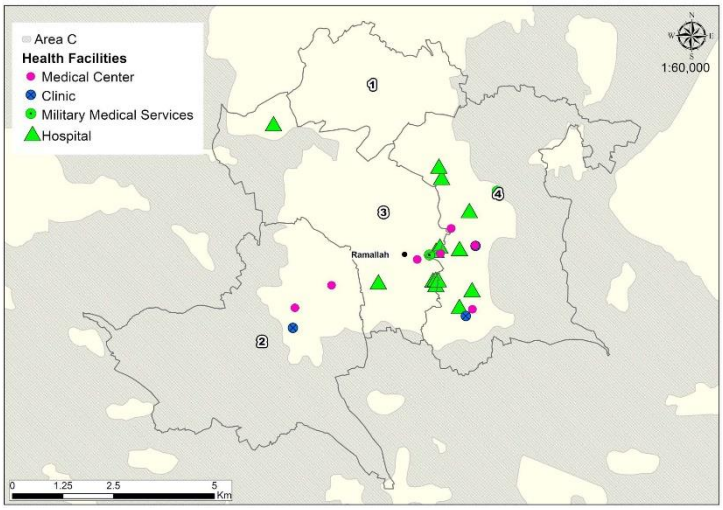


Figure 4.4.4-2: Health Care facilities in Ramallah and Al Bireh Urban Area

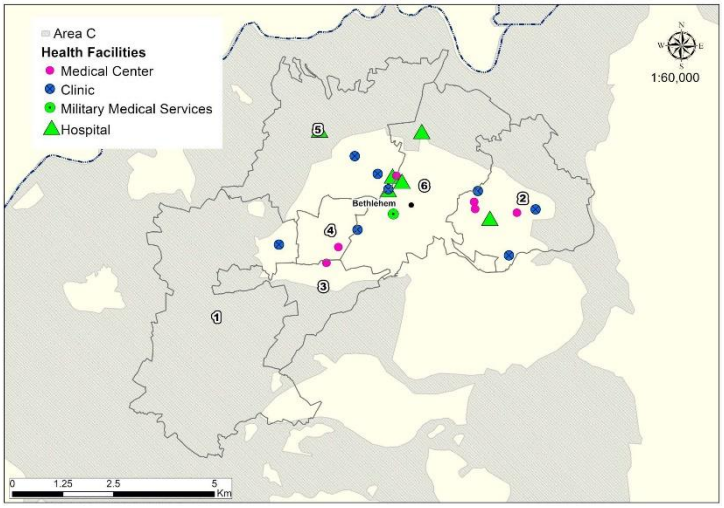


Figure 4.4.4-3: Health Care facilities in Bethlehem Urban Area

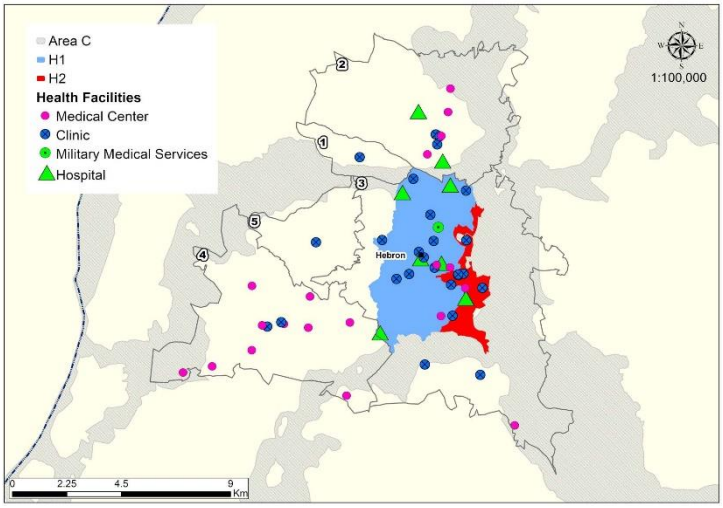


Figure 4.4.4-4: Health Care facilities in Hebron Urban Area

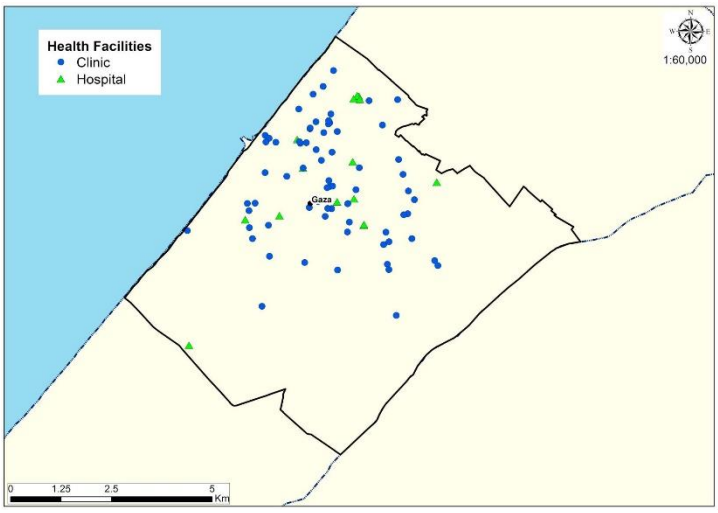


Figure 4.4.4-5: Health Care facilities in Gaza Urban Area

Source: MoLG - ICUD GIS database, https://geomolg.ps/

Health Care staff

Medical services in Palestine are provided by MoH, non-governmental health institutions, military medical services, the UNRWA and the private sector. MoH is the largest employer of human resources working in the health sector in Palestine. In 2018, the number of employees in the Palestinian MoH reached 14,430 employees at a rate of 29.7 employees per 10,000 population, of which 8,177 (56.7%) were employed in West Bank and 6,253 (43.3%) in Gaza Strip.

There are 31,873 medical cadres (Physicians, nurses, pharmacists, dentists and midwives) registered in various medical associations in Palestine, of which 24,432 (or 76.7%) in West Bank 76.7%, and 7,441 (or 23.3%) in Gaza Strip. (Figure 4.4.4-6)

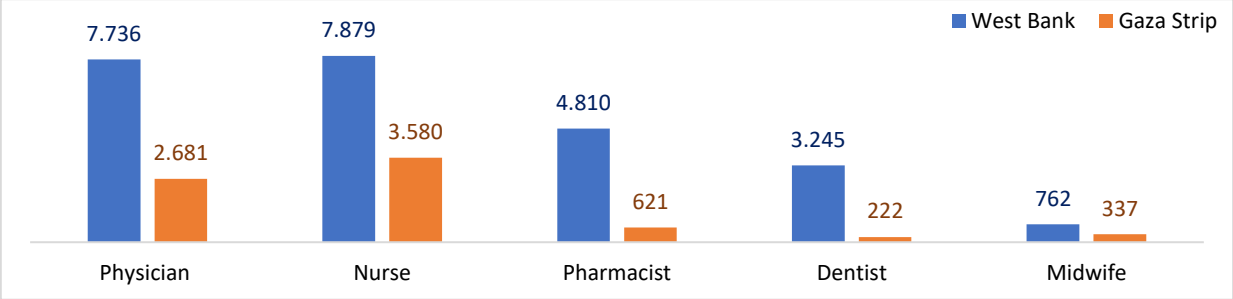


Figure 4.4.4-6: Distribution of Medical Human Resources by Specialty & Region, Palestine 2018

Source: Ministry of Health, Palestinian Health Information Center (PHIC), July 2019, Health Annual Report Palestine 2018

4.4.4.2 Access to health care

Besides the challenges that the occupation poses for realizing the full potential of Palestinian economic development, which also affects the health sector development, there are critical and specific issues that limit *access to health care*:

- Inadequate distribution of health facilities in a manner that serves all residential neighborhoods fairly; insufficient primary health care centers compared to the population in some areas; insufficient centers for people with special needs. [305]
- Unavailability of some specializations in the health sector, and a shortage of doctors specializing in some important specializations; and shortage of some specialized health centers and laboratories. [306]
- A chronic shortage of pharmaceuticals, supplies, spare parts and poor general maintenance led to a deterioration of quality of services in Gaza and to a lesser extent in the West Bank. In 2014, the MoH Central Drug Store in Gaza reported that medical disposables were at or near zero stock for MoH facilities. The main reason is an insufficient budget rather than security restrictions imposed by Israel. [307]
- Limited opportunity for health professionals in Gaza to attend trainings outside and access restrictions to get familiar with new medical techniques is also slowing down improvements in developing health care services in Gaza. [308]
- In the West Bank, travel restrictions for health staff (especially to East Jerusalem) are affecting the health service delivery: Permits are granted on a short but variable term and renewal is

[305] *ibid*
[306] *ibid*
[307] https://www.un.org/unispal/document/auto-insert-202027/
[308] https://www.un.org/unispal/document/auto-insert-202027/

occasionally and temporarily denied without apparent reason. Unpredictability is prevalent.[309]

- All patients and patient companions from the Gaza Strip must apply for Israeli permits to exit the Gaza Strip in order to access hospitals in the West Bank, including east Jerusalem, and Israel. Access has been particularly problematic in recent years, with the patient permit approval rate declining from more than 90% in 2012 to reach an all-time low of 54% in 2017. The majority of West Bank patients must also apply for permits to access east Jerusalem or Israeli hospitals. [310]

Health inequalities exist, with worse health indicators for some populations, such as those in Area C of the West Bank the Seam Zone, Area H2 in Hebron and in the Gaza Strip,compared to the Palestinian average. Of approximately 330,000 Palestinian residents in these areas, 114,000 (35%) have limited access to primary health care. There are also health inequalities between the Palestinian population and the 611,000 Israeli settlers in the West Bank. Life expectancy at birth in Israel, which includes the Israeli settler population in the West Bank, is approximately nine years higher than it is for Palestinians living in the same territory, for the same year[311].

4.4.4.3 Health status

The West Bank is undergoing a transition characterized by rapid urbanization and changing lifestyles. At the same time, an epidemiologic transition is taking place from a persistent burden of infectious diseases typical of developing countries (such as water-borne diseases from poor water quality) to a rise in noncommunicable (chronic) diseases such as cardiovascular disease, hypertension, diabetes mellitus, cancer and mental disorders. [312]

According to Health Annual Report Palestine 2018[313], one of the main reasons behind this epidemiologic transition is the fact that Palestine has a successful immunization programme and a well-functioning surveillance system for the control of communicable diseases. For more details see Annex I "Health status".

The mental health of Palestinians is affected by the exposure to violence and the context of chronic occupation, with mental ill health representing one of the most significant public health challenges. In the Gaza Strip, over half of conflict-affected children may be affected by post-traumatic stress disorder. Furthermore, an estimated 210,000, or over one in 10 people suffer from severe or moderate mental health disorders in the Gaza Strip. Overall, the Palestine has one of the highest burdens of adolescent mental disorders in the Eastern Mediterranean Region. About 54% of Palestinian boys and 47% of Palestinian girls aged six to 12 years reportedly have emotional and/or behavioural disorders, and the overall disease burden for mental illness is estimated to account for about 3% of disability-adjusted life years[314].

In 2018, reported crude mortality rate in Palestine was 2.6 cases per 1,000 populations. The total number of reported deaths in Palestine was 12,098, of which 7,148 or 59.1% were in West Bank, and

[309] *ibid*
[310] *https://apps.who.int/gb/ebwha/pdf_files/WHA72/A72_33-en.pdf*
[311] *ibid*
[312] *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2578778/*
[313] *Ministry of Health, Palestinian Health Information Center (PHIC), July 2019, Health Annual Report Palestine 2018*
[314] *https://apps.who.int/gb/ebwha/pdf_files/WHA72/A72_33-en.pdf*

4,950 or 40.9% were in Gaza Strip. Figure 4.4.4-7 below presents Major Causes of Death in Palestine in 2018. [315]

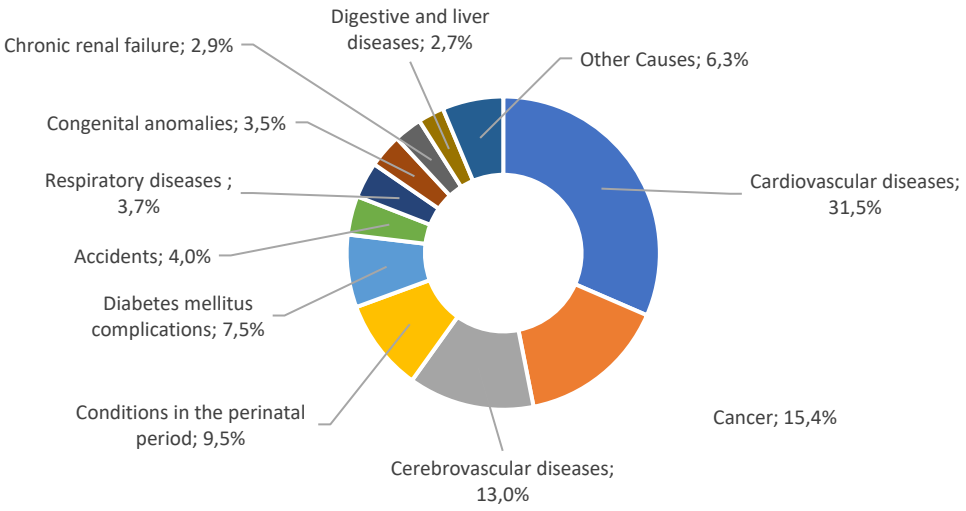


Figure 4.4.4-7: Major Causes of Death in Palestine in 2018

Source: Ministry of Health, Palestinian Health Information Center (PHIC), July 2019, Health Annual Report Palestine 2018

For more details about morbidity and mortality see Annex I "Health status".

4.4.5 Cultural Heritage

According to the Tangible Cultural Heritage Law 2018, *immovable* cultural heritage is considered as one of the following:

1. **Archaeological sites:** abandoned or destroyed sites or parts or any additions including soil, water, underground and groundwater containing associated constructors, heritage casts, and any other remains, in the form of a ruin, a Tell or a facility of a religious nature. These include villages, ancient cities and communities, where surveys show evidence of past civilizations.

2. **Monuments (Monuments, structures)**: The material remains that appear individually or as part of buildings, installations or elements consisting of architectural works, sculpted monuments, archaeological or engineering constructs, in addition to their surroundings, attachments, installation, installation and equipment, and whose protection constitutes a public or national interest or regional or local.

3. **Historic Areas:** Areas with a homogeneous urban form such as the centers of cities and villages or parts thereof, which contain architectural elements, such as streets, alleys, squares and arches, and are considered interconnected and homogeneous and their location in the scene of historical, artistic, scientific or spiritual value.

4. **Single buildings:** Buildings that are outside and not connected to historical areas, and contain architectural elements.

[315] *Ministry of Health, Palestinian Health Information Center (PHIC), July 2019, Health Annual Report Palestine 2018*

5. **Cultural Landscape:** Areas that include a tangible and distinctive product of the interaction between man and nature, are the legacy of many epochs of cultural and natural development of many generations of human effort, and are of global, regional or national importance.

Of these, GIS data are available for archaeological sites (as points) and cultural landscapes (as polygons); available immovable Cultural Heritage elements identified within the five (5) targeted Urban areas are summarized in Table 4.4.5-2 and are presented per Urban Area in Figure 4.4.5-1 to Figure 4.4.5-5 below.

The detailed list of Immovable Cultural Heritage in the five targeted urban areas is presented in Annex I "Cultural Heritage" of this report.

Table 4.4.5-1: Immovable Cultural Heritage (archaeological sites and cultural landscapes) in the five targeted Urban Areas

Urban Area	Archaeological Sites		Cultural Landscape			
	No	Within Area C	No	Coverage within the Urban Area (km²)	Within Area C (km²)	% within Area C/ Culture Landscape coverage
Nablus	56	18	2	34.49	27.30	79.17%
Ramallah & Al Bireh	46	25	1	3.15	3.11	98.64%
Bethlehem	35	23	1	1.41	1.4	100%
Hebron	66	21	-	-	-	-
Gaza	20 *	-	-	-	-	-
Total	**223**	**87**	**4**	**39.05**	**31.82**	**81.50%**

** 6 existing and 14 disappeared archaeological sites, as recorded in the MoLG - ICUD GIS database. Disappeared archaeological sites are attributed to escalations in the area*
Sources:
MoLG - ICUD GIS database, https://geomolg.ps/
Spatial and Sectoral Assessment Report, 2020, World Bank, Integrated Cities and Urban Development Project Gaza City - Improving Resilience of Urban Service Systems

Of the identified archaeological sites and cultural landscapes, a few have also been included in UNESCO's World Heritage List, World Heritage List in Danger and Tentative List. These are presented in the following table.

Table 4.4.5-2: Archaeological Sites and Cultural landscapes included in UNESCO's list within the five targeted Urban Areas

Urban Area	Archaeological Sites and Cultural landscapes*	UNESCO Tentative List	UNESCO World Heritage List	World Heritage List in Danger	Within Area C
Nablus	Khirbet esh Sheikh Ghanim	X			X
	Nablus - Inhabited village	X			
Ramallah & Al Bireh	-				
Bethlehem	Land of Olives and Vines – cultural landscape of southern Jerusalem, Battir *		X	X	X
	Bethlehem - Inhabited village		X		
Hebron	Dura - Inhabited village	X			
	Hebron Inhabited village		X	X	
Gaza	-				
Total	**-**	**3**	**3**	**2**	**2**

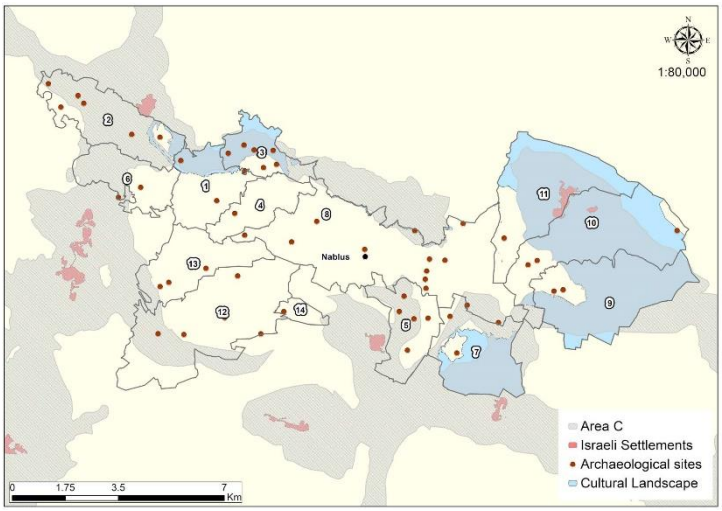


Figure 4.4.5-1: Archaeological Sites and Cultural Landscape in Nablus Urban Area

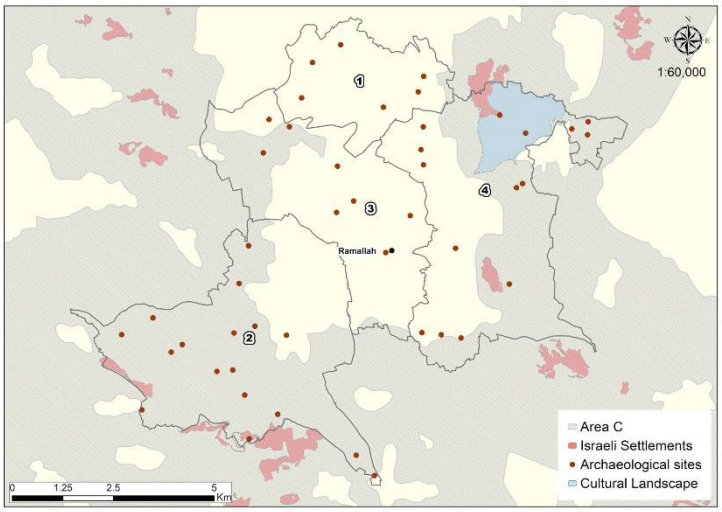


Figure 4.4.5-2: Archaeological Sites and Cultural Landscape in Ramallah and Al Bireh Urban Area

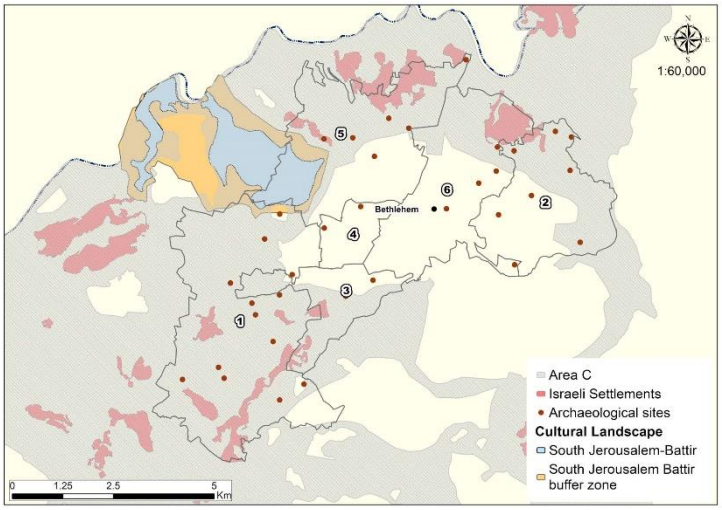


Figure 4.4.5-3: Archaeological Sites and Cultural Landscape in Bethlehem Urban Area

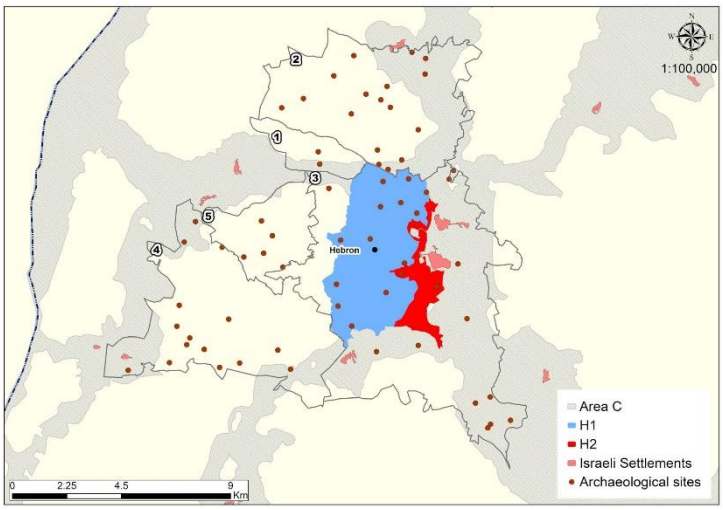


Figure 4.4.5-4: Archaeological Sites and Cultural Landscape in Hebron Urban Area

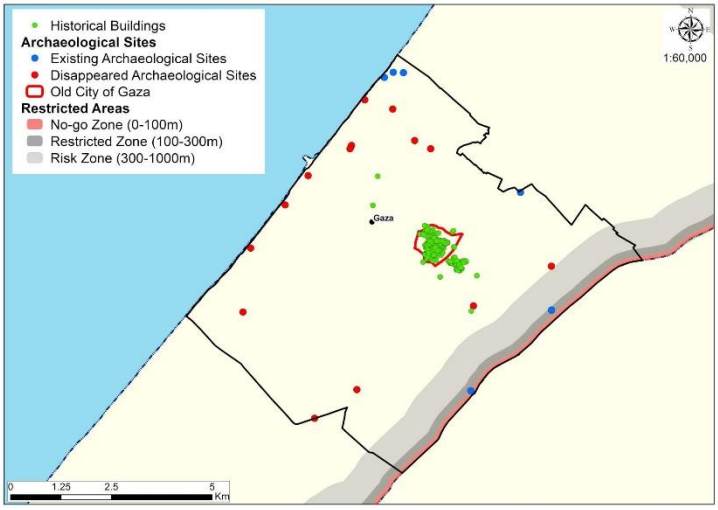


Figure 4.4.5-5: Archaeological Sites and historical buildings in Gaza Urban Area

Sources:
MoLG - ICUD GIS database, https://geomolg.ps/
Spatial and Sectoral Assessment Report, 2020, World Bank, Integrated Cities and Urban Development Project Gaza City - Improving Resilience of Urban Service Systems

Cultural Heritage Loss

Israeli excavations in area C involve seizure, destruction, or willful damage to cultural property and their illicit export outside of the occupied territory.

Destruction of archaeological findings and heritage in locations where excavations are taking place in the West Bank and East Jerusalem is estimated to amount to at least 200 sites since 1967. Some 47% of destructed sites are in Area A and Area B together and 53% in Area C.

Destruction in Areas A and B is caused by looting, urban expansion and private land work such as farming. In Area C, 30% of the destruction is a result of settlement construction and expansion, looting, and urban planning, which is carried out by Israeli authorities. Almost all sites in Area C are encircled by settlements. Since 1967, and as of 2014, many archaeological sites and ruins have been partially destroyed by the construction and/or expansion of the more than 200 settlements and military bases in Area C and East Jerusalem.

In some cases, the construction of the Wall has jeopardized archaeological sites. In other cases, Israeli archaeological activities are impeding Palestinian development of villages in Area C. Examples would be the villages of Zanuta and Susya in the South Hebron Hills and the village of Zif in Hebron District. [316]

4.4.6 Gender

4.4.6.1 Access to productive and financial resources

Women and men's **right to work** is adversely affected by the current political situation, although women suffer from additional social restrictions (e.g. village heads not accepting that women own shops; extra constraints for divorced women; limited access to professional training and vocational education). Women accounted for only 19.7% of the labour force in 2017. In this context, the lack of policies providing incentives for female participation in the economy is problematic, as is the lack of policies tackling the structural barriers for women's effective participation in the labour force. [317]

Despite the increment of female participation ratio in the labour force compared to previous years, still the gap remains large since male participation was almost 4 times more than female participation ratio during 2017. [318]

Analysis of wage data reveals significant **gender pay disparities** across economic sectors of activity. As Figure 4.4.6-1 shows, women, on average, earn 73 % of men's daily wage (83.3 ILS for women compared with 114.1 ILS for men). In the manufacturing sector gender-based wage disparities are even larger, with women earning slightly over half (52 %) of what men earn (96.7 ILS for men compared with 50.5 ILS for women). [319]

[316] *Occupation Remains, A Legal Analysis of the Israeli Archeology Policies in the West Bank: An International Law Perspective Diakonia IHL Resource Centre, 2015*
[317] *ibid*
[318] *Palestinian Central Bureau of Statistics, 2018. Women and Men in Palestine: Issues and Statistics, 2018. Ramallah - Palestine*
[319] *International Labour Organization (ILO), Regional Office for Arab States, 2018, The Occupied Palestinian Territory, An Employment Diagnostic Study*

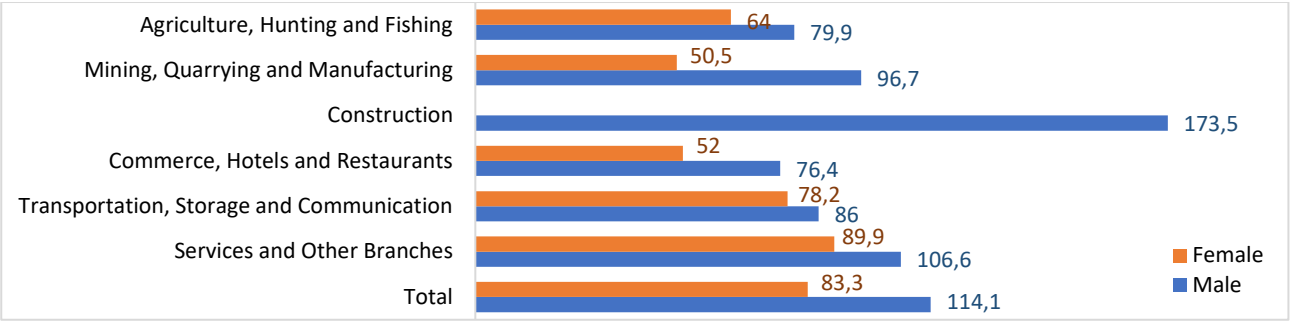


Figure 4.4.6-1: Average daily wage (ILS) in the Palestine by economic sector of activity and gender, 2016

Source: International Labour Organization (ILO), Regional Office for Arab States, 2018, The Occupied Palestinian Territory, An Employment Diagnostic Study

Once again, wage inequity disproportionately affects women; some 40.1 % (36.7% in West Bank and 48.6% in Gaza Strip) of women employed in the private sector earned less than the minimum wage in 2016. [320]

Unemployment rates for women are almost double compared to those of men in the four targeted urban areas of West Bank; in Gaza Urban area where unemployment is very high for all population, women's unemployment is approximately 40% higher to men's.

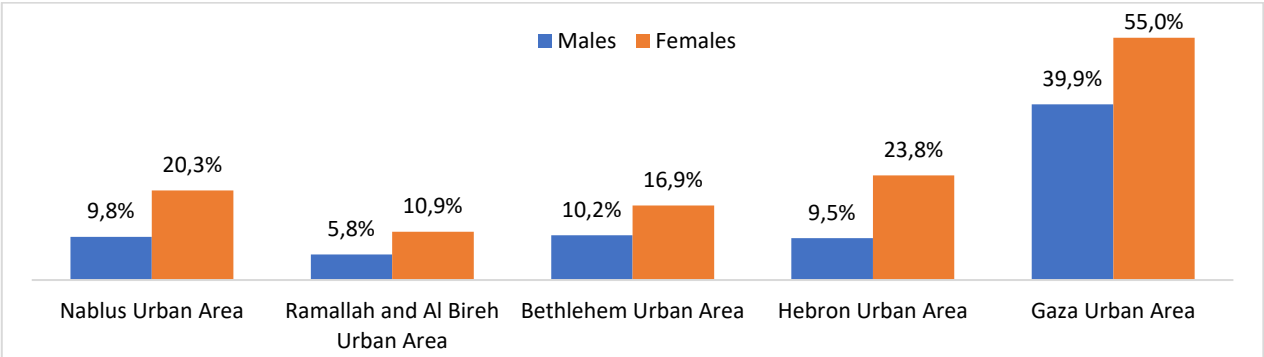


Figure 4.4.6-2: Unemployed Population (15 Years and over) in Localities within Urban Areas by Gender, 2017

Source: Palestinian Central Bureau of Statistics, 2019, Population, Housing and Establishments Census 2017: Census Final Results – Summary – Nablus, Ramallah & Al Bireh, Bethlehem, Hebron and Gaza Governorates

4.4.6.2 Civil liberties [321]

Women enjoy the same rights as men to vote in national and local (municipal) elections organised by the PA and to stand for public office at the national and local level (Presidency, Ministerial Council, Local Councils). Moreover, their participation is promoted through the establishment of legal quotas: each political party list must include at least one female candidate in the first three names, in the following four names and in each set of five names that follow and a minimum of two seats must be attributed to women in Local Councils comprising 13 seats or more.

Regarding access to justice, the law provides women with the same rights as men to bring cases to civil and criminal courts.

[320] *International Labour Organization (ILO), Regional Office for Arab States, 2018, The Occupied Palestinian Territory, An Employment Diagnostic Study*

[321] https://www.genderindex.org/wp-content/uploads/files/datasheets/2019/PS.pdf

4.4.6.3 Gender-based Violence

According to recent data[322], gender-based Violence (GBV) includes intimate partner violence, forced and/or early marriage, physical assault, resource denial, psychological abuse, honour killings, sexual assault and rape. In 2019, 27.2% of women in Palestine who had "ever been married" (22.2% in the West Bank and 35.2% in Gaza) were exposed to GBV (Table 4.4.6-1). Among these women, only 1.4% sought support outside the home (Table 4.4.6-2).

Table 4.4.6-1: Percentage of married women (18-64 years) who experienced (at least once) a form of violence by their husbands by region and type of violence, 2011 & 2019

Region	Type of Violence											
	Prevalence of violence		Psychological violence		Physical violence		Sexual violence		Social violence		Economic violence	
	2011	2019	2011	2019	2011	2019	2011	2019	2011	2019	2011	2019
Palestine	37.0	27.2	58.6	52.2	23.5	17.5	11.8	6.9	54.8	27.6	55.1	36.2
West Bank	29.9	22.2	48.8	46.1	17.4	12.1	10.2	5.8	44.8	20.2	41.6	29.3
Gaza Strip	51.0	35.2	76.4	62.5	34.7	25.8	14.9	8.7	78.9	41.0	88.3	46.7

Source: Palestinian Central Bureau of Statistics, 2019. Preliminary Results of the Violence Survey in the Palestinian Society, 2019

Table 4.4.6-2: Percentage of married women (18-64 years) who experienced a form of violence and sought help as per some of the parties they approached or the methods they followed to receive help by region 2011 & 2019

The party approached by the abused women or the methods used to receive help	Palestine		West Bank		Gaza Strip	
	2011	2019	2011	2019	2011	2019
They kept silent about the abuse and told no-one about it	65.3	60.6	64.8	55.5	66	66.9
They talked to their husbands and asked them to stop the abuse	51.3	48	39.5	44.7	65.4	52.2
They left their homes and went to the homes of their parents, a sibling or a relative	30.2	23.5	24	19.6	37.7	28.1
They headed to a psychosocial or legal help center	0.7	1.4	0.7	1.1	0.8	1.8

Source: Palestinian Central Bureau of Statistics, 2019. Preliminary Results of the Violence Survey in the Palestinian Society, 2019

Overall, Gender-Based Violence tends to decrease in West Bank and Gaza in the last decade. Furthermore, there is an increase of GBV victims asking for help. The highest rates of abuse occur in the governorates of Gaza and Hebron [323].

4.4.7 Social Welfare

According to recent data[324], due to the geopolitical situation in Palestine the following groups are considered as vulnerable:

- Communities in Area C, including Bedouins and herder communities;
- Hebron H2 Residents;
- Gaza residents

The above -mentioned vulnerable groups have been presented in section 4.1.2 of this report.
Further to the above, women and children are also considered as vulnerable groups in Palestine; these have been presented in sections 4.4.6 and 4.4.3.2 of this report, respectively.

[322] *United Nations Country Team Occupied Palestinian Territory, 2016, Common Country Analysis 2016, Leave No One Behind A Perspective on Vulnerability and Structural Disadvantage in Palestine*
[323] *ibid*
[324] *United Nations Country Team Occupied Palestinian Territory, 2016, Common Country Analysis 2016, Leave No One Behind A Perspective on Vulnerability and Structural Disadvantage in Palestine*

Residents of refugee camps are also considered as vulnerable as they live in extremely poor living conditions, with inadequate and poor sewage and water networks, chronic poverty, unemployment, over-crowding and occasional Israeli military incursions. The state of service delivery is far poorer than in the rest of Palestine. [325]

Further to the above-mentioned groups, the elderly and persons with disabilities are also considered as vulnerable.

4.4.7.1 Elderly

The elderly in Palestine rely primarily on traditional systems whereby their families are their main source of upkeep, care and support. The physical and mental health of the elderly is negatively affected as a result of having limited or no support systems, lacking access to social protection and health services and being exposed to discrimination, violence and abuse. [326]The percentage of the elderly (65 years and above) who experienced a type of abuse by a household member on an annual basis for years 2011, 2019 by region, gender and type of abuse is presented below.

Table 4.4.7-1: Percentage of the elderly (65 years and above) who experienced a type of abuse by a household member on an annual basis for years 2011, 2019 by region, gender and type of abuse

	Abuse experienced		Psychological abuse		Physical abuse		Medical negligence		Economic abuse		Social abuse	
	2011	2019	2011	2019	2011	2019	2011	2019	2011	2019	2011	2019
Palestine	7.3	7.6	11.4	12.4	2.8	1.7	17.1	21.6	3.5	1.6	1.7	0.6
Region												
West Bank	8.5	7.5	13.4	12.5	3.1	1.4	20.9	21.5	3.8	1.5	1.6	0.7
Gaza Strip	4.5	7.6	7.3	12.1	2.2	2.2	8.6	21.6	2.8	1.8	1.9	0.2
Gender												
Male	6.4	6.5	9.3	10.3	2.9	1.4	15.5	18.9	3.3	1.9	1.2	0.2
Female	7.9	8.4	13.2	14.1	2.7	1.9	18.3	23.8	3.7	1.3	2.1	0.9

Source: Palestinian Central Bureau of Statistics, 2019. Preliminary Results of the Violence Survey in the Palestinian Society, 2019

The elderly are approximately 4-8% of the total population per urban area.



Figure 4.4.7-1: Elderly rate of the total population by Urban Area, Census 2017

Source: Palestinian Central Bureau of Statistics, Census 2017 data

4.4.7.2 Persons with Disabilities

Persons with disabilities in Palestine face geographical, institutional and attitudinal barriers that hinder the enjoyment of their rights. Most disabilities are mobility-related, and the absence of infrastructure

[325] *United Nations Country Team Occupied Palestinian Territory, 2016, Common Country Analysis 2016, Leave No One Behind A Perspective on Vulnerability and Structural Disadvantage in Palestine*
[326] *United Nations Country Team Occupied Palestinian Territory, 2016, Common Country Analysis 2016, Leave No One Behind A Perspective on Vulnerability and Structural Disadvantage in Palestine*

adaptations to support persons with disabilities impairs their ability to engage with their community. Persons with disabilities are more likely than the general population to experience violations of their rights, poor physical and mental health conditions, poverty, and social isolation. The majority of disabled people do not work. Women with disabilities are more likely to face discrimination than other women, or men with disabilities. Public transportation and the majority of schools and offices are not adapted for easy access by persons with disabilities. More often than not, homes of persons with disabilities are not adapted for their convenience. This puts near-unsurmountable barriers in the path to their leading active and productive lives. [327]

According to the PCBS Census data (2017) [328], about 1.8% of the Palestinian population in Governorates relevant to the project are disabled.



Figure 4.4.7-2: Percentage of people with disabilities per Governorates relevant to the project, 2017

Source: Palestinian Central Bureau of Statistics, 2019, Population, Housing and Establishments Census 2017: Census Final Results – Summary – Nablus, Ramallah & Al Bireh, Bethlehem, Hebron and Gaza Governorates

4.5 Summary of baseline environmental characteristics and identification of associated opportunities and constraints per sector

Table 4.5-1 below summarizes the environmental characteristics of the five (5) targeted urban areas, as presented in the baseline chapter and identifies the associated opportunities and constraints for each development sector.

[327] *United Nations Country Team Occupied Palestinian Territory, 2016, Common Country Analysis 2016, Leave No One Behind A Perspective on Vulnerability and Structural Disadvantage in Palestine*
[328] *Palestinian Central Bureau of Statistics, 2019, Population, Housing and Establishments Census 2017: Census Final Results – Summary – Nablus, Ramallah & Al Bireh, Bethlehem, Hebron and Gaza Governorates*

Table 4.5-1: Baseline environmental characteristics and identification of associated opportunities and constraints per sector

Sector	Baseline Environmental Characteristics					Opportunities	Constraints
	Nablus Urban Area	Ramallah and Al Bireh Urban Area	Bethlehem Urban Area	Hebron Urban Area	Gaza Urban Area		
AGRICULTURE – FORESTRY - FISHING	**Land (availability / quality)** • Agriculture productivity: Only 3% of the Nablus Urban Area is classified as a High value Agricultural land; while 64% of the total Urban Area is classified as low value Agricultural Land • Agricultural land in existing master plans is about 0.65 km² or 0.6% of total Urban Area • No provision for Residential agriculture in existing Master Plans • Livestock production: Nablus has the highest cattle production out of the 4 targeted Urban Areas in West Bank - approximately 15% of the total cattle production in Palestine • Almost all agricultural land is rain-fed • 99% agricultural land is irrigated from wells and springs	• Agriculture productivity: Only 1% of the Ramallah and Al Bireh Urban Area is a High value Agricultural land; while 83% of the total Urban Area is classified as low value Agricultural Land • Agricultural land in existing master plans is about 0.40 km² or 0.6% of total Urban Area • Residential agriculture in existing Master Plans is about 0.51 km² or 0.7% of total Urban Area • Livestock production: Ramallah and Al Bireh has 6% of the total livestock production in Palestine • Almost all agricultural land is rain-fed • 94% agricultural land is irrigated from wells and springs	• Agriculture productivity: Only 6% of the Bethlehem Urban Area is a High value Agricultural land; while 63% of the total Urban Area is classified as low value Agricultural Land • Agricultural land in existing master plans is about 0.40 km² or 0.6% of total Urban Area • Residential agriculture in existing Master Plans is about 0.51 km² or 0.7% of total Urban Area • Livestock production: Bethlehem has 5% of the total livestock production in Palestine • Almost all agricultural land is rain-fed • 77% agricultural land is irrigated from wells and springs	• Agriculture productivity: 10% of the Hebron Urban Area is a High value Agricultural land; while 59% of the total Urban Area is classified as low value Agricultural Land • Agricultural land in existing master plans is about 1.12 km² or 0.7% of total Urban Area • Residential agriculture in existing Master Plans is about 3.27 km² or 2.0% of total Urban Area • Livestock production: Hebron has 15% of the total livestock production in Palestine • Almost all agricultural land is rain-fed	• Agriculture productivity: 15.3% of the Gaza Urban Area is a High value Agricultural land; 16% is medium value Agricultural land and 9.4% is classified as low value Agricultural Land • Agricultural land in existing master plans is about 10.12 km² or 18.2% of total Urban Area • Residential agriculture in existing Master Plans is about 1.97 km² or 23.6% of total Urban Area • 90% of all agriculture in Gaza can be considered urban or semi-urban • Livestock production: Gaza has 1.5% of the total livestock production in Palestine • Most agricultural land is rain-fed, including areas within the Gaza risk zone (1km from Gaza Strip boundaries)	✓ Adequate land available for expansion of agriculture (land restoration / rehabilitation) and suitable for reclamation (non-agricultural land inside the land, which is classified as agricultural according to CORINE first level classification) ✓ Adequate land available for expansion of residential agriculture ✓ Adequate land available for livestock production ✓ Potential to use rainwater collection systems (rainwater harvesting) ✓ Potential for the introduction of water efficient and water saving irrigation techniques such as drip and sub-surface irrigation to reduce evaporation and water losses ✓ Optimize WWTP treated wastewater for agricultural production ✓ Potential for the creation of Constructed Wetlands to treat greywater for agricultural purposes	× Existing agricultural land is mostly of low productivity (indicating soils of low fertility) × Increased salinity levels × Residential agriculture provisions in approved masterplans are limited × Lack of residential agriculture strategy × Scarcity and low quality of available agricultural inputs (fertilizers, livestock feed, animal vaccines) × Fragmentation of land property, and reduction of agricultural lands to small plots × Weak Governmental support and budget for agriculture sector. × Lack of supporting institutions for agriculture. × Lack of Agricultural cooperatives and unions × Lack of enforcement of urban planning, leading to encroachment onto agricultural land in certain areas. × Reduced access to markets due, in part, to Israeli access control and subsidies for Israeli produce × Water scarcity and increased temperature as a result of climate change
	Forests • 1% of total Urban Area is covered by existing planted Forests • Dominant species are pine, juniper, caroub, and oak • Land suitable for Forestation: 6% of total Urban Area	• There are no existing Forests within Ramallah and Al Bireh Urban Area • Land Suitable for Forestation: 15.3% of total Urban Area	• 1% of total Urban Area is covered by existing planted Forests • Dominant species are pine, juniper, caroub, and oak • Land suitable for Forestation: 0.53% of total Urban Area	• 2% of total Urban Area is covered by existing planted Forests • Dominant species are pine, juniper, caroub, and oak • Land suitable for Forestation: 4.35% of total Urban Area	• There are no existing Forests within Gaza Urban Area • There is no data about Land Suitable for Forestation in Gaza Urban Area	✓ Available land suitable for forestation / reclamation ✓ Promotion of non-timber forest products ✓ Potential for implementation of agroforestry interventions ✓ Available existing forest land suitable for recreation/ecotourism	× Forest land degradation × Increased prevalence of wildfire as a result of climate change
	Fishing • There are existing Aquaculture Farms in Nablus Urban Area	• There are no Aquaculture Farms in Ramallah and Al Bireh Urban Area	• There are no Aquaculture Farms in Bethlehem Urban Area	• There are existing Aquaculture Farms in Hebron Urban Area	• There are existing Aquaculture and mariculture farms	✓ Potential for expansion of existing freshwater aquafarms to expand income opportunities ✓ Potential for expansion of existing mariculture farms to expand income opportunities (for Gaza Urban Area) ✓ Potential market for aquaculture products ✓ Good level of existing know-how	× Lack of aquaculture strategy × Fishing restrictions into shallow waters have serious implications for Gaza's coastal ecosystem, depleting fish stocks by increasing the exploitation of immature fish that have yet to reach breeding age. × Fishing is affected by marine pollution, caused by partially treated and raw wastewater, which increases fish mortality. × Poor water quality could potentially be a constraint for aquaculture as pre-treatment would be required. × Lack of reliable energy may also be a constraint of aquaculture.
EDUCATION	**Land (availability / quality)** • No explicit provision for education facilities in existing master plans • The available land for Public Buildings and Facilities in	• No explicit provision for education facilities in existing master plans • The available land for Public Buildings and Facilities in	• No explicit provision for education facilities in existing master plans • The available land for Public Buildings and Facilities in	• No explicit provision for education facilities in existing master plans • The available land for Public Buildings and Facilities in	• No explicit provision for education facilities in existing master plans • The available land for public services in approved master plans	✓ Available land for education facilities	-

Sector	Baseline Environmental Characteristics					Opportunities	Constraints
	Nablus Urban Area	**Ramallah and Al Bireh Urban Area**	**Bethlehem Urban Area**	**Hebron Urban Area**	**Gaza Urban Area**		
	approved master plans is 1.36 km² or 1.3% of the total Urban Area	approved master plans is 1.24 km² or 1.7% of the total Urban Area	approved master plans is 0.81 km² or 1.5% of the total Urban Area	approved master plans is 0.78 km² or 0.5% of the total Urban Area	is 3.76 km² or 6.8% of the total Urban Area		
	Existing Education facilities					✓ Potential for the development of new education facilities with proximity to existing water, wastewater, energy and transportation networks ✓ Potential for the upgrade/rehabilitation of existing education facilities ✓ Tertiary education constitutes an asset of Rmallah and Al Bireh Urban Area, attracting human capital and eventually creating revenue	× Uneven distribution of education facilities between LGUs × Poor state of school infrastructure × Insufficient supportive educational facilities (laboratories, libraries, activities arenas, etc.) × Limited access to education facilities for the CWD × Lack of and limited technical and vocational schools
	• Existing education facilities: o 33 Pre-primary (Kindergarten) - most of them in Nablus o 106 Primary (Basic) - most of them in Nablus o 61 Secondary - most of them in Nablus o 6 Tertiary (Universities and Colleges) - in Nablus LGU and Beit Wazan LGU	• Existing education facilities: o 21 Pre-primary (Kindergarten) o 42 Primary (Basic) o 41 Secondary o 11 Tertiary (Universities and Colleges) - Ramallah and Al Bireh Urban Area has the largest concentration of international and local tertiary educational institutions among the West Bank Uban Areas	• Existing education facilities: o 9 Pre-primary (Kindergarten) - all in Ad Doha and Bethlehem LGUs o 35 Primary (Basic) o 31 Secondary o 2 Tertiary (Universities and Colleges) in Qusin LGU • In Al Khader and Artas LGUs there are only few education facilities (basic and secondary)	• Existing education facilities: o 33 Pre-primary (Kindergarten) – most of them within H1/H2 area o 35 Primary (Basic) o 31 Secondary o 2 Tertiary (Universities and Colleges) – all in H1 area	• Existing education facilities: o 26 Pre-primary (Kindergarten) o 234 Primary (Basic) o 45 Secondary o 17 Tertiary (Universities and Colleges)		
ENERGY	**Land (availability / quality)**					✓ Availability of Palestinian National Energy Efficiency Action Plan ✓ Availability of Palestinian Renewable Energy Law	× Limited land availability for large-scale renewable energy installations
	• No provision for energy facilities in existing master plans	• No provision for energy facilities in existing master plans	• No provision for energy facilities in existing master plans	• No provision for energy facilities in existing master plans	• No provision for energy facilities in existing master plans		
	Energy supply and demand					✓ Potential contribution of renewable energy to cover future energy demand (wind farms, solar pvs as per Urban Area characteristics) ✓ Agricultural residue and food processing wastes from Agro-Industry represent an important source of biomass ✓ Potential for energy production from waste ✓ Potential for the concentrating energy efficiency measures in the residential sector, where energy consumption is highest ✓ Improve energy efficiency of existing buildings (retrofitting/renovation) ✓ Improve energy consumption of street infrastructures ✓ Potential for the application of modern technologies for the rationalization of energy consumption	× Possible shortage of electricity at peaks of consumption × Energy reliance on neighboring countries × Lack of local storage capacity for petroleum and liquid gas, which are imported on a semi-daily basis × Poor infrastructure/inefficient transmission and distribution network × High electricity losses because of the poor state of infrastructure × Electricity energy demand increases × Limited land availability for large-scale renewable energy installations × Solar energy harvesting still very expensive for domestic use × Fragmentation of electricity distribution companies/bodies × Low recovery of payments for electricity from consumers
	• All localities in Nablus Urban Area are served by an electricity network however households experience daily power cuts during peak winter and summer months • Nablus Urban Area imports all fuel needs from Israel. • There is a new substation or under construction in Nablus Urban Area • Wind energy potential in mountains with heights about 1000m above sea level (where the speed reaches 5m/s) • High solar radiation potential	• All localities in Ramallah and Al Bireh Urban Area are served by an electricity network however households experience daily power cuts during peak winter and summer months • Ramallah and Al Bireh Urban Area imports all fuel needs from Israel. • There is a new substation or under construction in Ramallah and Al Bireh Urban Area • Wind energy potential in mountains with heights about 1000m above sea level (where the speed reaches 5m/s) • High solar radiation potential	• All localities in Bethlehem Urban Area are served by an electricity network however households experience daily power cuts during peak winter and summer months • Bethlehem Urban Area imports all fuel needs from Israel. • A new substation is planned in Bethlehem Urban Area • Wind conditions are not as favourable in Bethlehem Urban Area; therefore, windfarms would not be a preferable renewable energy option • Very high solar radiation potential	• All localities in Hebron Urban Area are served by an electricity network however households experience daily power cuts during peak winter and summer months • There is a substation in Hebron Urban Area • Wind energy potential in mountains with heights about 1000m above sea level (where the speed reaches 5m/s) • Very high solar radiation potential	• Gaza imports power from Israeli Electricity Company and Egypt • The only large-scale generation capacity in Palestine is the Gaza Power Plant, only producing around half of its total capacity, due to severe damages • It is planned to connect Gaza with natural gas, Gaza Power Plant will be converted to gas operation • Gaza Urban Area is served by an electricity network however almost all households experience daily power cuts • Ongoing power shortage has severely impacted the availability of essential services, particularly health, water and sanitation • Very low wind energy potential, insufficient for the consideration of potential wind applications as a renewable energy source • Very high solar radiation potential		
HEALTH	**Land (availability / quality)**					✓ Available land for health facilities	-
	• No explicit provision for health facilities in existing master plans • The available land for Public Buildings and Facilities in approved master plans is 1.36 km² or 1.3% of the total Urban Area	• No explicit provision for health facilities in existing master plans • The available land for Public Buildings and Facilities in approved master plans is 1.24 km² or 1.7% of the total Urban Area	• No explicit provision for health facilities in existing master plans • The available land for Public Buildings and Facilities in approved master plans is 0.81 km² or 1.5% of the total Urban Area	• No explicit provision for health facilities in existing master plans • The available land for Public Buildings and Facilities in approved master plans is 0.78 km² or 0.5% of the total Urban Area	• No explicit provision for education facilities in existing master plans • The available land for public services in approved master plans is 3.76 km² or 6.8% of the total Urban Area		
	Existing Health facilities					✓ Potential for the development of new health facilities with proximity to existing water, wastewater, energy and transportation networks ✓ Potential for the upgrade/rehabilitation of existing health facilities ✓ Most healthcare facilities in the West Bank Urban Areas are connected to public water and wastewater networks	× Uneven distribution of health facilities between LGUs × Limited access to primary health care centers × Limited access to health services for the PWD × Medical wastewater of hazardous substances is not treated before discharged to wastewater networks and no provision for the management of medical solid
	• 15 out of 29 Primary Health Care facilities are located in Nablus LGU: o 17 Clinics - 11 are located in in LGU of Nablus o 10 Medical Centers - 2 are located in LGU of Nablus o 2 Military Medical Services in LGU of Nablus • 7 Hospitals in LGU of Nablus	• Primary Health Care facilities: o 3 Clinics o 7 Medical Centers o 2 Military Medical Services (There is no PHC facility in Shurda Abu Qash LGU) • 14 Hospitals (there is no hospital in Shurda Abu Qash and Beitunya LGUs)	• 15 Primary Health Care facilities: o 8 Clinics o 6 Medical Centers o 1 Military Medical Service • 14 Hospitals • (In Al Khader, Artas and Ad Doha LGUs there are only three PHC (one per LGU) and none hospital) • Demographic distribution of primary healthcare facilities in	• 46 Primary Health Care facilities: o 26 Clinics o 19 Medical Centers o 1 Military Medical Service • 8 Hospitals (6 hospitals are located within H1/H2 areas) (In Beit Kahil and Taffuh there are only two PHC (one per LGU) • Demographic distribution of primary healthcare facilities in	• 71 primary health care facilities are located in Gaza LGU • 15 Hospitals • Health services - water and sanitation: water consumed in healthcare facilities in Gaza is less than half than that of the West Bank		

Sector	Baseline Environmental Characteristics					Opportunities	Constraints
	Nablus Urban Area	**Ramallah and Al Bireh Urban Area**	**Bethlehem Urban Area**	**Hebron Urban Area**	**Gaza Urban Area**		
	• Demographic distribution of primary healthcare facilities in 2018 districts in persons per facility in Nablus Governorate: 5,857 (the highest rate in West Bank	• Demographic distribution of primary healthcare facilities in 2018 districts in persons per facility in Ramallah and Al Bireh Governorate: 4,900 • Relatively good availability of hospitals compared with other Urban Areas (16% of the hospitals in the West Bank)	2018 districts in persons per facility in Bethlehem Governorate: 5,371	2018 districts in persons per facility in Hebron Governorate: 4,553 (the lowest rate of the Urban Areas in West Bank)			wastes, thus increasing health concerns × Lack of reliable power for enhancing healthcare
INDUSTRY	**Land availability**					✓ Land availability for expansion of light industry reasonably close to residential areas ✓ Stone and marble resources can be further exploited to boost industrial production	× Limited regulations and poor enforcement of legislation on industrial activities/ no regulations on industrial wastewater and hazardous waste management/no regulations on industrial air emissions × Limited land availability for the expansion of heavy industry
	• Provision in Master Plans o Industries: 2.13 km² or 1.97% of total Urban Area o Quarries: 0.7 km² or 0.065% of total Urban Area (Total 2.04% of total Urban Area)	• Provision in Master Plans o Industries: 1.54 km² or 2.13% of total Urban Area o Quarries: - (Total 2.13% of total Urban Area)	• Provision in Master Plans o Industries: 0.34 km² or 0.62% of total Urban Area o Quarries: - (Total 0.62% of total Urban Area)	• Provision in Master Plans o Industries: 0.86 km² or 0.53% of total Urban Area o Quarries: 0.36 km² or 0.22% of total Urban Area (Total 0.75% of total Urban Area)	• Provision in Master Plans o Industries: 3.74 km² or 6.72% of total Urban Area o Quarries: - (Total 6.72% of total Urban Area)		
	Existing industries / quarries					✓ Potential for expansion of existing industrial areas as drivers of economic development ✓ Potential for upgrading existing industrial infrastructure to reduce pollution ✓ Potential for socio-economic integration between industries (e.g. Stone industry and construction materials industry) o By-products from the stone-cutting industry can be crushed into aggregate potential for using construction waste for the rehabilitation and reuse of abandoned quarries for different purposes o Treated wastewater from stone & marble industry can be used in concrete production/stone slurry recycling o Demolition waste can be returned in stone-cutting workshops and reused as building materials ✓ Potential for using treated industrial wastewater to cover water needs ✓ Potential for the promotion of less water and energy demanding industries	× Proximity of quarries, industries and industrial areas to residential or commercial areas, thus increasing air, noise, soil and water pollution and health risks × Limited data on existing industries and related pollution emissions × Air/dust, soil and water pollution from industries may have adverse consequences on ecosystem services and the biodiversity of an area and cause degradation of agricultural land × Overextraction of natural resources as raw products of the stone industry (limestone in the West Bank/ sandstone in Gaza Strip) × Challenges in covering water and energy demands of the industry sector × Weak planning and control mechanisms of industrial zones
	• Eastern Industrial Area of Nablus within Urban Area limits • There are 8 quarries within Nablus Urban Area occupying a total area of approximately 300 hectares. They are located in the areas of Jammaa'in, o'rif, Yasuf, Mirda, Qira and Zeita.	• Ramallah and Al Bireh Industrial Zone within Urban Area limits • According to available data, there are 2 quarries in the Ramallah and Al Bireh Urban Area.	• There are no Industrial Estates or Free Zones within Bethlehem Urban Area • According to available data, there are 9 quarries in the Bethlehem Urban Area.	• Hebron Industrial Zone within Hebron Urban Area • According to available data, there are 38 quarries in Hebron Urban Area, concentrated in the LGUs of Beit Kahil, Halhul and Taffuh	• Gaza Industrial Zone within Gaza Urban Area limits		
SOLID WASTE	**Land (availability / quality)**					✓ Potential for the use of alternative waste treatment technologies requiring less space	× Low public acceptability for establishing landfill sites near urban areas × Limited land availability
	• No provision for solid waste facilities in existing master plans	• No provision for solid waste facilities in existing master plans	• No provision for solid waste facilities in existing master plans	• No provision for solid waste facilities in existing master plans	• No provision for solid waste facilities in existing master plans		
	Existing facilities					✓ Rehabilitation of dumpsites and expansion of existing facilities ✓ Most of the waste in sanitary landfills is organic and recyclable, therefore there is significant potential to reduce the volume of waste being disposed and to produce energy (composting, biogas generation, incineration)	× Municipal solid waste generation is expected to increase substantially due to population growth and urbanization trends × Long distance to existing landfills results in the use of random dumpsites to accommodate needs, thereby causing health concerns
	• 88% of solid waste from Nablus Governorate is collected and transported for 40km to Zahret El Finjan Landfill in Jenin Governorate, which is almost full, 8% is disposed in random dumpsites and 4% is recycled • There are 8 random dumpsites in Nablus Urban Area	• 50% of solid waste from Ramallah and Al Bireh Governorate is collected and transported for 100km to Zahret Al Fenjan (ZAF) Landfill in Jenin Governorate, which is almost full. • Ramallah and Al Bireh drops 50% of the waste collected into dumpsites.	• 100% of solid waste from Bethlehem Governorate is collected and transported to Al Menya, which is located within the same Governorate and is almost full • There are 6 random dumpsites in Bethlehem Urban Area	• 50% of solid waste from Hebron Governorate is collected and transported to Al Minya LF directly; and 50% is collected and transported to Al Minya LF through TS (Tarqumia 39 kms, Al Fahs 33kms and Yatta) • There are no random dumpsites in Hebron Urban Area	• 31% of solid waste is sent to Al-Yarmouk TS then to Johr Al-Diek LF (10km); 36% is sent to open illegal dumpsites at the north of Gaza Governorates; and 33% is sent directly to Johr Al-Diek Landfill, which is almost full • In Gaza Urban Area there are 2 random dumping sites		

Sector	Baseline Environmental Characteristics					Opportunities	Constraints
	Nablus Urban Area	**Ramallah and Al Bireh Urban Area**	**Bethlehem Urban Area**	**Hebron Urban Area**	**Gaza Urban Area**		
	• There is 1 Transfer Station within Nablus Urban Area • A few plastic recycling facilities are located in the Nablus region. In the Eastern Industrial Area of Nablus, paper/cardboard is reused	• The proposed Rammun Sanitary LF, in area C, will serve all localities from Ramallah and Al Bireh. • There are 7 random dumpsites in Ramallah and Al Bireh Urban Area • There are 2 Transfer Stations in Ramallah and Al Bireh Governorate, but none within Ramallah and Al Bireh Urban Area • No recycling facilities have been identified in RAB Urban Area.	• There is no Transfer Station within Bethlehem Urban Area • No recycling facilities have been identified in Bethlehem Urban Area.	• There is 1 Transfer Station (Al Fahs) within Hebron Urban Area • Waste processing is an important source of income for communities in the Hebron area • A few plastic recycling facilities are located in Hebron Governorate. In Hebron Governorate Industrial Area, paper/cardboard is reused	• There is 1 Transfer Station (El Yarmouk) within Gaza Urban Area. The are 20 also temporary sub-transfer stations. • Construction/building debris is currently recycled in Gaza at and around new building projects.		× Lack of palestinian standards for the siting, design, or operation of sanitary landfills × No regulatory framework for the transportation of solid waste × No palestinian standards/regulations for handling special and hazardous waste × Lack of policies and initiatives for separation of waste for reuse
TOURISM	**Land (availability / quality)**					✓ Available land for tourism	-
	• Provision for tourism/antiquities zones in existing masterplans: o Tourism Zone: 0.02km² or 0.02% of total Urban Area o Antiquities zones: 0.29km² or 0.3% of total Urban Area (Total 0.32% of total Urban Area) • Provision for tourism/antiquities zones in existing master plans <u>but not built up:</u> o Tourism Zone: 0.006km² or 0.006% of total Urban Area o Antiquities zones: 0.13km² or 0.12% of total Urban Area (Total 0.13% of total Urban area)	• Provision for tourism/antiquities zones in existing masterplans: o Tourism Zone: 0.2 km² or 0.28% of total Urban Area o Antiquities zones: 0.1 km² or 0.13% of total Urban Area (Total 0.41% of total Urban Area) • Provision for tourism/antiquities zones in existing master plans <u>but not built up:</u> o Tourism Zone: 0.1 km² or 0.13% of total Urban Area o Antiquities zones: 0.034 km² or 0.05% of total Urban Area (Total 0.18% of total Urban Area)	• Provision for tourism/antiquities zones in existing masterplans: o Tourism Zone: 0.33 km² or 0.59% of total Urban Area o Antiquities zones: 0.22 km² or 0.4% of total Urban Area (Total 0.99% of total Urban Area) • Provision for tourism/antiquities zones in existing master plans <u>but not built up:</u> o Tourism Zone: 0.17 km² or 0.31% of total Urban Area o Antiquities zones: 0.10 km² or 0.18% of total Urban Area (Total 0.49% of total Urban Area)	• Provision for tourism/antiquities zones in existing masterplans: o Tourism Zone: 0.015 km² or 0.01% of total Urban Area o Antiquities zones: 0.36 km² or 0.22% of total Urban Area (Total 0.23% of total Urban Area) • Provision for tourism/antiquities zones in existing master plans <u>but not built up:</u> o Tourism Zone: 0.004 km² or 0.002% of total Urban Area o Antiquities zones: 0.16 km² or 0.10% of total Urban Area (Total 0.10% of total Urban Area)	• Provision for tourism/antiquities zones in existing masterplans: o Tourism Zone: 0.81 km² or 1.5% of total Urban Area o Antiquities zones: - (Total 1.5% of total urban Area) • Provision for tourism/antiquities zones in existing master plans <u>but not built up:</u> o Tourism Zone: 0.39 km² or 0.7% of total Urban Area o Antiquities zones: - (Total 0.10% of total urban Area)		
	✓ Nature reserves / biodiversity hotspots					✓ Available land suitable for recreation/ecotourism ✓ Gaza beach is considered a feature of the city ✓ Endemic biodiversity and associated habitats that would attract local and international tourists.	× Lack of provision for management of protected areas in existing legislation × Fragmentation of nature reserves × Limited support and weak institutions for alternative forms of tourism × Coastal erosion due to man-made structures and seawater pollution due to wastewater discharges pose considerable limitations for future tourist development in Gaza beach
	• 3 Key Biodiversity Areas covering 5% of total Urban Area • 1 Nature Reserve covering 16% of total Urban Area	• 2 Key Biodiversity Areas covering 2% of total Urban Area • 1 Nature Reserve covering 2% of total Urban Area	• 3 Key Biodiversity Areas covering 11% of total urban area • No Nature Reserve	• 6 Key Biodiversity Areas covering 6% of total Urban Area • 3 Nature Reserves covering 6% of total Urban Area	• There are no Key Biodiversity Areas • There are no Nature Reserves		
	Wetlands and other conservation areas (IBAs-IPAs)					✓ Available land suitable for recreation/ecotourism	× Wetlands are not designated as protected areas in national legislation
	• 1 wetland • 2 IPAs covering 8.4% of total Urban Area	• There is a natural wetland (balou') in al bireh and beitunia, but its exact location is not available • 1 IBA covering 14% of total Urban Area	• No Wetland • 1 IBA Covering 8% Of Total Urban Area	• No wetland • 1 IPA covering 25% of total Urban Area	• 1 wetland • There is no IPA or IBA in Gaza Urban Area		
	Cultural heritage					✓ Availability of archaeological sites and cultural landscapes as tourism attractions	× There is no master plan for the places of archaeological interest × The tourist potential of Ramallah, Nablus and Hebron is neglected; Ramallah is less visited as it is primarily a business destination and nablus is rarely visited by foreigners at all.
	• 56 Archaeological Sites • 2 Cultural Landscapes Covering 34.49 Km² Or 32% Of Total Urban Area	• 46 archaeological sites • 1 cultural landscape covering 3.15 km² or 4.4% of total Urban Area	• 35 archaeological sites • 1 cultural landscape covering 1.41 km² or 2.56% of total Urban Area	• 66 archaeological sites • There are no cultural landscapes	• There are many historical sites and buildings in the old city of Gaza • There are no cultural landscapes		
TRANSPORTATION	**Land (availability / quality)**					✓ Integration of master plans with transportation plans	× Lack of coordination between spatial-planning models (land use policies) and transportation planning models × Lack of sustainable urban mobility guidelines
	• Available land for transport in approved master plans: 9.7 km² or 9% of total Urban Area	• Available land for transport in approved master plans: 7.4 km² or 10.3% of total Urban Area	• Available land for transport in approved master plans: 2.33 km² or 4.22% of total Urban Area	• Available land for transport in approved master plans: 5.67 km² or 3.48% of total Urban Area	• No provisions for transport (roads) in approved master plans		
	Existing network					✓ New ring road segments along with other connecting roads can	× Inconsistencies of linked roads with existing master plans
	• High levels of congestion in the Urban Area core	• High traffic volumes with limited options for expanding the	• High traffic volumes with limited options for expanding the	• High traffic volumes with limited options for expanding the	• Public transportation infrastructure is poor		

Sector	Baseline Environmental Characteristics					Opportunities	Constraints
	Nablus Urban Area	**Ramallah and Al Bireh Urban Area**	**Bethlehem Urban Area**	**Hebron Urban Area**	**Gaza Urban Area**		
	• Poor connectivity between LGUs (except for Nablus City)	roadway network or increasing its capacity • Poor connectivity between LGUs • Public transportation infrastructure is poor • Shared-taxi is the most used and common mode of Public Transport	roadway network or increasing its capacity • There is no external ring road and internal, external and through traffic are using the same network • Public transportation infrastructure is poor • Shared-taxi is the most used and common mode of Public Transport	roadway network or increasing its capacity. • Public transportation infrastructure is poor. • Shared-taxi is the most used and common mode of Public Transport	• The only infrastructure for maritime transport is represented by the fishery port of Gaza	enhance connectivity among LGUs and with the surrounding areas ✓ Lack of railway and air transport systems ✓ Lack of a modern mass transport fleet for passengers.	× Lack of policies and management plans to promote public transportation × Weak support for electrical and hybrid vehicles × Accessibility for PWD is not integrated in transportation planning
URBAN AND STRATEGIC PLANNING	**Housing**					✓ Potential for enhancement of the construction sector ✓ Potential for expansion of green infrastructure/green building sector ✓ Potential for reuse of existing vacant and ignored buildings	× Rapid urbanization, growing housing needs and significant pressure on urban services × No regulations on green buildings × No legal framework for the reuse of vacant and ignored buildings × Time consuming and overly complex permitting procedure × Weak enforcement of laws and bylaws for building and licensingresulting in extensive urban development outside of the designated urban boundaries
	• Built up areas in 2016 are 29.8% of the total Urban Area surface, showing an increased by 70% from 2007 to 2016 • Residential areas according to the approved Master Plans, that are not build-up: 13.7km² or 12.6% of total Urban Area	• Built up areas in 2016 are 36.1% of the total Urban Area surface, showing an increase by 40% from 2007 to 2016 • Residential areas according to the approved Master Plans, that are not build-up: 8.74km² or 12.13% of total Urban Area	• Built up areas in 2016 are 34.8% of the total Urban Area surface, showing an increase by 20% from 2007 to 2016 • Residential areas according to the approved Master Plans, that are not build-up: 13.7 km² or 12.6% of total Urban Area	• Built up areas in 2016 are 46.8% of the total Urban Area surface, showing an increase by 114% from 2007 to 2016 • Residential areas according to the approved Master Plans, that are not build-up: 10.14 km² or 6.23% of total Urban Area	• Built up areas in 2018 are 55% of the total Urban Area surface, showing no increase compared to 2016 • Residential areas according to the approved Master Plans, that are not build-up: 33 km² or 59.4% of total Urban Area		
	Refugee camps					-	× Extremely high population density and need for increased services (sewage treatment, waste management, water, transport network etc.) × There is no zoning or planning regime for refugee camps
	• Provision of camps in master plans: 0.46km² or 0.42% of total Urban Area • There are 4 existing refugee camps in Nablus Urban Area covering a total area of 0.57km²	• Provision of camps in master plans: 0.087km² or 0.12% of total Urban Area • There are 2 existing refugee camps in Ramallah and Al Bireh Urban Area	• Provision of camps in master plans: 0.093 km² or 0.17% of total Urban Area • There are 3 existing refugee camps in Bethlehem Urban Area covering a total area of 0.67 km²	• No provision of camps in master plans • There is no existing refugee camp in Hebron Urban Area	• Provision of camps in master plans: 0.73 km² or 1.32% of total Urban Area • There is 1 existing refugee camp in Gaza Urban Area		
	Recreation areas					✓ Potential for expanding existing green and public spaces and recreation areas	× Lack of a public or green space strategy × Green and public spaces not integrated into urban planning × Depletion of green and public spaces due to urban expansion
	• Provision of Recreation areas (Green areas, open green areas, Pedestrian Road Network, Public Gardens, Public squares, Sports and leisure facilities, stadium) in master plans: 0.56% of total Urban Area	• Provision of Recreation areas (Green areas, open green areas, Pedestrian Road Network, Public Gardens, Public squares, Sports and leisure facilities, stadium) in master plans: 0.5% of total Urban Area	• Provision of Recreation areas (Green areas, open green areas, Pedestrian Road Network, Public Gardens, Public squares, Sports and leisure facilities, stadium) in master plans: 1.76% of total Urban Area	• Provision of Recreation areas (Green areas, open green areas, Pedestrian Road Network, Public Gardens, Public squares, Sports and leisure facilities, stadium) in master plans: 0.71% of total Urban Area	• No provision of Recreation areas in master plans • There are limited green and open spaces in Gaza Urban Area.		
	Urban planning					✓ Implementation of existing Regional Plan for West Bank ✓ Revisit master plans to incorporate urban and transportation plans	× Lack of coordination between spatial-planning models (land use policies) and transportation planning models × Accessibility for PWD is not integrated in urban planning × Lack of systematic land registration/inventory of public lands × Mixed use in many areas between residential and industrial × Lack of national and regional planning × Weak enforcement of Urban Plans, including laws and regulations. × Lack of joint coordination and strategic planning between urban Area LGUs
	• 47.4% of the total Nablus Urban Area is covered by approved Master Plan	• 53.7% of the total Ramallah and Al Bireh Urban Area is covered by approved Master Plan	• 29.5% of the total Bethlehem Urban Area is covered by approved Master Plan	• 31.7% of the total Hebron Urban Area is covered by approved Master Plan	• 100% of the total Gaza Urban Area is covered by approved Master Plan		
	Flood hazard					✓ Potential for implementation of natural flood management practices ✓ Nablus is the first palestinian city to join the unisdr's resilience campaign	× Limitations for the siting of new facilities × Lack of data on flood potential (1: 100 year flood line is not included in most Master Plans)
	• (361.5+106.8=)468.3 km²/626.7 km²=80% of Nablus Governorate has very high/high vulnerability to floods	• 365.2 km² or 43.5% of Ramallah and Al Bireh Governorate has very high/high vulnerability to floods	• 176.5 km² or 29% of Bethlehem Governorate has very high/high vulnerability to floods	• 215.7 km² or 21% of Hebron Governorate has very high/high vulnerability to floods	• About 50% of Gaza Governorate has very high/high vulnerability to floods		

Sector	Baseline Environmental Characteristics					Opportunities	Constraints
	Nablus Urban Area	Ramallah and Al Bireh Urban Area	Bethlehem Urban Area	Hebron Urban Area	Gaza Urban Area		
						and can act as a model for other targeted Urban Areas	
	Earthquake hazard					✓ Incorporation of seismic proof guidelines in building regulations ✓ Nablus is the first palestinian city to join the unisdr's resilience campaign and can act as a model for other targeted Urban Areas	× Limitations for the siting of new facilities
	• Highest probability for an earthquake is expected in Nablus Urban Area	• Ramallah and Al Bireh Urban Area falls within low Earthquake Hazard Zone (zone 2A)	• Bethlehem Urban Area falls within low Earthquake Hazard Zone (zone 2A)	• Hebron Urban Area falls within low Earthquake Hazard Zone (zone 2A)	• Very low probability for an earthquake is expected in Gaza Urban Area		
WATER AND WASTEWATER	**Land (availability / quality)**					-	× Wastewater generation is expected to increase substantially due to population growth and urbanization trends
	• No (explicit) provision for water and wastewater facilities in existing master plans • The available land for public buildings and facilities in approved master plans is 1.36 km² or 1.3% of the total Urban Area	• No (explicit) provision for water and wastewater facilities in existing master plans • The available land for public buildings and facilities in approved master plans is 1.24 km² or 1.7% of the total Urban Area	• No (explicit) provision for water and wastewater facilities in existing master plans • The available land for public buildings and facilities in approved master plans is 0.81 km² or 1.5% of the total Urban Area	• No (explicit) provision for water and wastewater facilities in existing master plans • The available land for public buildings and facilities in approved master plans is 0.78 km² or 0.5% of the total Urban Area	• No (explicit) provision for education facilities in existing master plans • The available land for public services in approved master plans is 3.76 km² or 6.8% of the total Urban Area		
	Existing facilities (WWTP, Desalination plants, wastewater/water networks)					✓ Establish rainwater collection systems ✓ Optimize WWTP treated wastewater for agricultural production ✓ Potential for wastewater reuse for industry and urban applications (firefighting etc.) ✓ Potential for the creation of Constructed Wetlands to treat greywater ✓ Availability of standards and guidelines for treated wastewater reuse for irrigation ✓ Establish sustainable municipal water utilities and achieve economies of scale ✓ Potential for the reduction of Non-Revenue Water ✓ Promote the use of septic tanks in rural communities	× The sewage/rainwater network is ineffective with significant water losses. With the exception of Ramallah and Al Bireh Urban Area, it is a combined system for both sewage and rainwater; this causes floods and contamination of domestic water supply in some areas, increasing the health risks of waterborne diseases. × Health concerns from the use of cesspits and open channels × Lack of a regulatory framework for the monitoring of drinking water × No approved laws and regulations for controlling industrial wastewater pollution × Hazardous waste bylaws and regulations not available × No regulatory framework for the formation of regional (or other levels like municipal) water utilities companies × Lack of policies for harvesting domestic rain water × Scarcity of fuel for generators and limitations in electricity supply affect desalination plant operations
	• West Nablus WWTP is operating at a good efficiency rate • Wastewater network: o 28% out of total Nablus Urban Area was served by old sewage network o 66.7% out of total Nablus Urban Area localities were served by wastewater network in 2015. • There are no desalination plants in Nablus Urban Area • Water network: o All localities within the Urban Area were served by a water network o 61% out of total Nablus Urban Area was served by old water network o 72% (13 out of 18) of localities in Nablus experienced water cuts • Cesspits and open channels are most commonly used in the villages and camps where there are no sewerage networks	• 2 WWTPS: Al Bireh WWTP & Ramallah WWTP, that operate with no sludge management/utilization scheme • Wastewater network: o 1 out of 6 LGUs of Ramallah and Al Bireh Urban Area was served by old sewage network o 66.7% (4 out of 6) of total Ramallah and Al Bireh Urban Area localities were served by wastewater network in 2015. • There are no desalination plants in Ramallah and Al Bireh Urban Area • Water network: o All localities within the Urban Area were served by a water network o 66.7% (4 out of 6) of localities in Ramallah and Al Bireh Urban Area was served by old water network o 83% (5 out of 6) of localities in Ramallah and Al Bireh experienced water cuts • The sewage collection system and the rainwater system are separated. • Cesspits and open channels are most commonly used in the villages and camps where there are no sewerage networks • Most of the industrial waste is discharged into cesspits or sewage collection networks without any consideration for the potential to pollute. • Domestic water supply for Ramallah and Al Bireh Urban Area is Ground Water that requires disinfection only.	• There is no WWTP in Bethlehem Urban Area. • In Bethlehem Urban Areas there are 8 Onsite small-scale wastewater treatment plants • Wastewater network: o 89% out of total Bethlehem Urban Area localities were served by wastewater network in 2015 o 22% out of total Bethlehem Urban Area was served by old sewage network • There are no desalination plants in Bethlehem Urban Area • Water network: o All localities within the Urban Area were served by a water network o 88.9% (8 out of 9) of total Bethlehem Urban Area was served by old water network o 66.7% (6 out of 9) of localities in Bethlehem urban Areas experienced water cuts • Cesspits and open channels are most commonly used in the villages where there are no sewerage networks • Few industrial facilities dispose of their wastewater into the municipal wastewater network, the majority dumping their wastewater in the cesspits • Domestic water supply for Bethlehem Urban Area is Ground Water that requires disinfection only. • Water is supplied intermittently to the consumers. All consumers depend on roof tanks to cover the deficit in water supply.	• There is no WWTP in Hebron Urban Area. • In Hebron Urban Areas there are 36 Onsite small-scale wastewater treatment plants. • Wastewater network: o 20% out of total Hebron Urban Area localities was served by wastewater network in 2015. In Hebron city the wastewater network is covering only 60% of the city. • There are no desalination plants in Hebron Urban Area • Water network: o All localities within the Urban Area were served by a water network o 40% (2 out of 5) of total Hebron Urban Area was served by old water network that might cause pollution and cause high water losses. o 80% (4 out of 5) of localities in Hebron urban Areas experienced water cuts. • Domestic water supply for Hebron Urban Area is groundwater that requires disinfection only. • Water is supplied intermittently to the consumers. All consumers depend on roof tanks to cover the deficit in water supply.	• There is one WWTP: Gaza Wastewater Treatment Plant (Gaza Central), which has been damaged by conflicts, and are affected by power outages and lack of adequate maintenance. • Wastewater network: o The sewage network in Gaza City, covers approximately 61.5% of the city and provides services to approximately 85% of the city's population. The rest of the city's residents rely on septic tanks to drain the sewage from their homes. o Ash Shati' Camp is served by old sewage network • There are six (6) desalination plants (5 private and 1 public) within Gaza Urban Area • Water network: o Gaza city was served by old water network o Gaza Urban Area experienced water cuts		

Sector	Baseline Environmental Characteristics					Opportunities	Constraints
	Nablus Urban Area	Ramallah and Al Bireh Urban Area	Bethlehem Urban Area	Hebron Urban Area	Gaza Urban Area		
		• Water is supplied intermittently to the consumers. All consumers depend on roof tanks to cover the deficit in water supply.					
	Surface water (quality / quantity)					✓ Potential to use rainwater collection systems (rainwater harvesting) ✓ Potential for the introduction of water efficient and water saving irrigation techniques such as drip and sub-surface irrigation to reduce evaporation and water losses	× Increase of drought frequency and duration affecting surface water availability × Inadequate sewage collection network discharges wastewater into nearby wadis thereby causing pollution and health concerns × In Gaza, because the topography is flat and land is scarce, the scope for storing and using any remaining surface water is limited.
	• There are 3 wastewater streams within Nablus Urban Area • Water scarcity/drought hazard: medium • Annual Rainfall Quantity: 610 mm	• There is 1 wastewater stream within Ramallah and Al Bireh Urban Area • Water scarcity/drought hazard: medium • Annual Rainfall Quantity: 597 mm	• There is 1 wastewater stream within Bethlehem Urban Area • Water scarcity/drought hazard: high • Annual Rainfall Quantity: 455 mm	• There is 1 wastewater stream within Hebron Urban Area • Water scarcity/drought hazard: medium • Annual Rainfall Quantity: 506 mm	• Wadi Gaza is rapidly degrading due to anthropogenic activities including discharge of municipal sewage, dumping of solid wastes, rampant use of pesticides and illegal poaching. These waste products form a river of untreated wastewater of more than 5 km long that discharges into the Mediterranean Sea. • Water scarcity/drought hazard: high		
	Groundwater (quality / quantity)					✓ Potential for wastewater reuse for groundwater recharge, industry reuse and urban applications (firefighting etc.) ✓ Potential for the creation of constructed wetlands to treat wastewater from WWTP for agricultural purposes ✓ Curb further extraction of groundwater from the aquifer and contribute to aquifer restoration	× Low aquifer balance/limited possibilities for further groundwater exploitation × Declining water tables/ impaired groundwater aquifers × Increase of drought frequency and duration affecting groundwater availability × × Ineffective irrigation network / water losses × Deteriorated groundwater quality
	• Hydrogeology: 58.8% of the total Urban Area is located on land where the underlying geological formations are aquifers and 41.2% on aquitards • Groundwater vulnerability: 43% of total Urban Area is extremely vulnerable to groundwater pollution and 49% of total Urban Area has low or no sensitivity to pollution • Annual aquifer balance is low (5.22 km³)	• Hydrogeology: approximately 80% of the total Urban Area is located on land where the underlying geological formations are aquifers and 20% on aquitards • Groundwater vulnerability: only the 3.4% of total Urban Area is extremely vulnerable to groundwater pollution, 77% has moderate and 49% has low/no sensitivity to pollution • Annual aquifer balance is very high (27.04 km³)	• Hydrogeology: 56.3% of the total Urban Area is located on land where the underlying geological formations are aquifers and 43.7% on aquitards • Groundwater vulnerability: 18% of total Urban Area is extremely vulnerable to groundwater pollution and 82% has low/no sensitivity to pollution • Annual aquifer balance is low (3.46 km³)	• Hydrogeology: 71.6% of the total Urban Area is located on land where the underlying geological formations are aquifers and 28.4% on aquitards • Groundwater vulnerability: 16% of total Urban Area is extremely vulnerable to groundwater pollution, 6% has high or moderate to groundwater vulnerability and 78% has no sensitivity to pollution	• Approximately 55% of water abstraction from wells is used for agricultural purposes and the remaining 45% is used for domestic purposes • Over 90% of the total groundwater volume in Gaza is unfit for domestic use (High concentrations of nitrate and chloride) • Principle sources of groundwater pollution are poorly treated or raw sewage and the lateral inflow of saline groundwater and seawater. • The Coastal Aquifer's annual abstraction rate exceeds the recharge rate and the sustainable use rate based on its recharge rate, leading to severe deterioration.		

CHAPTER 5 STRATEGIC ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

For the purposes of the Strategic Environmental and Social Impact Assessment process, existing environmental, social and development plans for various sectors at the national, regional and local levels have been reviewed. Initially, *environmental and socio-economic sector* plans were reviewed for the identification of Strategic E&S Objectives; subsequently, existing *development sector* plans were reviewed for the identification of Strategic Development Objectives (i.e., higher-level objectives for each development sector) and Strategic Development Priorities (i.e., more detailed objectives, required to achieve the higher-level objectives). This process was, in most cases, implemented separately; initially for the 'environment' and 'socio-economic' sectors, and then for the 'development' sectors, as identified in section 2.1 of this report. However, the review of planning documentation for selected environment sectors such as Water & Wastewater and Solid Waste as well as selected socio-economic sectors such as Education and Health, which entail the construction of critical infrastructure, resulted in the identification of *both* Strategic E&S Objectives and Strategic Development Objectives. This process is described in detail below.

5.1 Strategic E&S Objectives

A total of 29 existing policies, strategies and plans for various sectors at the national, regional and local levels have been reviewed; these are presented in detail in Annex IV of this report. The distribution of the reviewed documentation for Strategic E&S Objectives by region and sector is presented in Figure 5.1-1 below.

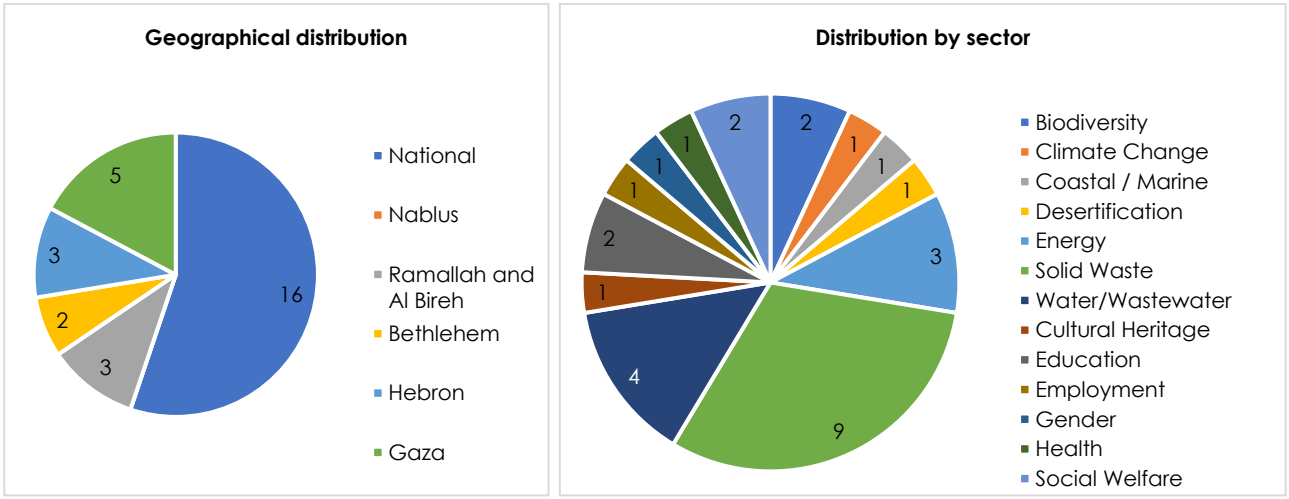


Figure 5.1-1: Distribution of the reviewed documentation for Strategic E&S Objectives by region and sector (Total reviewed documentations: 29)

As a result of this exercise, Strategic E&S Objectives in the above-mentioned existing planning documentation were identified; overall, **43 Strategic Environment Objectives** and **27 Strategic Socio-economic Objectives** were identified, as presented in Figure 5.1-2 below. These are presented in detail in Annex VI of this report. 65% of the total identified Strategic Environment Objectives are relevant to the Solid Waste Sector and 30% of the total identified Strategic Socio-economic Objectives are relevant to the Employment Sector.

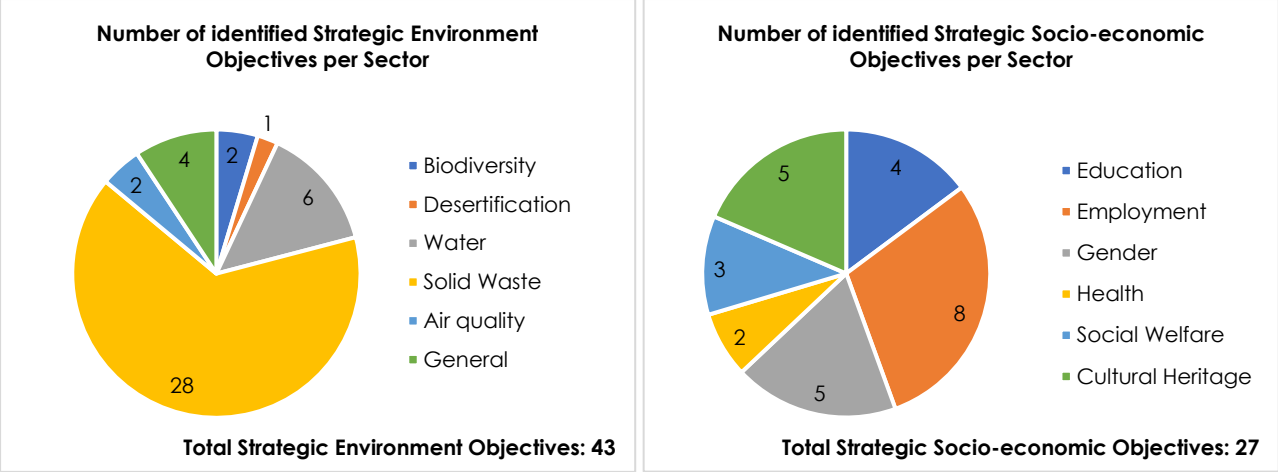


Figure 5.1-2: Number of identified Strategic E&S Objectives per Sector

Sustainable urban development is inextricably linked with access to self-sufficient water and energy resources in Palestine. In this context, water & wastewater and energy policy documentation has been reviewed for Strategic E&S Objectives; these have been accounted for in the above-mentioned calculations.

The next step in this process was to omit from further consideration in the SESA Strategic E&S Objectives considered as a) not relevant to SESA b) too generic; as a result, 17 Strategic Environment Objectives and 13 Strategic Socio-economic Objectives were screened. Of these, 11 Strategic Environment Objectives and 5 Strategic Socio-economic Objectives were relevant to Legal/Institutional/Capacity Building and were addressed horizontally, thus resulting in the initial selection of 6 and 8 Strategic Environment and Socio-economic Objectives respectively. An overview of this process is presented in Figure 5.1-3 below; presentation in detail is included in Annex VI of this report.

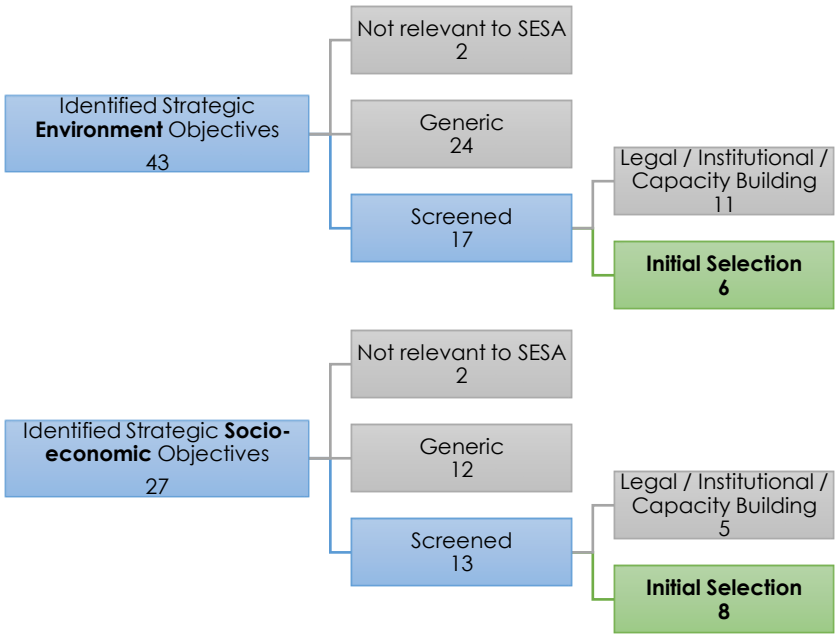


Figure 5.1-3: Initial selection of Strategic E&S Objectives according to existing E&S planning documentations

Furthermore, additional Strategic E&S Objectives that did not emerge from E&S planning and policy documentation but rather from JV expert judgement were considered for final adoption. Overall, 6 Environment SDGs and 8 Socio-economic SDGs were considered for final adoption.

An overview of this process is presented in Table 5.1-1 below.

Table 5.1-1: Development of Strategic E&S Objectives– Process Overview

	Strategic E&S Objectives		
	Existing E&S planning documentation		JV Expert Judgement
	Identified	Initially selected	SDGs
ENVIRONMENT	43	6	6
SOCIO-ECONOMIC	27	8	8

In an effort to avoid duplications, Strategic E&S Objectives were combined and/or modified.

The output of this process is a final list of twelve (12) adopted Strategic E&S Objectives; these Strategic E&S Objectives are considered as benchmarks which all proposed SDP would have to meet. The final list of adopted Strategic E&S Objectives is presented in Table 5.1-2 below, including their source (i.e., the planning and policy documentation where identified).

Table 5.1-2: Adopted Strategic E&S Objectives

Sector	Adopted Strategic E&S Objectives	Source
Conservation (biodiversity, desertification)	1. Conservation and sustainable use of biodiversity within the framework of national sustainable development efforts in Palestine; combat desertification, halt and reverse land degradation, halt biodiversity loss	National Biodiversity Strategy and Action Plan for Palestine 1999/Expert Judgement (SDG 15)
Climate change	2. Take urgent action to combat climate change and its impacts	National adaptation plan to climate change, 2016 / Expert Judgement (SDG 13)
Marine resources	3. Conserve and sustainably use the oceans, seas and marine resources	Expert Judgement (SDG 14)
Solid Waste	4. Ensure sustainable consumption and production patterns (solid waste prevention, reduction, recycling, reuse)	Expert Judgement (SD Target 12.5)
Water	5. Ensure availability and sustainable management of water resources and provide water and sanitation services for all	Expert Judgement (SDG 6)
Energy	6. Ensure universal access to affordable, reliable and modern energy services and increase the share of renewable energy in the energy mix	Expert Judgement (SDG 7)
Air quality	7. Make cities and human settlements inclusive, safe, resilient and sustainable, by paying special attention to air quality	Expert Judgement (SD Target 11.6)
Cultural heritage	8. Strengthen efforts to protect and safeguard Palestine's cultural heritage	Expert Judgement (SD Target 11.4)
Education	9. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	Expert Judgement (SDG 4)
Employment/ Economic growth	10. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all, strengthen the realization of rights at work, reduce unemployment rates in Palestine and support poverty alleviation	The Palestinian Decent Work Programme 2018 – 2022/Expert Judgement (SDG 8)
Gender	11. Achieve gender equality and empower all women and girls	Expert Judgement (SDG 5)
Health	12. Ensure healthy lives and promote well-being for all at all ages;	National Health Strategy 2017-

Sector	Adopted Strategic E&S Objectives	Source
	ensure a comprehensive and integrated health system that contributes to improving the quality of health services and sustainably enhancing the health status	2022/Expert Judgement (SDG 3)

It must be noted that planning documentation on Air quality was not identified; however, Strategic Environmental Objective 7 was included in order to ensure that air quality is included in environmental considerations of urban development planning.

During Phase Two Consultation the final list of identified Strategic E&S Objectives was presented to critical stakeholders including, among others, MDLF, MoLG/ICUD and EQA; stakeholders' feedback was subsequently integrated into the assessment process.

5.2 Strategic Development Priorities

5.2.1 Identification of Strategic Development Objectives and Strategic Development Priorities

A total of 139 existing policies, strategies and plans for various sectors at the national, regional and local levels have been reviewed; these are presented in detail in Annex IV of this report. The distribution of the reviewed documentation for Strategic Development Objectives and SDP by region and sector is presented in Figure 5.2.1-1 below.

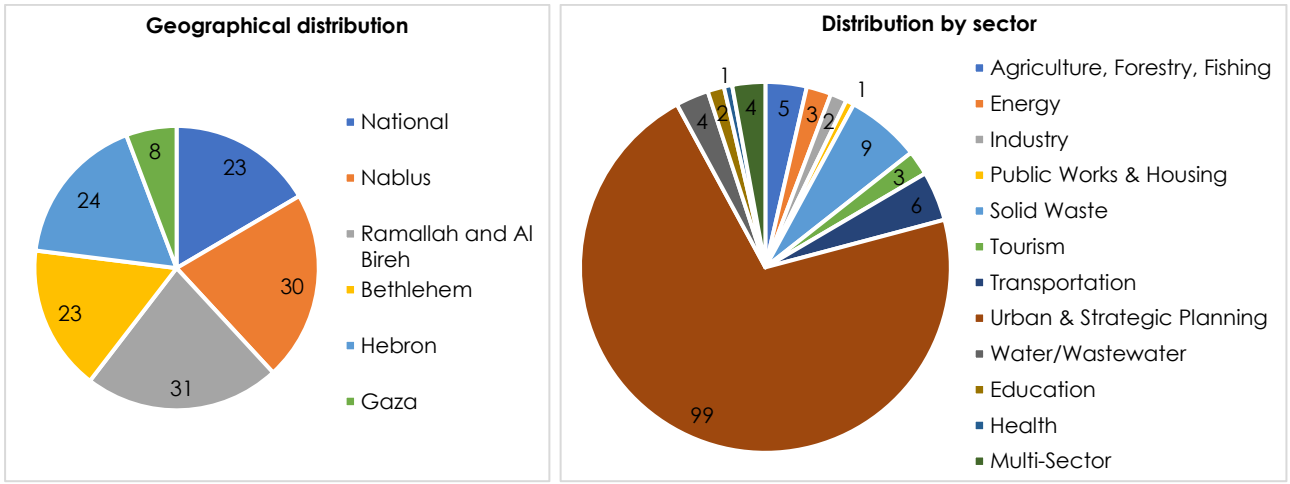


Figure 5.2.1-1: Distribution of the reviewed documentation for Strategic Development Objectives and SDP by region and sector (Total reviewed documentations: 139)

As a result of this exercise, a total of **52 Strategic Development Objectives** and **438 Strategic Development Priorities** (SDP) were identified in existing policies, strategies and plans at the national, regional and local levels. Of the total SDP identified, 303 SDP applied for various development sectors and 135 SDP for various environmental and socio-economic sectors; these are presented in detail in Annex V and Annex VII of this report.

As presented in Figure 5.2.1-2, most of the identified Strategic Development Objectives and SDP are for Urban & Strategic Planning.

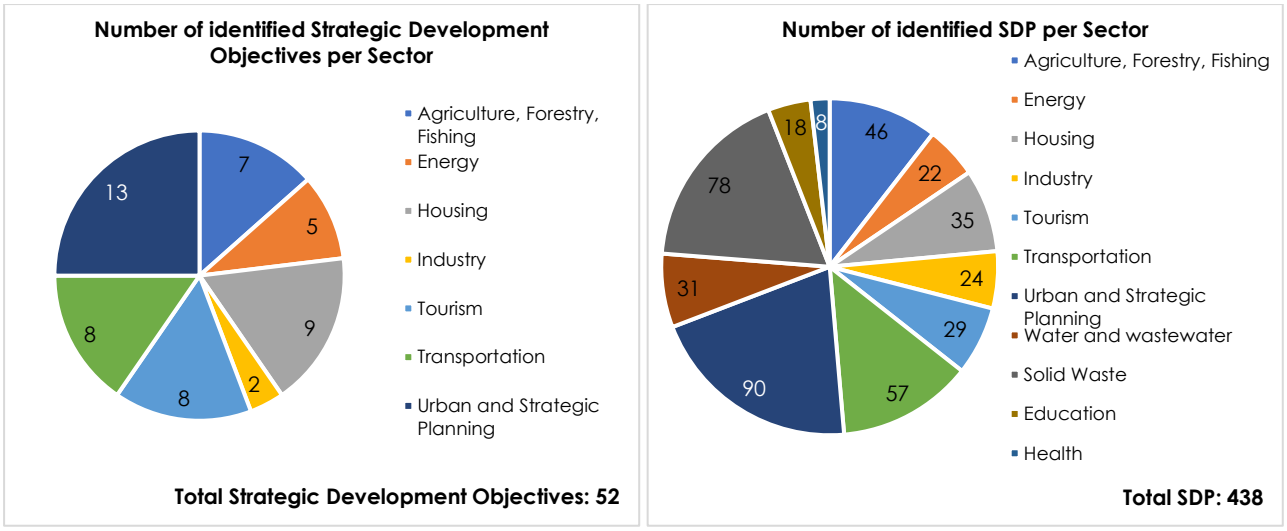


Figure 5.2.1-2: Number of identified Strategic Development Objectives and SDP per Sector

Planning documentation categorized as 'multi-sector' is relevant to more than one sector. For example, as on overarching document, the 'National Policy Agenda - Putting Citizens First 2017-2022', 2016 falls under this category.

The next step in this process was, as previously, to omit from further consideration in the SESA, SDP considered as a) not relevant to SESA b) too generic; as a result, 237 SDP were screened. Of these, 117 SDP were relevant to Legal/Institutional/Capacity Building and were grouped separately, thus resulting in the initial selection of 120 SDP relevant to physical planning/growth planning. During Phase Two Consultation the final list of identified SDP was presented to critical stakeholders including, among others, MDLF, MoLG/ICUD and EQA; stakeholders' feedback was subsequently integrated into the assessment process.

An overview of this process is presented in Figure 5.2.1-3 below and in details in Annex VII of this report.

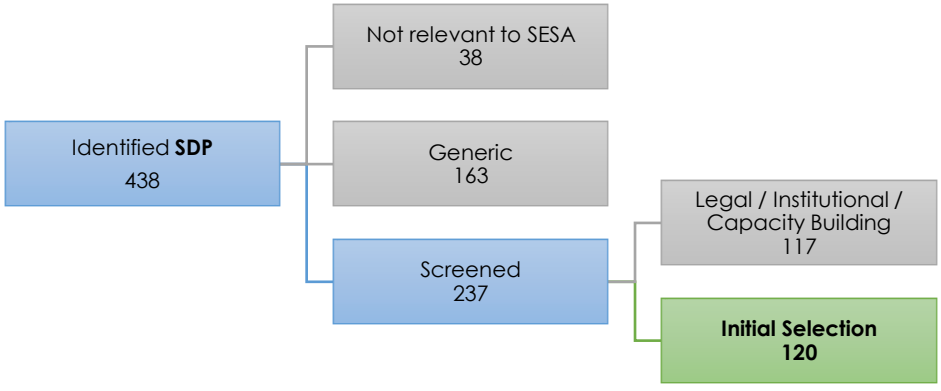


Figure 5.2.1-3: Initial selection of SDP

The wording of initially selected SDP was modified to integrate one or more strategic priorities per sector or between sectors in order to avoid duplications.

As a result of this process, 37 SDP related to physical planning/growth planning and identified in existing planning documentation were included in the preliminary selection. These are presented in Table 5.2.1-1 below.

The sources of each strategic development priority (i.e., the planning and policy documentation where identified) are clearly indicated. In cases where the wording of identified SDP has been modified in order to integrate one or more priorities per sector or across sectors, the source is marked as 'JV Expert Judgement – '*Title of Policy or Planning Document*'.

The preliminary selection of development priorities (the 37 SDP) is essentially an initial proposal for the optimum use of identified environmental characteristics for future growth at the national level taking into consideration the exploitation of respective opportunities and the minimization of related constraints these entail, as presented in section 4.5 of this report (Table 4.5-1). The identified links between environmental characteristics, respective opportunities and constraints and SDP are presented in Table 5.2.1-2 below.

Table 5.2.1-1: Strategic Development Priorities (SDP) – Preliminary selection

Sector	Strategic Development Priorities	Compilation of identified SDP[329]	Sources
AGRICULTURE, FORESTRY, FISHING	1. Develop, promote and implement sustainable agricultural practices, including residential agriculture and support small-scale food producers in Palestine	SDP **12, 33, 41, 42, 43, 45, 46**	JV Expert Judgement / SUSTAINABLE CONSUMPTION AND PRODUCTION 2016 / SD Target 2.3
	2. Sustainable development of the fishing sector and restoration of fishing stocks	SDP **24, 44**	JV Expert Judgement / National Spatial Plan 2025-2050
	3. Protect agricultural & forest lands from urban expansion and other forms of degradation	SDP **11**	National Agricultural Sector Strategy 2017-2022
	4. Implement initiatives towards intensive and semi-intensive agricultural production systems and increase productivity and competitiveness in local and international markets	SDP **17**	JV Expert Judgement/National Agricultural Sector Strategy 2017-2022
	5. Establish large water facilities for the transfer of water or water collection or wastewater treatment and increase the efficiency of the available water	SDP **6, 32, 34, 35**	National Agricultural Sector Strategy 2017-2022
	6. Livestock production, including breeding domestic animals as part of the household component	SDP **19**	National Agricultural Sector Strategy 2017-2022
	7. Link all agricultural land or lands that could be cultivated	SDP **7**	National Agricultural Sector Strategy 2017-2022
EDUCATION	8. Build and upgrade education facilities	-	JV Expert Judgement / SD TARGET 4.a
ENERGY	9. Increase reliance on renewable energy	SDP **50, 341**	JV Expert Judgement / 2017-22 National Policy Agenda Putting Citizens First, 2016 / National adaptation plan to climate change, Palestine 2016
	10. Develop transmission and distribution systems and rationalize energy consumption through the application of modern technologies	SDP **52, 53, 54, 120**	JV Expert Judgement / The Comprehensive National Strategy of Energy Sector in Palestine (2017-2022)
	11. Exchange of energy with neighboring countries through electrical linkage projects	SDP **49, 62, 63, 65**	The Comprehensive National Strategy of Energy Sector in Palestine (2017-2022)
	12. Diversify energy sources; increase the storage capacity and reserves of oil and gas	SDP **47, 58, 59, 67, 68, 121**	The Comprehensive National Strategy of Energy Sector in Palestine (2017-2022)
	13. Develop new and enhance existing Power Plants	SDP **48**	JV expert judgement / National adaptation plan to climate change, Palestine 2016
HEALTH	14. Build and upgrade essential health-care facilities	-	JV Expert Judgement / SD TARGET 3.8
INDUSTRY	15. Establish industrial zones, industrial compounds and industrial incubators	SDP **105, 114**	JV Expert Judgement/National Spatial Plan 2025-2050
	16. Support, rehabilitate and increase the establishment and development of small enterprises of a productive nature (craft areas)	SDP **115**	Spatial Development Strategic Framework for Nablus Governorate 2010-2014 / Hebron SDIP / SDIP Nablus /

[329] *See Annex VII of this report*

Sector	Strategic Development Priorities	Compilation of identified SDP[329]	Sources
			SD Target 9.3
	17. Ensure optimal organization of the process of industrial exploitation of natural resources promoting the comparative advantages in each region	SDP **107, 109, 112, 113, 116, 122, 126**	JV Expert Judgement / National Spatial Plan 2025-2050 / Spatial Development Strategic Framework for Nablus Governorate 2010-2014 / Gaza vision 2035
	18. Rehabilitation of industrial facilities and industrial equipment	SDP **124, 127**	JV Expert Judgement / National adaptation plan to climate change, Palestine 2016
SOLID WASTE	19. Safe and efficient disposal of SW using advanced technological methods	SDP **340, 341, 362**	JV Expert Judgement / National Strategy for Solid Waste Management in Palestine 2017-2022
	20. Supporting and promoting the current management systems for SW collection and transport, in order to improve the quality and effectiveness of services and provide them to all citizens	SDP **338, 363, 397, 398, 399, 409**	National Strategy for Solid Waste Management in Palestine 2017-2022
	21. Safe and efficient disposal of SW in regional sanitary landfills enough for servicing all communities while prohibiting random dumpsites which must be closed and rehabilitated	SDP **339, 341, 362**	JV Expert Judgement / National Strategy for Solid Waste Management in Palestine 2017-2022
TOURISM	22. Promote the diversification of the tourism to integrate alternative forms of tourism	SDP **128, 145, 300, 301**	Tourism Sector Export Strategy 2014-2018
	23. Upgrade and develop existing tourism product (seasonal, pilgrimage tourism)	SDP **130, 154**	JV Expert Judgement / Tourism Sector Export Strategy 2014-2018
	24. Focus tourism development to specific target groups of tourists (diaspora, Muslim, BRICS	SDP **135, 136, 137**	Tourism Sector Export Strategy 2014-2018
	25. Intensive investment in the building of hotels and restaurants, diversify their category and improve services	SDP **148**	JV Expert Judgement/National Spatial Plan 2025-2050
TRANSPORT	26. Establish a public transport network including non-road dependent modes of transportation	SDP **160, 162, 163, 164, 166, 177, 183, 240**	National Transport Master Plan for Palestine 2016-2045
	27. Develop multimodal transportation and link the road network, railways and airports with the seaport.	SDP **161, 165, 189, 190, 191, 193, 194, 195, 200, 211, 239, 242**	National Transport Master Plan for Palestine 2016-2045
URBAN & STRATEGIC PLANNING [330]	28. Urban infill: dense construction in urban centers to take advantage of available land, taking into consideration sustainable planning and construction methods (smart city model)	SDP **83, 90, 92, 98, 103, 227, 228, 231, 256, 272, 273, 274, 276, 296, 297**	JV Expert Judgement / National Spatial Plan 2025-2050/National adaptation plan to climate change, Palestine 2016
	29. Urban periphery: construction around existing urban centers to increase city size, and development of decentralized areas taking into consideration sustainable planning and construction methods (smart city model)	SDP **76, 102, 103, 256, 259**	JV Expert Judgement / SDFP-Spatial Development Framework Plan/National adaptation plan to climate change, Palestine 2016
	30. Establish new cities that absorb the high rate of population growth (smart city	SDP **256**	JV Expert Judgement / National Spatial Plan 2025-

[330] *Including 'Public Works and Housing'*

Sector	Strategic Development Priorities	Compilation of identified SDP[329]	Sources
	model)		2050
	31. Regenerate urban public spaces including green areas	SDP **262, 301**	Tell ACIP 2020 – Nablus / Zawata ACIP 2020 – Nablus / Beit Kahil SDIP 2018-2021 – Hebron / SDIP 2019-2022 – Gaza / SD TARGET 11.7
	32. Activating investment in urban infrastructure networks through joint programs with the private sector	SDP **77**	Strategic Plan for Developing the Housing Sector Palestine 2010
	33. Improve road, water and electricity networks and plans to serve the housing sector and improve services in rural and marginalized areas	SDP **76, 100, 228**	JV Expert Judgement / National Spatial Plan 2025-2050
WATER & WASTEWATER	34. Use of unconventional water resources for covering water demands for all uses (e.g., wastewater treatment for agriculture, desalination for drinking water) and unconventional wastewater treatment practices	SDP **304, 308, 309, 313, 323, 327**	JV Expert Judgement / National Agricultural Sector Strategy 2017-2022
	35. Develop decentralized wastewater collection, transportation and treatment systems	SDP **312, 328**	JV Expert Judgement / National Water Sector Strategic Plan and Action Plan, 2017-2022
	36. Develop centralized infrastructure, increasing the efficiency of wastewater systems (collection, transportation and treatment)	SDP **312, 328**	JV Expert Judgement / National Water Sector Strategic Plan and Action Plan, 2017-2022
	37. Improve the efficiency of water distribution systems in order to minimize losses and implement water consumption optimization methodologies	SDP **304, 308, 309, 310, 324, 325, 330, 331**	JV Expert Judgement / National Water Sector Strategic Plan and Action Plan, 2017-2022

Table 5.2.1-2: Links of environmental characteristics, opportunities and constraints with preliminary selected Strategic Development Priorities

Sector	Baseline Environmental Characteristics	Opportunities	Constraints	Strategic Development Priorities (SDP)																																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
AGRICULTURE – FORESTRY - FISHING	**Land (availability / quality)**	✓ Adequate land available for expansion of agriculture (land restoration / rehabilitation) and suitable for reclamation (non-agricultural land inside the land, which is classified as agricultural according to CORINE first level classification) ✓ Adequate land available for expansion of residential agriculture ✓ Adequate land available for livestock production ✓ Potential to use rainwater collection systems (rainwater harvesting) ✓ Potential for the introduction of water efficient and water saving irrigation techniques such as drip and sub-surface irrigation to reduce evaporation and water losses ✓ Optimize WWTP treated wastewater for agricultural production ✓ Potential for the creation of Constructed Wetlands to treat greywater for agricultural purposes	× Existing agricultural land is mostly of low productivity (indicating soils of low fertility) × Increased salinity levels × Residential agriculture provisions in approved masterplans are limited × Lack of residential agriculture strategy × Scarcity and low quality of available agricultural inputs (fertilizers, livestock feed, animal vaccines) × Fragmentation of land property, and reduction of agricultural lands to small plots × Weak Governmental support and budget for agriculture sector. × Lack of supporting institutions for agriculture. × Lack of Agricultural cooperatives and unions × Lack of enforcement of urban planning, leading to encroachment onto agricultural land in certain areas. × Reduced access to markets due, in part, to Israeli access control and subsidies for Israeli produce × Water scarcity and increased temperature as a result of climate change	X		X	X	X	X	X																												X			
	Forests	✓ Available land suitable for forestation / reclamation ✓ Promotion of non-timber forest products ✓ Potential for implementation of agroforestry interventions ✓ Available existing forest land suitable for recreation/ecotourism	× Forest land degradation × Increased prevalence of wildfire as a result of climate change	X		X			X																X															
	Fishing	✓ Potential for expansion of existing freshwater aquafarms to expand income opportunities ✓ Potential for expansion of existing mariculture farms to expand income opportunities (for Gaza Urban Area) ✓ Potential market for aquaculture products ✓ Good level of existing know-how	× Lack of aquaculture strategy × Fishing restrictions into shallow waters have serious implications for Gaza's coastal ecosystem, depleting fish stocks by increasing the exploitation of immature fish that have yet to reach breeding age. × Fishing is affected by marine pollution, caused by partially treated and raw wastewater, which increases fish mortality. × Poor water quality could potentially be a constraint for aquaculture as pre-treatment would be required. × Lack of reliable energy may also be a constraint of aquaculture.	X	X																																X	X		
EDUCATION	**Land (availability / quality)**	✓ Available land for education facilities	-								X																													
	Existing Education facilities	✓ Potential for the development of new education facilities with proximity to existing water, wastewater, energy and transportation networks ✓ Potential for the upgrade/rehabilitation of existing education facilities ✓ Tertiary education constitutes an asset of Ramallah and Al Bireh Urban Area, attracting human capital and eventually creating revenue	× Uneven distribution of education facilities between LGUs × Poor state of school infrastructure × Insufficient supportive educational facilities (laboratories, libraries, activities arenas, etc.) × Limited access to education facilities for the CWD × Lack of and limited technical and vocational schools								X		X																X									X	X	X
ENERGY	**Land (availability / quality)**	✓ Availability of Palestinian National Energy Efficiency Action Plan ✓ Availability of Palestinian Renewable Energy Law	× Limited land availability for large-scale renewable energy installations			X						X	X	X	X	X																								
	Energy supply and demand	✓ Potential contribution of renewable energy to cover future energy demand (wind farms, solar pvs as per Urban Area characteristics) ✓ Agricultural residue and food processing wastes from Agro-Industry represent an important source of biomass ✓ Potential for energy production from waste ✓ Potential for the concentrating energy efficiency measures in the residential sector, where energy consumption is highest	× Possible shortage of electricity at peaks of consumption × Energy reliance on neighboring countries × Lack of local storage capacity for petroleum and liquid gas, which are imported on a semi-daily basis × Poor infrastructure/inefficient transmission and distribution network × High electricity losses because of the poor state of infrastructure × Electricity energy demand increases	X		X	X	X	X		X	X	X	X	X	X	X	X			X	X		X					X	X									

Sector	Baseline Environmental Characteristics	Opportunities	Constraints	Strategic Development Priorities (SDP)																																				
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
		✓ Improve energy efficiency of existing buildings (retrofitting/renovation) ✓ Improve energy consumption of street infrastructures ✓ Potential for the application of modern technologies for the rationalization of energy consumption	× Limited land availability for large-scale renewable energy installations × Solar energy harvesting still very expensive for domestic use × Fragmentation of electricity distribution companies/bodies × Low recovery of payments for electricity from consumers																																					
HEALTH	**Land (availability / quality)**	✓ Available land for health facilities	-														X																							
	Existing Health facilities	✓ Potential for the development of new health facilities with proximity to existing water, wastewater, energy and transportation networks ✓ Potential for the upgrade/rehabilitation of existing health facilities ✓ Most healthcare facilities in the West Bank Urban Areas are connected to public water and wastewater networks	× Uneven distribution of health facilities between LGUs × Limited access to primary health care centers × Limited access to health services for the PWD × Medical wastewater of hazardous substances is not treated before discharged to wastewater networks and no provision for the management of medical solid wastes, thus increasing health concerns × Lack of reliable power for enhancing healthcare										X				X											X	X								X		X
INDUSTRY	**Land availability**	✓ Land availability for expansion of light industry reasonably close to residential areas ✓ Stone and marble resources can be further exploited to boost industrial production	× Limited regulations and poor enforcement of legislation on industrial activities/ no regulations on industrial wastewater and hazardous waste management/no regulations on industrial air emissions × Limited land availability for the expansion of heavy industry			X												X	X			X														X	X		
	Existing industries / quarries	✓ Potential for expansion of existing industrial areas as drivers of economic development ✓ Potential for upgrading existing industrial infrastructure to reduce pollution ✓ Potential for socio-economic integration between industries (e.g. Stone industry and construction materials industry) o By-products from the stone-cutting industry can be crushed into aggregate potential for using construction waste for the rehabilitation and reuse of abandoned quarries for different purposes o Treated wastewater from stone & marble industry can be used in concrete production/stone slurry recycling o Demolition waste can be returned in stone-cutting workshops and reused as building materials ✓ Potential for using treated industrial wastewater to cover water needs ✓ Potential for the promotion of less water and energy demanding industries	× Proximity of quarries, industries and industrial areas to residential or commercial areas, thus increasing air, noise, soil and water pollution and health risks × Limited data on existing industries and related pollution emissions × Air/dust, soil and water pollution from industries may have adverse consequences on ecosystem services and the biodiversity of an area and cause degradation of agricultural land × Overextraction of natural resources as raw products of the stone industry (limestone in the West Bank/ sandstone in Gaza Strip) × Challenges in covering water and energy demands of the industry sector × Weak planning and control mechanisms of industrial zones									X					X	X	X	X	X												X						
SOLID WASTE	**Land (availability / quality)**	✓ Potential for the use of alternative waste treatment technologies requiring less space	× Low public acceptability for establishing landfill sites near urban areas × Limited land availability			X																X		X															
	Existing facilities	✓ Rehabilitation of dumpsites and expansion of existing facilities ✓ Most of the waste in sanitary landfills is organic and recyclable, therefore there is significant potential to reduce the volume of waste being disposed and to produce energy (composting, biogas generation, incineration)	× Municipal solid waste generation is expected to increase substantially due to population growth and urbanization trends × Long distance to existing landfills results in the use of random dumpsites to accommodate needs, thereby causing health concerns × Lack of palestinian standards for the siting, design, or operation of sanitary landfills × No regulatory framework for the transportation of solid waste × No palestinian standards/regulations for handling special and hazardous waste × Lack of policies and initiatives for separation of waste for reuse			X																X		X															

Sector	Baseline Environmental Characteristics	Opportunities	Constraints	Strategic Development Priorities (SDP)																																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
TOURISM	**Land (availability / quality)**	✓ Available land for tourism																							X			X												
	Nature reserves / biodiversity hotspots	✓ Available land suitable for recreation/ecotourism ✓ Gaza beach is considered a feature of the city ✓ Endemic biodiversity and associated habitats that would attract local and international tourists.	× Lack of provision for management of protected areas in existing legislation × Fragmentation of nature reserves × Limited support and weak institutions for alternative forms of tourism × Coastal erosion due to man-made structures and seawater pollution due to wastewater discharges pose considerable limitations for future tourist development in Gaza beach																						X																
	Wetlands and other conservation areas (IBAs-IPAs)	✓ Available land suitable for recreation/ecotourism	× Wetlands are not designated as protected areas in national legislation																						X																
	Cultural Heritage	✓ Availability of archaeological sites and cultural landscapes as tourism attractions	× There is no master plan for the places of archaeological interest × The tourist potential of Ramallah, Nablus and Hebron is neglected; Ramallah is less visited as it is primarily a business destination and Nablus is rarely visited by foreigners at all.																							X	X														
TRANSPORT	**Land (availability / quality)**	✓ Integration of master plans with transportation plans	× Lack of coordination between spatial-planning models (land use policies) and transportation planning models × Lack of sustainable urban mobility guidelines																										X	X	X	X	X			X					
	Existing network	✓ New ring road segments along with other connecting roads can enhance connectivity among LGUs and with the surrounding areas ✓ Lack of railway and air transport systems ✓ Lack of a modern mass transport fleet for passengers.	× Inconsistencies of linked roads with existing master plans × Lack of policies and management plans to promote public transportation × Weak support for electrical and hybrid vehicles × Accessibility for PWD is not integrated in transportation planning																										X	X											
URBAN AND STRATEGIC PLANNING	**Housing**	✓ Potential for enhancement of the construction sector ✓ Potential for expansion of green infrastructure/green building sector ✓ Potential for reuse of existing vacant and ignored buildings	× Rapid urbanization, growing housing needs and significant pressure on urban services × No regulations on green buildings × No legal framework for the reuse of vacant and ignored buildings × Time consuming and overly complex permitting procedure × Weak enforcement of laws and bylaws for building and licensing resulting in extensive urban development outside of the designated urban boundaries																										X			X	X	X		X	X				
	Refugee Camps	-	× Extremely high population density and need for increased services (sewage treatment, waste management, water, transport network etc.) × There is no zoning or planning regime for refugee camps																				X							X	X					X	X		X	X	X
	Recreation areas	✓ Potential for expanding existing green and public spaces and recreation areas	× Lack of a public or green space strategy × Green and public spaces not integrated into urban planning × Depletion of green and public spaces due to urban expansion																															X							
	Urban planning	✓ Implementation of existing Regional Plan for West Bank ✓ Revisit master plans to incorporate urban and transportation plans	× Lack of coordination between spatial-planning models (land use policies) and transportation planning models × Accessibility for PWD is not integrated in urban planning × Lack of systematic land registration/inventory of public lands × Mixed use in many areas between residential and industrial × Lack of national and regional planning × Weak enforcement of Urban Plans, including laws and regulations. × Lack of joint coordination and strategic planning between Urban Area LGUs																										X	X	X	X	X	X							
	Flood hazard	✓ Potential for implementation of natural flood management practices ✓ Nablus is the first palestinian city to join the unisdr's resilience campaign and can act as a model for other targeted Urban Areas	× Limitations for the siting of new facilities × Lack of data on flood potential (1: 100 year flood line is not included in most Master Plans)								X							X											X			X	X	X							

Sector	Baseline Environmental Characteristics	Opportunities	Constraints	Strategic Development Priorities (SDP)																																				
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
	Earthquake Hazard	✓ Incorporation of seismic proof guidelines in building regulations ✓ Nablus is the first palestinian city to join the unisdr's resilience campaign and can act as a model for other targeted Urban Areas	× Limitations for the siting of new facilities								X							X										X			X	X	X							
WATER AND WASTEWATER	**Land (availability / quality)**	-	× Wastewater generation is expected to increase substantially due to population growth and urbanization trends																																	X	X	X	X
	Existing facilities (WWTP, Desalination plants, wastewater / water networks)	✓ Establish rainwater collection systems ✓ Optimize WWTP treated wastewater for agricultural production ✓ Potential for wastewater reuse for industry and urban applications (firefighting etc.) ✓ Potential for the creation of Constructed Wetlands to treat greywater ✓ Availability of standards and guidelines for treated wastewater reuse for irrigation ✓ Establish sustainable municipal water utilities and achieve economies of scale ✓ Potential for the reduction of Non-Revenue Water ✓ Promote the use of septic tanks in rural communities	× The sewage/rainwater network is ineffective with significant water losses. It is a combined system for both sewage and rainwater; this causes floods and contamination of domestic water supply in some areas, increasing the health risks of waterborne diseases. × Health concerns from the use of cesspits and open channels × Lack of a regulatory framework for the monitoring of drinking water × No approved laws and regulations for controlling industrial wastewater pollution × Hazardous waste bylaws and regulations not available × No regulatory framework for the formation of regional (or other levels like municipal) water utilities companies × Lack of policies for harvesting domestic rain water × Scarcity of fuel for generators and limitations in electricity supply affect desalination plant operations					X			X			X						X														X	X	X	X	X
	Surface water (quality / quantity)	✓ Potential to use rainwater collection systems (rainwater harvesting) ✓ Potential for the introduction of water efficient and water saving irrigation techniques such as drip and sub-surface irrigation to reduce evaporation and water losses	× Increase of drought frequency and duration affecting surface water availability × Inadequate sewage collection network discharges wastewater into nearby wadis thereby causing pollution and health concerns × In Gaza, because the topography is flat and land is scarce, the scope for storing and using any remaining surface water is limited.					X																												X	X	X	
	Groundwater (quality / quantity)	✓ Potential for wastewater reuse for groundwater recharge, industry reuse and urban applications (firefighting etc.) ✓ Potential for the creation of constructed wetlands to treat wastewater from WWTP for agricultural purposes ✓ Curb further extraction of groundwater from the aquifer and contribute to aquifer restoration	× Low aquifer balance/limited possibilities for further groundwater exploitation × Declining water tables/ impaired groundwater aquifers × Increase of drought frequency and duration affecting groundwater availability × × Ineffective irrigation network / water losses × Deteriorated groundwater quality					X																												X			X

5.2.2 Refinement process of Strategic Development Priorities

As an outcome of the refinement process, the relations (i.e., synergies and conflicts) between the preselected SDP and the Strategic E&S Objectives were identified. More specifically, the preselected 37 SDP were assessed against the final list of the 12 adopted Strategic E&S Objectives. The result of this exercise led to the exclusion of certain SDP from further consideration in the SESA process; identified 28 SDP which received highest total scores were therefore considered as viable development solutions for future growth. These are summarized in Table 5.2.2-1 below; the remaining SDP that were not considered as viable development solutions are shaded in grey.

The rationale behind the scoring in the refinement process matrix is presented below.

Table 5.2.2-1:Refinement Process Matrix - Identification of synergies and conflicts between preselected SDP and Strategic E&S Objectives

Sector	Strategic Development Priorities (SDP) \ Strategic E&S Objectives	1. Conservation and sustainable use of biodiversity within the framework of national sustainable development efforts in Palestine; combat desertification, halt and reverse land degradation, halt biodiversity loss.	2. Take urgent action to combat climate change and its impacts*	3. Conserve and sustainably use the oceans, seas and marine resources	4. Ensure sustainable consumption and production patterns (solid waste prevention, reduction, recycling, reuse)	5. Ensure availability and sustainable management of water resources and provide water and sanitation services for all	6. Ensure universal access to affordable, reliable and modern energy services and increase the share of renewable energy in the energy mix	7. Make cities and human settlements inclusive, safe, resilient and sustainable, by paying special attention to air quality	8. Strengthen efforts to protect and safeguard Palestine's cultural heritage	9. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	10. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all, strengthen the realization of rights at work, reduce unemployment rates in Palestine and support poverty alleviation	11. Achieve gender equality and empower all women and girls	12. Ensure healthy lives and promote well-being for all at all ages; ensure a comprehensive and integrated health system that contributes to improving the quality of health services and sustainably enhancing the health status.	TOTAL SCORE
Agriculture, Forestry, Fishing	1. Develop, promote and implement sustainable agricultural practices, including residential agriculture and support small-scale food producers in Palestine	2	2	0	1	1	1	1	1	0	1	1	1	12
	2. Sustainable development of the fishing sector and restoration of fishing stocks	2	1	2	?	1	?	0	0	0	1	0	1	8
	3. Protect agricultural & forest lands from urban expansion and other forms of degradation	2	1	0	1	?	-1	2	1	0	0	0	0	6
	4. Implement initiatives towards intensive and semi-intensive agricultural production systems and increase productivity and competitiveness in local and international markets	1	-1	0	2	-1	1	-1	0	0	2	?	1	4
	5. Establish large water facilities for the transfer of water or water collection or wastewater treatment and increase the efficiency of the available water	-1	1	1	0	1	-1	?	-1	0	1	0	1	2
	6. Livestock production, including breeding domestic animals as part of the household component	1	-1	0	1	-1	1	-1	0	0	1	0	1	2
	7. Link all agricultural land or lands that could be cultivated	1	0	0	0	0	0	0	-1	0	1	0	0	1
Education	8. Build and upgrade education facilities	-1	0	0	1	?	1	-1	1	2	1	1	0	5
Energy	9. Increase reliance on renewable energy	-1	2	?	2	2	2	1	0	0	2	0	1	11
	10. Develop transmission and distribution systems and rationalize energy consumption through the application of modern technologies	-1	?	0	0	2	2	?	0	0	1	0	1	5
	11. Exchange of energy with neighboring countries through electrical linkage projects	-1	?	0	0	2	2	0	0	0	1	0	1	5
	12. Diversify energy sources; increase the storage capacity and reserves of oil and gas	-1	?	0	0	1	1	?	0	0	1	0	1	3
	13. Develop new and enhance existing Power Plants	-1	?	0	?	2	2	-1	0	0	1	0	1	4
Health	14. Build and upgrade essential health-care facilities	-1	0	0	1	?	1	-1	0	0	1	0	2	3
Industry	15. Establish industrial zones, industrial compounds and industrial incubators	-1	1	0	1	1	1	1	-1	0	2	0	1	6
	16. Support, rehabilitate and increase the establishment and development of small enterprises of a productive nature (craft areas)	?	?	0	1	?	0	?	2	0	1	1	?	5
	17. Ensure optimal organization of the process of industrial exploitation of natural resources promoting the comparative advantages in each region	?	0	0	?	?	?	0	0	0	2	1	0	3
	18. Rehabilitation of industrial facilities and industrial equipment	0	1	0	1	1	?	1	0	0	1	0	1	6
Solid Waste	19. Safe and efficient disposal of SW using advanced technological methods	1	1	1	2	1	2	1	0	0	1	0	1	11
	20. Supporting and promoting the current management systems for SW collection and transport, in order to improve the quality and effectiveness of services and provide them to all citizens	?	1	1	1	0	?	1	0	0	1	0	1	6
	21. Safe and efficient disposal of SW in regional sanitary landfills enough for servicing all communities while prohibiting random dumpsites which must be closed and rehabilitated	2	-1	1	?	?	2	1	-1	0	1	0	1	6

Sector	Strategic E&S Objectives / Strategic Development Priorities (SDP)	1. Conservation and sustainable use of biodiversity within the framework of national sustainable development efforts in Palestine; combat desertification, halt and reverse land degradation, halt biodiversity loss.	2. Take urgent action to combat climate change and its impacts*	3. Conserve and sustainably use the oceans, seas and marine resources	4. Ensure sustainable consumption and production patterns (solid waste prevention, reduction, recycling, reuse)	5. Ensure availability and sustainable management of water resources and provide water and sanitation services for all	6. Ensure universal access to affordable, reliable and modern energy services and increase the share of renewable energy in the energy mix	7. Make cities and human settlements inclusive, safe, resilient and sustainable, by paying special attention to air quality	8. Strengthen efforts to protect and safeguard Palestine's cultural heritage	9. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	10. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all, strengthen the realization of rights at work, reduce unemployment rates in Palestine and support poverty alleviation	11. Achieve gender equality and empower all women and girls	12. Ensure healthy lives and promote well-being for all at all ages; ensure a comprehensive and integrated health system that contributes to improving the quality of health services and sustainably enhancing the health status.	TOTAL SCORE
Tourism	22. Promote the diversification of the tourism to integrate alternative forms of tourism	2	1	1	1	1	1	?	1	0	1	0	?	9
	23. Upgrade and develop existing tourism product (seasonal, pilgrimage tourism)	?	?	0	?	?	?	?	2	1	2	0	?	5
	24. Focus tourism development to specific target groups of tourists (diaspora, Muslim, BRICS)	?	?	0	?	?	?	?	1	0	1	0	?	2
	25. Intensive investment in the building of hotels and restaurants, diversify their category and improve services	-1	?	?	-1	-1	-1	?	-1	0	1	0	?	-4
Transport	26. Establish a public transport network including non-road dependent modes of transportation	-1	1	0	0	0	2	2	0	1	1	?	1	7
	27. Develop multimodal transportation and link the road network, railways and airports with the seaport.	-1	-1	-1	1	1	-1	-1	0	2	2	0	2	3
Urban & Strategic Planning	28. Urban infill: dense construction in urban centers to take advantage of available land, taking into consideration sustainable planning and construction methods (smart city model)	1	1	0	1	1	1	1	-1	1	1	0	1	8
	29. Urban periphery: construction around existing urban centers to increase city size, and development of decentralized areas taking into consideration sustainable planning and construction methods (smart city model)	-1	?	0	1	1	1	-1	-1	2	1	0	2	5
	30. Establish new cities that absorb the high rate of population growth (smart city model)	-2	?	0	1	1	1	-1	-1	1	1	0	1	2
	31. Regenerate urban public spaces including green areas	1	1	0	0	-1	-1	1	0	0	0	0	1	2
	32. Activating investment in urban infrastructure networks through joint programs with the private sector	-1	?	0	1	1	1	?	-1	?	1	0	?	2
	33. Improve road, water and electricity networks and plans to serve the housing sector and improve services in rural and marginalized areas	-1	?	0	1	1	1	?	-1	?	1	0	?	2
Water & Wastewater	34. Use of unconventional water resources for covering water demands for all uses (e.g., wastewater treatment for agriculture, desalination for drinking water) and unconventional wastewater treatment practices	1	?	1	0	2	-2	?	0	0	1	0	1	4
	35. Develop decentralized wastewater collection, transportation and treatment systems	-1	?	1	0	2	-1	?	0	0	1	0	1	3
	36. Develop centralized infrastructure, increasing the efficiency of wastewater systems (collection, transportation and treatment)	-1	?	1	0	2	-1	?	0	0	1	0	1	3
	37. Improve the efficiency of water distribution systems in order to minimize losses and implement water consumption optimization methodologies	0	1	0	0	2	1	1	0	0	1	0	1	7

Legend

+2	*full synergy*
+1	*considerable synergy*
0	*no synergy*
-1	*considerable conflict*
-2	*absolute conflict*
?	*Uncertain interaction*

Agriculture

With reference to the **agriculture sector**, it is of great importance to optimize the utilization of natural resources in a sustainable way by responding to the human and natural induced limitations (i.e., land degradation, scarce water resources, inappropriate practices leading to contamination of soils and groundwater, restrictions on essential agricultural inputs etc.). In this context, seven (7) Strategic Development Priorities have been initially selected in order to address these limitations by making optimum use of available environmental resources.

As a general comment, almost all selected agriculture SDP (with the exception of SDP 5) contribute to the achievement of the conservation objective (E&S Objective 1); sustainable agriculture practices such as residential agriculture (SDP 1) have the potential to respond to agricultural land fragmentation; sustainable fishing methods (SDP 2) can address fish stock depletion; protection of agricultural and forest lands from urban expansion with interventions such as land reclamation (SDP 3) can prevent address land degradation; intensive and semi-intensive agriculture (SDP 4) can contribute to restore the vitality of agricultural land, and agricultural production goals can be achieved without threats to conservation providing that specific practices such as agroforestry or precision agriculture are implemented; the same applies for livestock production, providing that practices such as silvopastoral farming are introduced (SDP 6); connection of all agricultural lands that could be cultivated (SDP 7) contributes to reverse land degradation. The introduction of water-efficient irrigation technologies (SDP 5) will most probably have land requirements that could be related with habitat loss and therefore are considered to be in conflict with E&S Objective 1.

The same applies for the health objective (E&S Objective 12) and the employment/growth objective (E&S Objective 10). Most identified agriculture SDP (with the exception of SDP 3 and SDP 7) contribute to food security and therefore to improved human health, while almost all (with the exception of SDP 3) are linked with the potential for employment opportunities.

With the exception of SDP 2, SDP 5 and SDP 7, all other selected agriculture SDP are in synergy with the solid waste objective (E&S Objective 4); agricultural waste from these SDP may be reused for energy production and/or recycled or composted, thus contributing to the improvement of soil quality.

However, this is not the case for the water and energy objectives (E&S Objectives 5 & 6 respectively). The implementation of intensive and semi-intensive agricultural production interventions (SDP 4), would most probably exert further pressure on already scarce water resources; the same applies for the expansion of livestock production (SDP 6). The establishment of facilities for the provision of irrigation water (SDP 5) will most probably have energy requirements that would further pressure the already burdened energy network. The protection of agricultural and forest land (SDP 3) is expected to be in conflict with the land requirements of any energy production technology, be it renewable or not.

The protection of cultural heritage (E&S Objective 8) may be in conflict with the establishment of facilities for the provision of irrigation water (SDP 5) but also with the connection of all agricultural lands that could be cultivated (SDP7). However, the promotion of small-scale sustainable agriculture practices (SDP 1) and the protection of agricultural and forest lands from urban expansion (SDP 3), which have limited land requirements are considered to be supportive of E&S Objective 8.

Intensive agricultural practices with heavy use of fertilizers (SDP 4) and livestock production waste (SDP 6) are considered as contributors to air pollution, mainly in the form of ammonia (E&S Objective 7). Obviously, this is not the case for sustainable agricultural practices (SDP 1) and for interventions related to the protection of agricultural lands and forests (SDP 3).

Agriculture is the sector most sensitive to climate change in the West Bank, which is the source of most agricultural products (86%) in Palestine. The anticipated irrigation water shortages that are expected as a result of climate change, are in turn expected to have impacts on vegetable, oil and citrus production. In this context, the establishment of facilities for the provision of irrigation water (SDP 5) is expected to contribute to the alleviation of climate change impacts on the agriculture sector (E&S Objective 2). The same applies for the promotion of climate-smart agricultural practices (SDP 1) which can increase agricultural productivity but also reduce greenhouse gas emissions. The protection of agricultural and forest land from urban expansion (SDP 3), is expected to act as a stabilizing force for climate change; the same applies for sustainable fishing practices (SDP 2) which can rebuild fish stocks thus improving resilience to climate change. On the contrary, intensive agricultural practices (SDP 4) and livestock production (SDP 6) have considerable greenhouse gas emissions and are therefore are expected to contribute to climate change.

Health and Education

As a result of the planning documentation review for the **education and health sectors** (SDP 8 and SDP 14 respectively), only one SDP per sector was selected, addressing the main identified limitation which is the availability and quality of educational and health facilities. With the exception of E&S Objective 8 on the protection of cultural heritage and E&S Objective 11 on gender equality, where no relation with the health sector can be assumed, the contribution of these SDP to the achievement of E&S Objectives is expected to be analogous.

Energy

With reference to the **energy sector**, all selected energy SDP may contribute to the employment/growth objective (E&S Objective 10), as they address energy availability concerns that are vital for economic growth and also have potential for the creation of employment opportunities. In the same context, all selected energy SDP may contribute to the health objective (E&S Objective 12) as energy security is also related with the provision of reliable health services. The same applies for the water objective (E&S Objective 5), as water and sanitation services are inextricably linked with energy supply. On the other hand, any energy production technology, be it renewable or not, to a greater or lesser extent, is expected to be in conflict with to the achievement of the conservation objective (E&S Objective 1).

Regarding the climate change objective (E&S Objective 2), with the exception of renewable energy interventions (SDP 9) which can obviously contribute to its achievement, the interaction with all other energy SDP is considered as uncertain. The same applies to the marine resources' objective (E&S Objective 3), where interaction with the potential for the implementation of marine renewable energy (SDP 9) is considered uncertain.

Renewable energy waste can be used for energy generation, thus indicating synergy between SDP 9 and the solid waste objective (E&S Objective 4). Similarly, introduction of renewable energy technologies (SDP 9) is expected to contribute to the improvement of air quality (E&S Objective 7)

whereas the use of existing or new power plants (SDP 13) is expected to work against achieving this goal.

Industry

With reference to the **industry sector**, the establishment of industrial zones (SDP 15) is expected to act against the achievement of the conservation objective (E&S Objective 1) as it will most probably have land requirements that could be related with habitat loss. However, the remaining industry SDP, due to their small scale (SDP 16 and SDP 18) or nature have either uncertain (SDP 16 and SDP 17)) or nonexistent (SDP 18) relation with the conservation objective.

The establishment of craft areas (SDP 16) and the exploitation of the comparative advantages in each region (SDP 17) are expected to provide opportunities for the employment of women (E&S Objective 11) but are not considered likely to have any impacts on human health (E&S Objective 12). However, this is not the case for the establishment of industrial zones (SDP 15) and the rehabilitation of industrial facilities (SDP 18); these SDP are expected to contribute to the improvement of the population's health status due to the anticipated control and minimization of industrial emissions. In the same context, SDP 15 and SDP 18 are expected to act synergistically towards the achievement of air quality improvement (E&S Objective 7) but also to the alleviation of climate change impacts (E&S Objective 2).

Industrial parks (SDP 15) may introduce solar PVs to cover their energy requirements, thus contributing to an increase in the implementation of renewable energy (E&S Objective 6). Furthermore, the establishment of industrial parks is related to the control of industrial waste and wastewater emissions (E&S Objective 4 and E&S Objective 5); the same applies for the rehabilitation of industrial facilities (SDP 18), as it is considered likely to contribute to the decrease in industrial waste and wastewater emissions.

The promotion of craft areas (SDP 16) is interrelated with the protection of cultural heritage (E&S Objective 8); on the other hand, the establishment of industrial areas (SDP 15), with the land requirements it entails, is most probably expected to be in conflict with E&S Objective 8 on cultural heritage protection.

Solid Waste

With reference to the **solid waste sector,** all selected solid waste SDP are expected to contribute to the employment/growth objective (E&S Objective 10), as they have potential for job creation and local economic development. Furthermore, all selected solid waste SDP are expected to contribute to the health objective (E&S Objective 12) as they address the health concerns related to uncontrolled waste disposal. In the same context, all selected solid waste SDP are expected to contribute considerably to the improvement of air quality (E&S Objective 7) but also to the alleviation of pollution from uncontrolled ocean dumping (E&S Objective 3).

However, the same does not apply for the contribution to the alleviation of climate change impacts (E&S Objective 2) due to the considerable methane emissions from landfill disposal. Similarly, the creation of landfills and (SDP 21), even though a viable solid waste management option, does not contribute to waste prevention or reduction (E&S Objective 4); however, the rehabilitation of dumpsites can be considered as a contributor to sustainable consumption and production practices, provided that reuse of wastes is promoted (e.g., e-wastes etc.). Therefore, the overall interaction of

SDP 21 with E&S Objective 4 can be considered as uncertain. Rehabilitation of uncontrolled dumping can contribute to the alleviation of harmful impacts to local flora and fauna and restoration of landfill sites can work as potential reserve of semi-natural habitats thus contributing to the achievement of the conservation objective (E&S Objective 1).

Landfill gas (SDP 21) can be transformed into electricity, or into a clean renewable transport fuel as compressed biogas for waste trucks and waste-to-energy facilities divert waste from landfills to generate energy from the combustion of municipal solid waste that remains after recycling (SDP 19). Therefore, overall, the waste sector SDP may be considered as significant contributors to the introduction of reliable and modern energy services (E&S Objective 6).

Leachate contamination from dumpsites poses serious human health concerns, the alleviation of which cannot be ensured through the introduction of sanitary landfills (SDP 21); therefore, the interaction with improving water resources quality (E&S Objective 5) can be considered as uncertain. Finally, the land requirements of landfills (SDP 21) are most probably likely to be in conflict with E&S Objective 8 on cultural heritage protection.

Tourism

With reference to the **tourism sector**, all selected tourist SDP are expected to contribute to the employment/growth objective (E&S Objective 10). The same applies for the cultural heritage objective (E&S Objective 8), with the exception of the land-consuming intensive development of tourist infrastructure (SDP 25) which may be in conflict with potential existing cultural heritage sites. The promotion of alternative, local forms of tourism (SDP 22) is related to sustainable fishing, with revenues being used for marine conservation initiatives (E&S Objective 3); however, SDP 25 may be in conflict with the protection of Gaza Sea resources.

The development of land-consuming tourist infrastructure (SDP 25), may exert pressure on existing solid waste, water and energy demands (E&S Objectives 4, 5 and 6 respectively) while for the promotion of alternative forms of tourism (SDP 22) this is not expected to be the case. For the remaining tourist SDP, the overall interaction can be considered as uncertain; addressing the needs of an enhanced tourism sector, by making optimum use of available environmental resources would entail the promotion of sustainable solid waste, water and wastewater as well as energy management practices in order to cover growing pressure on existing infrastructure networks. In the same context, the interaction of tourism SDP with the air quality and health objectives (E&S Objectives 7 and 12 respectively) can also be considered as uncertain.

The same applies for the interaction with the climate change objective (E&S Objective 2); any additional pressure from the promotion of alternative forms of tourism (SDP 22) is most probably going to be distributed evenly over time and therefore not stress existing infrastructure excessively while at the same time, the introduction of interventions for the protection and promotion of cultural heritage and eco-tourist attractions (such as flood management schemes) would also contribute to climate change resilience.

The promotion of alternative forms of tourism (SDP 22) will most probably act in synergy with the achievement of the conservation objective (E&S Objective 1) as these are expected to contribute to halting biodiversity loss and habitat degradation.

Transport

With reference to the **transport sector**, both selected SDP may contribute considerably to the employment/growth objective (E&S Objective 10); improved transportation networks are expected to enhance accessibility to existing or future health and education facilities (E&S Objective 12 and E&S Objective 9) but can also contribute to improved water supply (E&S Objective 5) and solid waste management services (E&S Objective 4).

On the other hand, the land-take which is related to both selected transport SDP is expected to negatively impact habitats and biodiversity (E&S Objective 1). Marine habitats (E&S Objective 3) may be adversely impacted by the development of a seaport (SDP 27).

The establishment of a public transport network (SDP 26) is expected to contribute considerably to the improvement of air quality (E&S Objective 7). This is not the case for the expansion of the existing road network and the development of multimodal transportation networks (SDP 27), which are considerable contributors to air pollution and energy consumption (E&S Objective 6). Taking into consideration the GHG emissions associated with transportation modes, same principles apply for the contribution of both transport SDP to the alleviation of climate change impacts (E&S Objective 2).

Urban and Strategic Planning

With reference to the **urban and strategic planning sector**, all selected SDP are expected to contribute to the employment/growth objective (E&S Objective 10). The same applies for the solid waste, water and energy objectives (E&S Objectives 4, 5 and 6 respectively), the only exception being the regeneration of urban public spaces (SDP 31); their creation and upkeeping will have water and energy requirements (E&S Objectives 5 and 6 respectively). In the same context, the distribution of health and education facilities would be improved by the implementation of most selected SDP and therefore synergy with the education and health objectives (E&S Objectives 9 and 12 respectively) is expected.

On the other hand, most selected urban and strategic planning SDP are land-consuming and therefore are expected to be in conflict with the protection of cultural heritage (E&S Objective 8). The same applies for the conservation objective (E&S Objective 1); with the exception of urban infill (SDP 28) and urban public spaces regeneration (SDP 31), land consumption of remaining SDP is expected to be in conflict with E&S Objective 1.

Furthermore, the urban infill approach (SDP 28) entails minimization of travelling distances and would therefore be expected to be in synergy with the air quality objective (E&S Objective 7); this is not the case for the urban periphery approach (SDP 29) or the establishment of new cities (SDP 30). For the same reason, with reference to the climate change objective (E&S Objective 2), even though all urban growth approaches (SDP 28, 29 and 30) entail the integration of smart-city model practices, the urban infill approach is considered be more likely to contribute to the alleviation of climate change.

Waste and Wastewater

With reference to the **water and wastewater sector,** obviously, all selected water SDP are expected to contribute to the water objective (E&S Objective 5), the marine resources objective (E&S Objective 3), the employment/growth objective (E&S Objective 10), and the health objective (E&S Objective 12).

Regarding achievement of the energy objective (E&S Objective 6), water supply, distribution and wastewater treatment (SDP 35 and SDP 36) require energy-intensive technologies while newer technologies (SDP 34), tend to be more energy-intensive than prevailing technologies. For example, water from desalination plants is much more energy intensive than conventional surface or groundwater supplies. Water-use efficiency including water loss/leakage reduction (Non-Revenue Water reduction) may have a significant impact on energy consumption of municipal water and wastewater services (SDP 37); in this context, SDP 37 is expected to contribute to the achievement of E&S Objective 6.

Regarding the climate change objective (E&S Objective 2), with the exception of SDP 37, the remaining SDP are expected to have uncertain interaction. On the one hand, as mentioned above, water and wastewater services are energy-consuming and in this sense, they would be in conflict with the achievement of E&S Objective 2; on the other hand, non-conventional water resources and improved access to water and wastewater services are a means of adaptation to drought and climate change. In this context, SDP 37 is expected to contribute not only to E&S Objective 6, as mentioned above, but also to E&S Objective 2. Under this rationale, SDP 37 is also expected to contribute to E&S Objective 7 on air quality improvement. The interaction of the remaining water and wastewater SDP to the achievement of improving air quality (E&S Objective 7) is uncertain.

With reference to the conservation objective (E&S Objective 1), establishment of water supply, distribution and wastewater treatment facilities (SDP 35 and SDP 36) is likely to have land requirements that could be related with habitat loss and therefore are considered to be in conflict with E&S Objective 1; this does not apply for SDP 37, which has negligible, if any, land requirements. Green wastewater infrastructure (SDP 34) is expected to contribute to the achievement of the conservation objective (E&S Objective 1), as these technologies can help meet water quality requirements with minimal disturbance to existing biodiversity.

5.3 Priority Setting

The 28 SDP that received highest scores and were considered as viable development solutions for future growth were subsequently prioritized:

- by the JV team as part of the horizontal ranking process;
- by stakeholders as part of the vertical ranking process.

The list of experts and their field of expertise are included in Annex VIII of this report. The horizontal and vertical ranking methodology have been presented in detail in section 2.3.2.4 of this report. An overview of the horizontal and vertical ranking process is presented in sections 5.3.1 and 5.3.2 below.

5.3.1 Horizontal ranking

Horizontal ranking entails ranking of SDP based on specific criteria. It has been conducted by the JV Team, of whom 75% are local and 25% international experts and therefore have an in-depth knowledge of national and regional development priorities. JV experts were asked to complete the exercise having a national-level approach in mind, thus controlling bias for SDP that benefited specific regions. The horizontal ranking criteria and ranking scale have been presented in Table

2.3.2-1 above. The scores of all JV members were added and the lowest overall scores are equivalent to the potential top-5 SDP.

A total of 19 JV Experts completed the horizontal ranking process; the completed consultation material, results and team composition are presented in detail in Annex VIII of this report. The overall scores of all participants were added and the lowest overall scores correspond to the potential SDP top-5 priorities; these are presented in Table 5.3.1-1 below and are highlighted in bold.

Table 5.3.1-1: Horizontal Ranking Results across the five targeted Urban Areas

Sector	SDP	Total Score	Horizontal Ranking
AGRICULTURE, FORESTRY, FISHING	**1. Develop, promote and implement sustainable agricultural practices, including residential agriculture and support small-scale food producers in Palestine**	**29.7**	**2**
	2. Sustainable development of the fishing sector and restoration of fishing stocks	30.8	7
	3. Protect agricultural & forest lands from urban expansion and other forms of degradation	32.1	13
	4. Implement initiatives towards intensive and semi-intensive agricultural production systems and increase productivity and competitiveness in local and international markets	36.6	24
EDUCATION	5. Build and upgrade education facilities	37.1	25
ENERGY	**6. Increase reliance on renewable energy**	**29.3**	**1**
	7. Develop transmission and distribution systems and rationalize energy consumption through the application of modern technologies	33.0	15
	8. Exchange of energy with neighboring countries through electrical linkage projects	35.6	21
	9. Diversify energy sources; increase the storage capacity and reserves of oil and gas	44.2	28
	10. Develop new and enhance existing Power Plants	41.9	27
HEALTH	11. Build and upgrade essential health-care facilities	32.0	9
INDUSTRY	12. Establish industrial zones, industrial compounds and industrial incubators	33.5	16
	13. Support, rehabilitate and increase the establishment and development of small enterprises of a productive nature (craft areas)	31.2	8
	14. Ensure optimal organization of the process of industrial exploitation of natural resources promoting the comparative advantages in each region	35.8	22
	15. Rehabilitation of industrial facilities and industrial equipment	35.8	23
SOLID WASTE	**16. Safe and efficient disposal of SW using advanced technological methods**	**30.0**	**4**
	17. Supporting and promoting the current management systems for SW collection and transport, in order to improve the quality and effectiveness of services and provide them to all citizens	30.2	6
	18. Safe and efficient disposal of SW in regional sanitary landfills enough for servicing all communities while prohibiting random dumpsites which must be closed and rehabilitated	**30.1**	**5**
TOURISM	19. Promote the diversification of the tourism to integrate alternative forms of tourism	32.0	11
	20. Upgrade and develop existing tourism product (seasonal, pilgrimage tourism)	33.5	17
TRANSPORT	21. Establish a public transport network including non-road dependent modes of transportation	33.5	18
	22. Develop multimodal transportation and link the road network, railways and airports with the seaport.	38.2	26
URBAN & STRATEGIC PLANNING	23. Urban infill: dense construction in urban centers to take advantage of available land, taking into consideration sustainable planning and construction methods (smart city model)	32.2	14
	24. Urban periphery: construction around existing urban centers to increase city size, and development of decentralized areas taking into consideration sustainable planning and construction methods (smart city model)	35.0	20
WATER &	**25. Use of unconventional water resources for covering water demands for all uses (e.g., wastewater treatment for agriculture, desalination for drinking water) and**	**29.8**	**3**

Sector	SDP	Total Score	Horizontal Ranking
WASTEWATER	**unconventional wastewater treatment practices**		
	26. Develop decentralized wastewater collection, transportation and treatment systems	32.0	10
	27. Develop centralized infrastructure, increasing the efficiency of wastewater systems (collection, transportation and treatment)	34.1	19
	28. Improve the efficiency of water distribution systems in order to minimize losses and implement water consumption optimization methodologies	32.0	12

Overall, the outcome of the horizontal ranking exercise was that the solid waste management, energy, water & wastewater and agriculture sectors were considered as most significant across all Urban Areas.

As a result of the horizontal ranking process, two out of three solid waste management SDP were included in the top-5 priorities, with the promotion of sustainable, advanced technological solutions for solid waste scoring lowest and therefore ranking as a priority for the solid waste management sector. The upgrading of current waste management solutions, including landfills and prohibition of dumpsites, is also a priority for the solid waste management sector, however it lags behind in terms of environmental benefits when compared to SDP 16.

Furthermore, the results of the horizontal ranking process provided a clear indication regarding the promotion of sustainable SDP for the Agriculture and Energy and Water & Wastewater sectors; emphasis is given on sustainable agricultural practices and support of small-scale food producers, on the promotion of renewable energy as well as on the use of unconventional water resources for covering water demands for all uses.

5.3.2 Vertical ranking

During the vertical ranking process, as part of Phase 3 Consultation, a total of 84 Stakeholder authorities, represented by 136 participants, were contacted at the national, regional and local levels; of these, 73 Stakeholder authorities, represented by 113 participants provided their feedback in the form of completed consultation material.

Stakeholders' participation in the vertical ranking process was quite high, reaching 87% for contacted authorities and 83% for their representatives.

The full list of contacted stakeholders and their representatives is presented in Annex VIII of this report. The completed consultation material may be accessed via the SESA Palestine ftp file sharing platform[331].

Stakeholders were asked to select the top-5 out of the 28 selected SDP that they consider as most significant, by assigning one (1) point to each. Local stakeholders were asked to complete the exercise taking into consideration the overall needs of urban development for the targeted urban areas and having a cross-sectoral approach in mind, thus controlling bias for SDP that benefited their field of expertise. The total points per SDP were added to provide the top-5 SDP that received highest scores.

[331] http://gofile.me/6J3So/FgBtWnGNW

A limited number of stakeholder representatives (7% of total) selected more or less than 5 SDP. These responses were taken into consideration as completed, without any interference, so as to ensure an unbiased approach to the scoring exercise.

The **overall** results of the vertical ranking process across the five targeted Urban Areas are presented in Table 5.3.2-1 below. The top-5 priority SDP that scored highest across the five targeted urban areas are highlighted in bold.

Table 5.3.2-1: Vertical Ranking results across the five targeted Urban Areas

Sector	SDP	Total Score	Vertical Ranking
AGRICULTURE, FORESTRY, FISHING	1. Develop, promote and implement sustainable agricultural practices, including residential agriculture and support small-scale food producers in Palestine	25	9
	2. Sustainable development of the fishing sector and restoration of fishing stocks	5	26
	3. Protect agricultural & forest lands from urban expansion and other forms of degradation	**34**	**4**
	4. Implement initiatives towards intensive and semi-intensive agricultural production systems and increase productivity and competitiveness in local and international markets	8	21
EDUCATION	5. Build and upgrade education facilities	24	10
ENERGY	**6. Increase reliance on renewable energy**	**63**	**2**
	7. Develop transmission and distribution systems and rationalize energy consumption through the application of modern technologies	11	17
	8. Exchange of energy with neighboring countries through electrical linkage projects	9	20
	9. Diversify energy sources; increase the storage capacity and reserves of oil and gas	8	22
	10. Develop new and enhance existing Power Plants	4	27
HEALTH	**11. Build and upgrade essential health-care facilities**	**33**	**5**
INDUSTRY	12. Establish industrial zones, industrial compounds and industrial incubators	26	8
	13. Support, rehabilitate and increase the establishment and development of small enterprises of a productive nature (craft areas)	18	13
	14. Ensure optimal organization of the process of industrial exploitation of natural resources promoting the comparative advantages in each region	7	23
	15. Rehabilitation of industrial facilities and industrial equipment	3	28
SOLID WASTE	**16. Safe and efficient disposal of SW using advanced technological methods**	**66**	**1**
	17. Supporting and promoting the current management systems for SW collection and transport, in order to improve the quality and effectiveness of services and provide them to all citizens	20	12
	18. Safe and efficient disposal of SW in regional sanitary landfills enough for servicing all communities while prohibiting random dumpsites which must be closed and rehabilitated	12	16
TOURISM	19. Promote the diversification of the tourism to integrate alternative forms of tourism	22	11
	20. Upgrade and develop existing tourism product (seasonal, pilgrimage tourism)	6	25
TRANSPORT	21. Establish a public transport network including non-road dependent modes of transportation	18	14
	22. Develop multimodal transportation and link the road network, railways and airports with the seaport.	7	24
URBAN & STRATEGIC PLANNING	23. Urban infill: dense construction in urban centers to take advantage of available land, taking into consideration sustainable planning and construction methods (smart city model)	30	7
	24. Urban periphery: construction around existing urban centers to increase city size, and development of decentralized areas taking into consideration sustainable planning and	18	15

Sector	SDP	Total Score	Vertical Ranking
	construction methods (smart city model)		
WATER & WASTEWATER	**25. Use of unconventional water resources for covering water demands for all uses (e.g., wastewater treatment for agriculture, desalination for drinking water) and unconventional wastewater treatment practices**	**38**	**3**
	26. Develop decentralized wastewater collection, transportation and treatment systems	11	18
	27. Develop centralized infrastructure, increasing the efficiency of wastewater systems (collection, transportation and treatment)	31	6
	28. Improve the efficiency of water distribution systems in order to minimize losses and implement water consumption optimization methodologies	11	19

Overall, the results of the vertical ranking process *across the five targeted urban areas* showed a clear preference of sustainable, advanced technological solutions for solid waste, energy and water & wastewater SDP. The protection of agricultural lands from urban expansion and the development and upgrading of health-care facilities are also ranked among the top-5 SDP across the five targeted urban areas.

The results of the vertical ranking process *per Urban Area* are presented in Table 5.3.2-2 below, where the top-5 SDP priorities from vertical ranking are highlighted in yellow.

Table 5.3.2-2: Vertical Ranking results per Urban Area

Sector	SDP	Nablus		Ramallah AndAl Bireh		Bethlehem		Hebron		Gaza	
		Total Score	Vertical Ranking	Total Score	Vertical Ranking	Total Score	Vertical Ranking	Total Score	Vertical Ranking	Total Score	Vertical Ranking
AGRICULTURE, FORESTRY, FISHING	**1. Develop, promote and implement sustainable agricultural practices, including residential agriculture and support small-scale food producers in Palestine**	0	27	5	14	**10**	**4**	3	10	**7**	**5**
	2. Sustainable development of the fishing sector and restoration of fishing stocks	0	28	0	28	0	23	0	20	5	9
	3. Protect agricultural & forest lands from urban expansion and other forms of degradation	**10**	**3**	**8**	**4**	5	8	5	6	6	6
	4. Implement initiatives towards intensive and semi-intensive agricultural production systems and increase productivity and competitiveness in local and international markets	2	16	2	21	3	15	0	21	1	23
EDUCATION	**5. Build and upgrade education facilities**	6	6	**7**	**5**	7	6	0	22	4	12
ENERGY	**6. Increase reliance on renewable energy**	**14**	**2**	**16**	**2**	**12**	**2**	**8**	**3**	**13**	**2**
	7. Develop transmission and distribution systems and rationalize energy consumption through the application of modern technologies	1	21	5	13	1	19	0	23	4	13
	8. Exchange of energy with neighboring countries through electrical linkage projects	1	22	1	25	0	24	1	16	6	7
	9. Diversify energy sources; increase the storage capacity and reserves of oil and gas	1	23	3	17	0	25	4	8	0	26
	10. Develop new and enhance existing Power Plants	1	24	0	27	1	20	0	24	2	20
HEALTH	**11. Build and upgrade essential health-care facilities**	**8**	**4**	6	8	**13**	**1**	2	13	4	10
INDUSTRY	**12. Establish industrial zones, industrial compounds and industrial incubators**	4	11	4	15	5	9	**10**	**1**	3	15
	13. Support, rehabilitate and increase the establishment and development of small enterprises of a productive nature (craft areas)	3	13	4	16	6	7	1	17	4	11
	14. Ensure optimal organization of the process of industrial exploitation of natural resources promoting the comparative advantages in each region	2	17	1	24	0	26	3	11	1	21
	15. Rehabilitation of industrial facilities and industrial equipment	1	25	2	23	0	27	0	25	0	28
SOLID WASTE	**16. Safe and efficient disposal of SW using advanced technological methods**	**15**	**1**	**22**	**1**	**10**	**5**	**6**	**4**	**13**	**3**
	17. Supporting and promoting the current management systems for SW collection and transport, in order to improve the quality and effectiveness of services and provide them to all citizens	4	12	5	11	4	11	2	14	5	8
	18. Safe and efficient disposal of SW in regional sanitary landfills enough for servicing all communities while prohibiting random dumpsites which must be closed and rehabilitated	5	8	2	18	1	21	0	26	4	14
TOURISM	**19. Promote the diversification of the tourism to integrate alternative forms of tourism**	2	18	5	12	**12**	**3**	3	12	0	27
	20. Upgrade and develop existing tourism product (seasonal, pilgrimage tourism)	1	26	1	26	3	16	0	27	1	24
TRANSPORT	21. Establish a public transport network including non-road dependent modes of transportation	2	19	6	10	4	12	4	9	2	19
	22. Develop multimodal transportation and link the road network, railways and airports with the seaport.	2	20	2	22	0	28	0	28	3	18
URBAN & STRATEGIC PLANNING	**23. Urban infill: dense construction in urban centers to take advantage of available land, taking into consideration sustainable planning and construction methods (smart city model)**	6	7	7	6	5	10	1	18	**11**	**4**
	24. Urban periphery: construction around existing urban centers to increase city size, and development of decentralized areas taking into consideration sustainable planning and construction methods (smart city model)	5	9	7	7	3	17	2	15	1	22
WATER & WASTEWATER	**25. Use of unconventional water resources for covering water demands for all uses (e.g., wastewater treatment for agriculture, desalination for drinking water) and unconventional wastewater treatment practices**	5	10	6	9	4	13	**9**	**2**	**14**	**1**
	26. Develop decentralized wastewater collection, transportation and treatment systems	3	14	2	19	1	22	5	7	0	25
	27. Develop centralized infrastructure, increasing the efficiency of wastewater systems (collection, transportation and treatment)	**7**	**5**	**11**	**3**	4	14	**6**	**5**	3	16
	28. Improve the efficiency of water distribution systems in order to minimize losses and implement water consumption optimization methodologies	3	15	2	20	2	18	1	19	3	17

The results of the vertical ranking process obviously differ per targeted urban area; however, two SDP on solid waste (SDP 16) and energy (SDP 6) are common in *all* targeted urban areas.

Furthermore, Nablus and Ramallah & Al Bireh Urban Areas share four out of five top priorities with education facilities replacing the development and upgrading of health-care facilities.

On the other hand, Bethlehem and Gaza Urban Areas share three out of five top priorities, the third being the promotion of sustainable agriculture practices (SDP 1). Similarly, Hebron and Gaza Urban Areas have three top-5 priorities in common, the third being the use of unconventional water resources (SDP 25).

Overall, for the agriculture and water & wastewater sectors there is a discrepancy between top priorities between Urban Areas. For the agriculture sector, SDP 1 is top priority in Bethlehem and Gaza Urban Areas while SDP 3 is top priority in Nablus and Ramallah and Al Bireh. For the water & wastewater sector, SDP 25 is a top priority in Hebron and Gaza Urban Areas, while SDP 27 is a top 5 priority in Nablus, Ramallah and Al Bireh and Hebron Urban Areas.

Nablus and Bethlehem Urban Areas have included the development of essential health facilities in their top-5 priorities (SDP 11).

Finally, as expected, the establishment of industrial zones (SDP 12), the promotion of alternative forms of tourism (SDP 19) and vertical urban expansion (SDP 23) are among top-5 priorities in Hebron, Bethlehem and Gaza Urban Areas respectively.

5.3.3 Final ranking

The final ranking of SDPs is based on the sum of the ranking placements from the vertical and horizontal ranking steps. The five SDPs with the lowest combined ranking scores were considered the five priority SDPs. These were then analyzed further by means of spatial mapping. The results from this process are presented in Table 5.3.3-1.

Table 5.3.3-1: Horizontal, Vertical and Final Ranking Results across the five targeted Urban Areas

Sector	SDP	Horizontal Ranking	Vertical Ranking	Final Ranking
AGRICULTURE, FORESTRY, FISHING	**1. Develop, promote and implement sustainable agricultural practices, including residential agriculture and support small-scale food producers in Palestine**	**2**	9	**4**
	2. Sustainable development of the fishing sector and restoration of fishing stocks	7	26	18
	3. Protect agricultural & forest lands from urban expansion and other forms of degradation	13	**4**	6
	4. Implement initiatives towards intensive and semi-intensive agricultural production systems and increase productivity and competitiveness in local and international markets	24	21	23
EDUCATION	5. Build and upgrade education facilities	25	10	20
ENERGY	**6. Increase reliance on renewable energy**	**1**	**2**	**1**
	7. Develop transmission and distribution systems and rationalize energy consumption through the application of modern technologies	15	17	17
	8. Exchange of energy with neighboring countries through electrical linkage	21	20	22

Sector	SDP	Horizontal Ranking	Vertical Ranking	Final Ranking
	projects			
	9. Diversify energy sources; increase the storage capacity and reserves of oil and gas	28	22	27
	10. Develop new and enhance existing Power Plants	27	27	28
HEALTH	**11. Build and upgrade essential health-care facilities**	9	**5**	**5**
INDUSTRY	12. Establish industrial zones, industrial compounds and industrial incubators	16	8	12
	13. Support, rehabilitate and increase the establishment and development of small enterprises of a productive nature (craft areas)	8	13	9
	14. Ensure optimal organization of the process of industrial exploitation of natural resources promoting the comparative advantages in each region	22	23	24
	15. Rehabilitation of industrial facilities and industrial equipment	23	28	25
SOLID WASTE	**16. Safe and efficient disposal of SW using advanced technological methods**	**4**	**1**	**2**
	17. Supporting and promoting the current management systems for SW collection and transport, in order to improve the quality and effectiveness of services and provide them to all citizens	6	12	7
	18. Safe and efficient disposal of SW in regional sanitary landfills enough for servicing all communities while prohibiting random dumpsites which must be closed and rehabilitated	**5**	16	8
TOURISM	19. Promote the diversification of the tourism to integrate alternative forms of tourism	11	11	11
	20. Upgrade and develop existing tourism product (seasonal, pilgrimage tourism)	17	25	21
TRANSPORT	21. Establish a public transport network including non-road dependent modes of transportation	18	14	16
	22. Develop multimodal transportation and link the road network, railways and airports with the seaport.	26	24	26
URBAN & STRATEGIC PLANNING	23. Urban infill: dense construction in urban centers to take advantage of available land, taking into consideration sustainable planning and construction methods (smart city model)	14	7	10
	24. Urban periphery: construction around existing urban centers to increase city size, and development of decentralized areas taking into consideration sustainable planning and construction methods (smart city model)	20	15	19
WATER & WASTEWATER	**25. Use of unconventional water resources for covering water demands for all uses (e.g., wastewater treatment for agriculture, desalination for drinking water) and unconventional wastewater treatment practices**	**3**	**3**	**3**
	26. Develop decentralized wastewater collection, transportation and treatment systems	10	18	14
	27. Develop centralized infrastructure, increasing the efficiency of wastewater systems (collection, transportation and treatment)	19	6	13
	28. Improve the efficiency of water distribution systems in order to minimize losses and implement water consumption optimization methodologies	12	19	15

The vertical ranking results per Urban Area have also been combined with horizontal ranking results and presented in Table 5.3.3-2 below. Again, for the final ranking of SDP per Urban Area, 50% weighting was applied equally on horizontal and vertical ranking results.

Table 5.3.3-2: Horizontal, Vertical and Final Ranking Results per Urban Area

Sector	SDP	Horizontal Ranking	Nablus		Ramallah And Al Bireh		Bethlehem		Hebron		Gaza	
			Vertical Ranking	Final Ranking	Vertical Ranking	Final Ranking	Vertical Ranking	Final Ranking	Vertical Ranking	Final Ranking	Vertical Ranking	Final Ranking
AGRICULTURE, FORESTRY, FISHING	**1. Develop, promote and implement sustainable agricultural practices, including residential agriculture and support small-scale food producers in Palestine**	**2**	27	15	14	**4**	**4**	**2**	10	**4**	**5**	**4**
	2. Sustainable development of the fishing sector and restoration of fishing stocks	7	28	18	28	20	23	21	20	19	9	6
	3. Protect agricultural & forest lands from urban expansion and other forms of degradation	13	**3**	6	**4**	6	8	9	6	7	6	8
	4. Implement initiatives towards intensive and semi-intensive agricultural production systems and increase productivity and competitiveness in local and international markets	24	16	22	21	22	15	22	21	25	23	25
EDUCATION	5. Build and upgrade education facilities	25	6	17	**5**	18	6	17	22	24	12	19
ENERGY	**6. Increase reliance on renewable energy**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**3**	**1**	**2**	**1**
	7. Develop transmission and distribution systems and rationalize energy consumption through the application of modern technologies	15	21	19	13	14	19	18	23	21	13	12
	8. Exchange of energy with neighboring countries through electrical linkage projects	21	22	23	25	25	24	24	16	23	7	13
	9. Diversify energy sources; increase the storage capacity and reserves of oil and gas	28	23	27	17	23	25	28	8	20	26	28
	10. Develop new and enhance existing Power Plants	27	24	28	27	28	20	26	24	27	20	26
HEALTH	**11. Build and upgrade essential health-care facilities**	9	**4**	**4**	8	**5**	**1**	**4**	13	10	10	9
INDUSTRY	**12. Establish industrial zones, industrial compounds and industrial incubators**	16	11	12	15	17	9	12	**1**	**5**	15	15
	13. Support, rehabilitate and increase the establishment and development of small enterprises of a productive nature (craft areas)	8	13	9	16	12	7	7	17	11	11	10
	14. Ensure optimal organization of the process of industrial exploitation of natural resources promoting the comparative advantages in each region	22	17	21	24	24	26	23	11	17	21	23
	15. Rehabilitation of industrial facilities and industrial equipment	23	25	26	23	26	27	25	25	26	28	27
SOLID WASTE	**16. Safe and efficient disposal of SW using advanced technological methods**	**4**	**1**	**2**	**1**	**2**	**5**	**3**	**4**	**3**	**3**	**3**
	17. Supporting and promoting the current management systems for SW collection and transport, in order to improve the quality and effectiveness of services and provide them to all citizens	6	12	7	11	7	11	8	14	8	8	**5**
	18. Safe and efficient disposal of SW in regional sanitary landfills enough for servicing all communities while prohibiting random dumpsites which must be closed and rehabilitated	**5**	8	**5**	18	10	21	11	26	14	14	11
TOURISM	**19. Promote the diversification of the tourism to integrate alternative forms of tourism**	11	18	14	12	11	**3**	**5**	12	9	27	20
	20. Upgrade and develop existing tourism product (seasonal, pilgrimage tourism)	17	26	24	26	21	16	19	27	22	24	21
TRANSPORT	21. Establish a public transport network including non-road dependent modes of transportation	18	19	20	10	15	12	15	9	13	19	18
	22. Develop multimodal transportation and link the road network, railways and airports with the seaport.	26	20	25	22	27	28	27	28	28	18	24
URBAN & STRATEGIC PLANNING	23. Urban infill: dense construction in urban centers to take advantage of available land, taking into consideration sustainable planning and construction methods (smart city model)	14	7	8	6	8	10	10	18	16	**4**	7
	24. Urban periphery: construction around existing urban centers to increase city size, and development of decentralized areas taking into consideration sustainable planning and construction methods (smart city model)	20	9	16	7	13	17	20	15	18	22	22
WATER & WASTEWATER	**25. Use of unconventional water resources for covering water demands for all uses (e.g., wastewater treatment for agriculture, desalination for drinking water) and unconventional wastewater treatment practices**	**3**	10	**3**	9	**3**	13	6	**2**	**2**	**1**	**2**
	26. Develop decentralized wastewater collection, transportation and treatment systems	10	14	11	19	16	22	16	7	6	25	16
	27. Develop centralized infrastructure, increasing the efficiency of wastewater systems (collection, transportation and treatment)	19	**5**	10	**3**	9	14	13	**5**	12	16	17
	28. Improve the efficiency of water distribution systems in order to minimize losses and implement water consumption optimization methodologies	12	15	13	20	19	18	14	19	15	17	14

Differentiation between horizontal and vertical ranking scores is mainly due to the geographical scale applied. In most cases, differentiations between the horizontal and vertical ranking scores are alleviated in the final ranking. The criteria applied to categorize differentiations between ranking scores have been presented in section 2.3.2.4 of this report.

For most SDP in any of the targeted urban areas, differentiation between vertical and final ranking scores is considered as negligible.

The environmental and social/health benefits of SDP 25 have resulted in high horizontal ranking score, thus leading to moderate differentiation between vertical and final ranking for three out of five targeted urban areas (Nablus, Ramallah and Al Bireh and Bethlehem); similarly the high implementation cost of SDP 27 has resulted in relatively low horizontal ranking score, thus leading to moderate differentiation between vertical and final ranking for Ramallah and Al Bireh and Hebron Urban Areas.

High differentiation between vertical and final ranking applies to SDP 1 for two out of five targeted urban areas and to SDP 5 for Nablus, Ramallah and Al Bireh and Bethlehem.

With reference to the differentiation in the agriculture SDP 1, Nablus Urban Area is a commercial and educational center and Ramallah and Al Bireh is an administrative and cultural center, therefore the implementation of sustainable agricultural practices (SDP 1) was not captured in the vertical ranking results. However, due to the high environmental and social / health benefits that are expected from the implementation of sustainable agricultural practices, (SDP 1) has scored high in the horizontal ranking.

Regarding the differentiation in the education SDP 5, even though Nablus Urban Area has a high number of primary and secondary education facilities and the largest university in Palestine is located in Nablus Governorate, upgrading of educational facilities has scored high in the vertical ranking thus indicating that improvement of these facilities is high in the priorities for urban growth in Nablus Area. Ramallah and Al Bireh has high concentration of tertiary educational institutions, which are considered an asset of Ramallah and Al Bireh Urban Area for the attraction of human capital and the creation of revenue; the importance of the education sector is captured in the vertical ranking exercise, where SDP 5 is among the top-5 priorities. Bethlehem Urban Area has the lowest number of education facilities from the West Bank Urban Areas with an uneven distribution between LGUs; therefore, the improvement of educational facilities has scored relatively high in the vertical ranking, thus indicating that improvement of these facilities is among the high priorities for the area. These characteristics of the education sector were not captured in the horizontal ranking exercise, where the high performance of the education SDP in the social and institutional/governance criteria did not manage to counterbalance its low performance on environmental benefit and implementation cost criteria, thus resulting in an overall low score for SDP 5 in the horizontal ranking.

5.4 Recommendations for future development

Recommendations for future development are based on the output of spatial analysis, which was performed for each targeted urban area and apply to areas that were not built-up (areas LU3 and LU4, as defined in section 4.3.1.2.4 of this report). The recommendations for future development for each Urban Area are presented in sections 5.4.1 - 5.4.5 below.

SESA recommendations for each targeted urban area in West Bank also include a commentary on the Urban Growth Boundaries, which were the output of Urban Growth Scenarios, developed as part of the Integrated Cities and Urban Development Project. More specifically, Urban Growth Scenarios were developed aiming to identify the optimum path that each urban area could follow in order not only to address the expected population growth but also to promote sustainable urbanization (CAPSUS S.C. Urban Growth Scenarios for Palestine - CAPSUS Sustainable Capital, 2019). As a result of the Urban Growth Scenarios exercise, areas that have a high probability of becoming urban by 2035 were identified; these areas for West Bank may extend beyond Urban Area boundaries. It must be noted that, as Gaza Urban Area may not extend urban growth beyond its boundaries, the Urban Growth Scenarios were not taken into consideration in the SESA recommendations.

5.4.1 Nablus Urban Area

5.4.1.1 Key development sectors

Agriculture, Forestry and Fishing

Table 5.4.1-1 below presents the priority areas and exclusion areas for future agriculture development in Nablus Urban Area. All percentages in Table 5.4.1-1 are calculated based on the total surface of Nablus Urban Area (108.2 km²). The priority and exclusion areas for agriculture development within Area C are also presented, in order to allow for an overview of areas that can be developed in the short-term.

Table 5.4.1-1: Priority and Exclusion Areas for Agriculture Development - Nablus Urban Area

		Nablus Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total surface	**km²**	108.2	32.92	0.88	13.5	60.9
	%	100%	30.43%	0.81%	12.48%	56.29%
Within Area C	**km²**	45.7	2.5	0.85	8.67	33.7
	%	42.3%	2.31%	0.79%	8.01%	31.15%

Legend

The sum of these areas are the priority areas for future agriculture development.

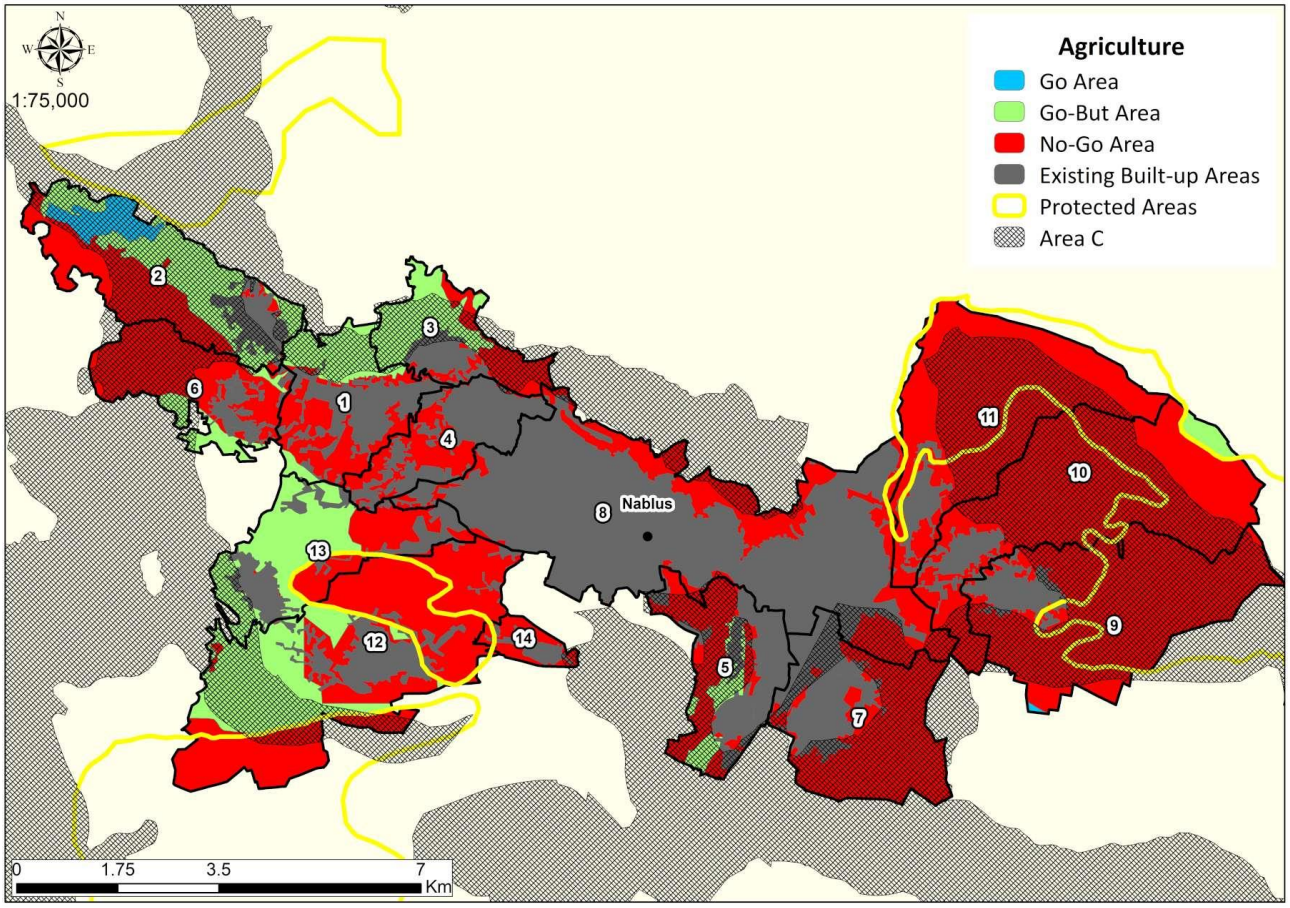


Figure 5.4.1-1: Priority and Exclusion Areas for Agriculture Development - Nablus Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 56% of Nablus Urban Area total surface is considered as an exclusion area and therefore not a priority for agricultural development. It must be noted that approximately 38% of this exclusion area (or approximately 21% of Nablus Urban Area total surface) are protected areas.

Approximately 22% of Nablus Urban Area that is considered as an exclusion area for agricultural development is 'extremely vulnerable to pollution'. However, approximately 89% of this area (or 20% of Nablus Urban Area total surface) could, under certain conditions, be used for agricultural purposes. More specifically, in these areas where the underlying geological formations are aquifers, precision agriculture could assist in overcoming the water pollution risk, thereby extending the area that would be suitable for agriculture; closed-loop hydroponic farming that is unlikely to result in groundwater pollution could also be implemented. The remaining 11% of this exclusion area that is extremely vulnerable to pollution and where the underlying geological formations are aquitards (mostly to the west of Nablus Urban Area, within Qusin LGU) cannot be used for agricultural development.

Water shortages can be addressed through the use of the existing WWTP's treated wastewater for agricultural production and the introduction of water efficient and water saving irrigation techniques such as drip and sub-surface irrigation to reduce evaporation and water losses.

It must be noted that, as a result of the final ranking exercise, agriculture SDP are not within the top-5 priorities for Nablus Urban Area. However, since SDP 3 '*Protect agricultural & forest lands from urban*

expansion and other forms of degradation' has scored high (6th) in the final ranking exercise, it is proposed that, where appropriate, in approximately 13% of Nablus Urban Area total surface where agriculture may be developed ('priority areas for agriculture development'), priority is given in the reclamation of the non-agricultural land inside the land which is classified as agricultural according to CORINE first level classification of land cover/use; this land is considered as an important reserve for increasing the agricultural area therefore reclamation of these areas would be of great economic value to Nablus Urban Area.

Given the fact that Nablus has high cattle production (approximately 15% of the total cattle production in Palestine), rangeland reclamation may also be an option in the 'priority areas for agriculture development'. Agroforestry is also an option, given the fact that approximately 1% of Nablus Urban Area is covered by forests. Finally, there is potential for expansion of existing freshwater aquafarms.

As shown in Figure 5.4.1-2 below, approximately 22% of the areas that have a high probability of becoming urban by 2035 ('Urban Growth Boundary') *within* Nablus Urban Area falls within the priority area for agriculture development (marked in blue); given the fact that available land is limited, future urban planning would have to revisit the proposed Urban Growth Boundaries so as to protect agricultural land from urban expansion as much as possible. An option would be to promote residential agriculture interventions in these areas.

Approximately 58% of the Urban Growth Boundary for Nablus Urban Area, falls *outside* the Nablus Urban Area limits. To the west/north west of Nablus Urban Area where, according to SESA recommendations, agriculture can be developed within the Urban Area boundary, urban expansion outside urban area boundaries would be in conflict with adjacent agricultural uses within urban area boundaries; these areas are marked in orange.

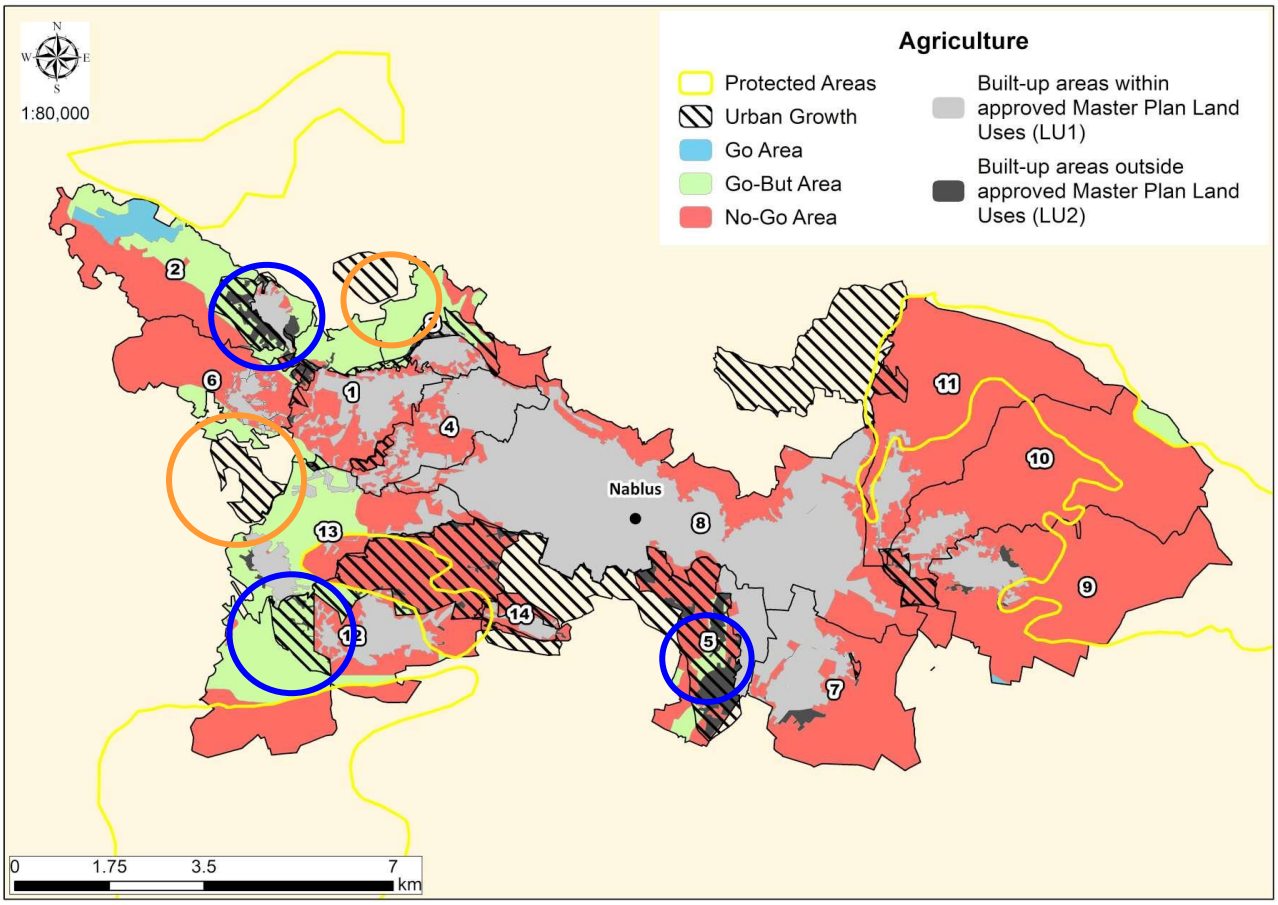


Figure 5.4.1-2: Urban Growth Boundaries & Priority and Exclusion areas for agriculture development – Nablus Urban Area

Urban and Strategic Planning

Table 5.4.1-2 below presents the priority areas and exclusion areas for urban planning development in Nablus Urban Area. All percentages in Table 5.4.1-2 are calculated based on the total surface of Nablus Urban Area (108.2 km²). The priority and exclusion areas for urban planning development within Area C are also presented, in order to allow for an overview of areas that can be developed in the short-term.

Table 5.4.1-2: Priority and Exclusion Areas for Urban Planning Development - Nablus Urban Area

		Nablus Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total Surface	km²	108.2	32.92	26.85	20.45	27.98
	%	100%	30.43%	24.82%	18.90%	25.86%
Within Area C	km²	45.7	2.5	19.19	9.29	14.74
	%	42.3%	2.31%	17.74%	8.59%	13.62%

Legend

The sum of these areas are the priority areas for urban planning development.

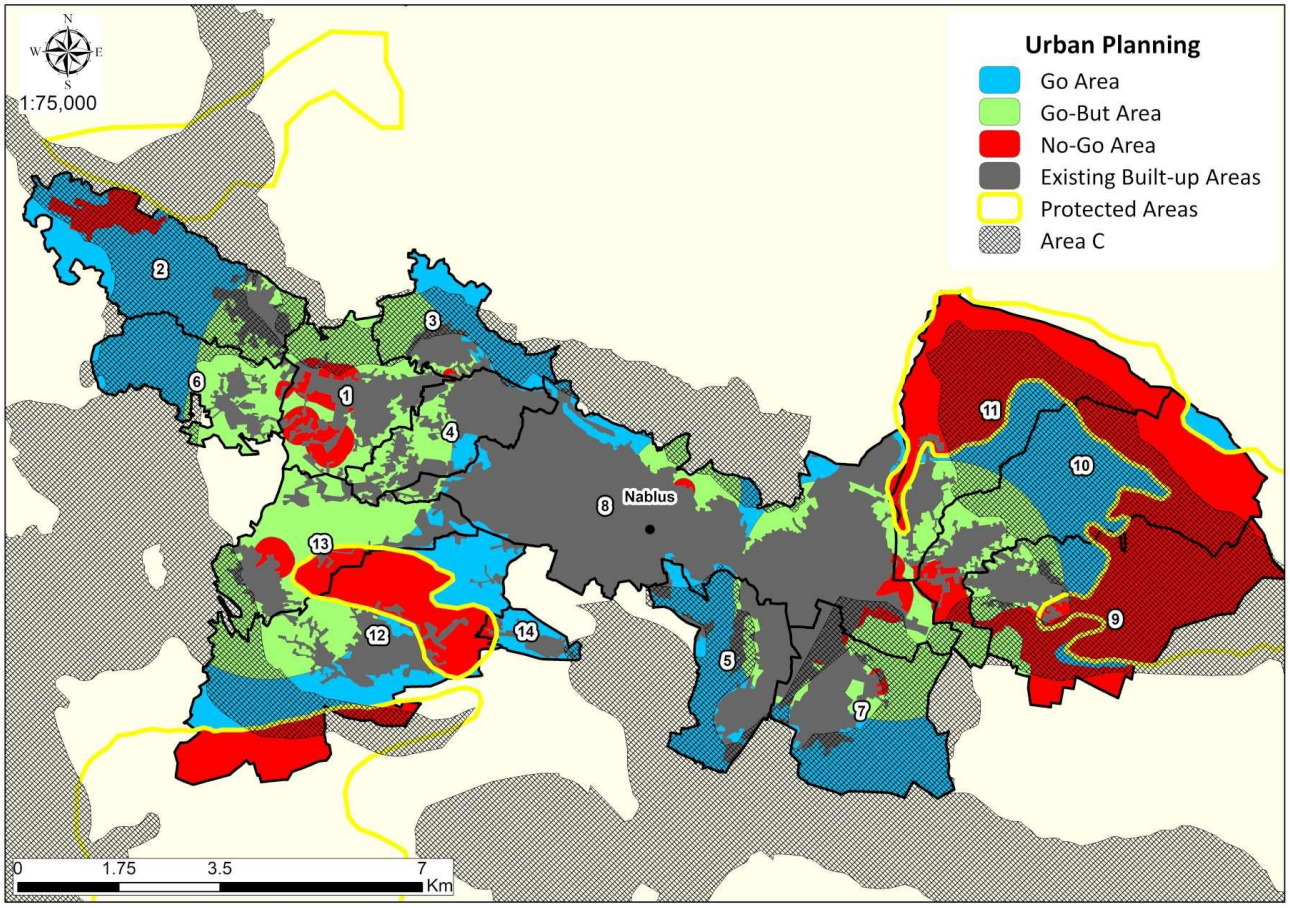


Figure 5.4.1-3: Priority and Exclusion Areas for Urban Planning Development - Nablus Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 28% of Nablus Urban Area total surface is considered as an exclusion area and therefore not a priority for urban planning development. It must be noted that approximately 76% of this exclusion area (or approximately 21% of Nablus Urban Area total surface) are protected areas and therefore not suitable for urban planning development.

It must be noted that, as a result of the final ranking exercise, urban planning SDP are not within the top-5 priorities for Nablus Urban Area. However, since SDP 23 '*Urban infill: dense construction in urban centers to take advantage of available land, taking into consideration sustainable planning and construction methods (smart city model)'* has scored relatively high (8th) in the final ranking exercise, it is proposed that, where appropriate, in approximately 44% of Nablus Urban Area total surface where urban planning may be developed ('priority areas for urban planning development'), priority may be given to the reuse of existing vacant and ignored buildings to cover growing housing needs and the promotion of green infrastructure.

In order to ensure that the 500m distance criterion from existing or proposed antiquities areas is met at all times, in go-but areas and in the vicinity of antiquities, public urban spaces (i.e., open areas, Urban Green Spaces etc.) would be preferable.

As shown in Figure 5.4.1-4 below, approximately 18% of the areas that have a high probability of becoming urban by 2035 as predicted by the Urban Growth Scenarios, have already been urbanized but are not included in approved Master Plans (LU2) and approximately 30% of the built-up areas that are not included in approved Master Plans (LU2) fall *outside* the Urban Growth Boundary; in both

cases, future urban planning (town planners) would have to revisit approved Master Plans and Urban Growth Boundaries so as to include areas that have already been developed (marked in blue).

Approximately 21% of the Urban Growth Boundary falls within protected areas (nature reserves and key biodiversity areas) (marked in pink in Figure 5.4.1-4 below); future urban planning would have to revisit the proposed Urban Growth Boundaries so as to minimize likely impacts of urban expansion into sensitive areas. It must be noted that, approximately 2% of protected areas (or 3% of protected areas within the Urban Growth Boundary) are already built-up, therefore it is considered a priority to prevent further encroachment of urban development into protected areas. Furthermore, approximately 25% of total stream length within Nablus Urban Area falls within the Urban Growth Boundaries, thus posing limitations that would have to be taken into consideration for future urban development along riparian areas so as to minimize likely water pollution.

As mentioned earlier, and as shown in Figure 5.4.1-4 below, urban planning development to the west/north west of Nablus Urban Area within the Urban Area boundary (marked in orange) would be in synergy with urban expansion outside urban area boundaries. Furthermore, to the north east of Nablus Urban Area, urban expansion outside urban area boundaries would be in conflict with the adjacent protected area within urban area boundaries; all reasonable care (i.e., ecological buffer zones etc.) should be taken into consideration for the minimization of any likely impacts of future urban growth on this protected area.

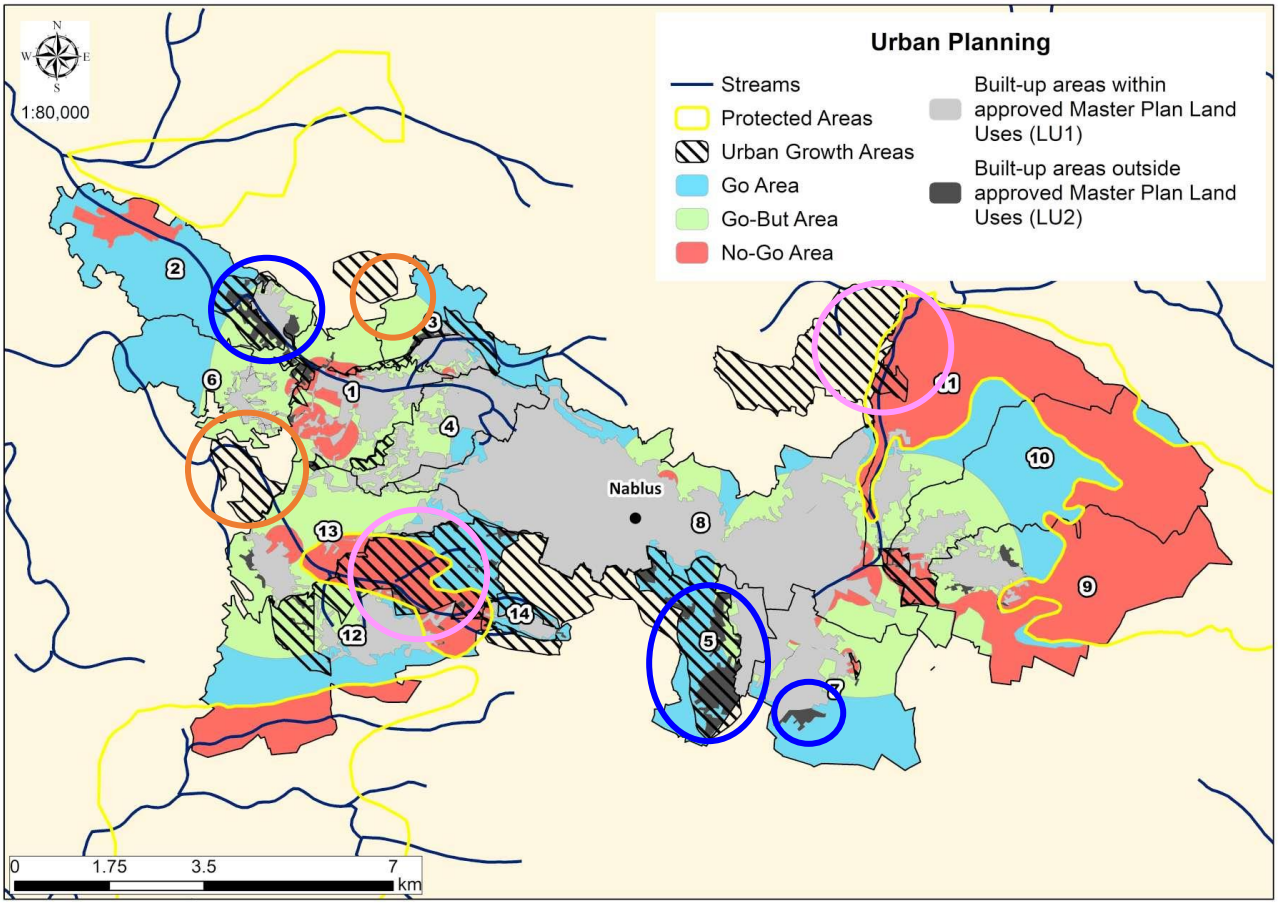


Figure 5.4.1-4: Urban Growth Boundaries & Priority and Exclusion areas for urban development – Nablus Urban Area

Tourism

Table 5.4.1-3 below presents the priority areas and exclusion areas for future tourism development in Nablus Urban Area. All percentages in Table 5.4.1-3 are calculated based on the total surface of Nablus Urban Area (108.2 km²). The priority and exclusion areas for tourism development within Area C are also presented, in order to allow for an overview of areas that can be developed in the short-term.

Table 5.4.1-3: Priority and Exclusion Areas for Tourism Development - Nablus Urban Area

		Nablus Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total cover area	km²	108.2	32.92	17.88	55.32	2.08
	%	100%	30.43%	16.52%	51.13%	1.92%
Within Area C	km²	45.7	2.5	11.2	31.7	0.3
	%	42.3%	2.31%	10.39%	29.30%	0.30%

Legend

The sum of these areas are the priority areas for tourism development.

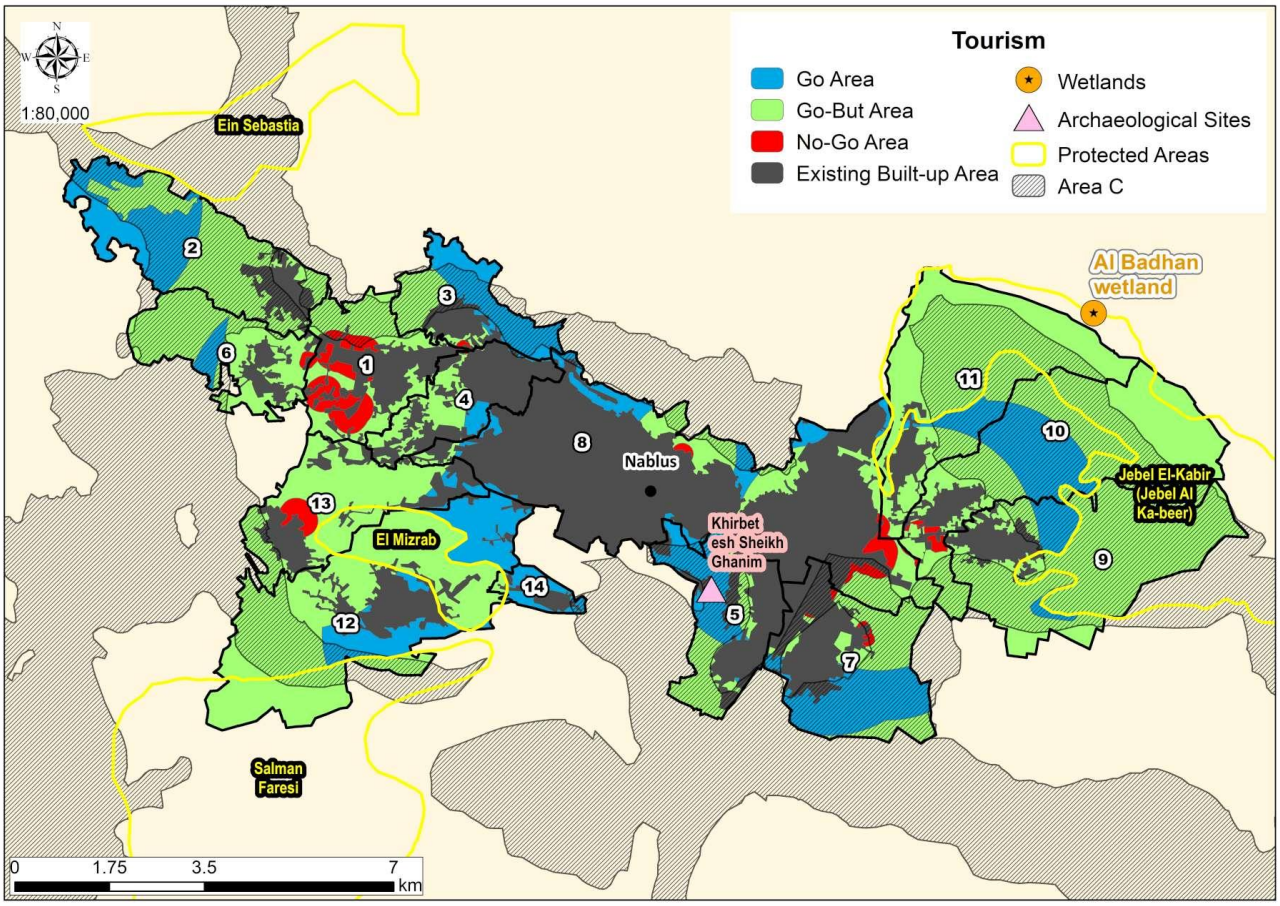


Figure 5.4.1-5: Priority and Exclusion Areas for Tourism Development - Nablus Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 2% of Nablus Urban Area total surface is considered as an exclusion area, due to application of buffer zones between existing industries and tourism, and therefore not a priority for tourism development. In approximately 68% of Nablus Urban Area total surface, tourism may be developed; however, in approximately 31% of this area *only* eco-tourism

activities may be developed. More specifically, in protected areas (covering approximately 21% of Nablus Urban Area) there are opportunities for the promotion of conservation tourism. Such interventions could also be implemented in Wadi Al-Badhan wetland, which is an Important Bird Area, but not designated as a protected area; these initiatives could act as a step in the direction of attaining formal conservation status of this area. Furthermore, in lands with high agricultural value, there is opportunity for the implementation of agro-tourism interventions.

Existing forests as well as land suitable for forestation can also be used for recreation and eco-tourism purposes, thus contributing in the abatement of forest land degradation; this would align with the international trend on realizing the economic value of natural capital.

In the vicinity of antiquities zones (to the north of Nablus Urban Area) as well as near existing archaeological sites (for example Khirbet esh Sheikh Ghanim, which is under UNESCO's tentative list) which are located near areas that are not built-up, as shown in Figure 5.4.1-5 above and are designated as 'go' areas for tourism, there is potential for the creation of tourist facilities.

Overall, the tourist potential of Nablus Urban Area is neglected; this is captured in the results of the final ranking exercise, where tourism SDP are not within the top-5 priorities for Nablus Urban Area; SDP 19 '*Promote the diversification of the tourism to integrate alternative forms of tourism'* has scored moderately (14th) in the final ranking exercise.

As shown in Figure 5.4.1-6 below, to the northeast of Nablus Urban Area, urban expansion outside urban area boundaries (marked in orange) does not seem to be in conflict with the existing antiquity zone located outside urban area limits; however, this is not the case for the antiquity zone to the northwest and the archeological site to the northeast of the urban area (marked in red) where adequate buffer zones should be taken into consideration in order to minimize any likely impacts from future urban growth.

For the antiquity zone to the north which is located within urban area limits but outside urban growth boundaries, there seem to be no conflicts with areas that have a high probability of becoming urban by 2035; this area is marked in purple. The archaeological sites located to the northwest and south of the urban area (marked in green) are located within urban growth boundaries; all reasonable care (i.e., buffer zones etc.) should be taken into consideration for the minimization of any likely impacts of future urban growth on these archaeological sites. There is however opportunity for the development of tourist facilities in 'go' areas that fall within Urban Growth Boundaries; this is approximately in 33% of the total urban growth expansion surface.

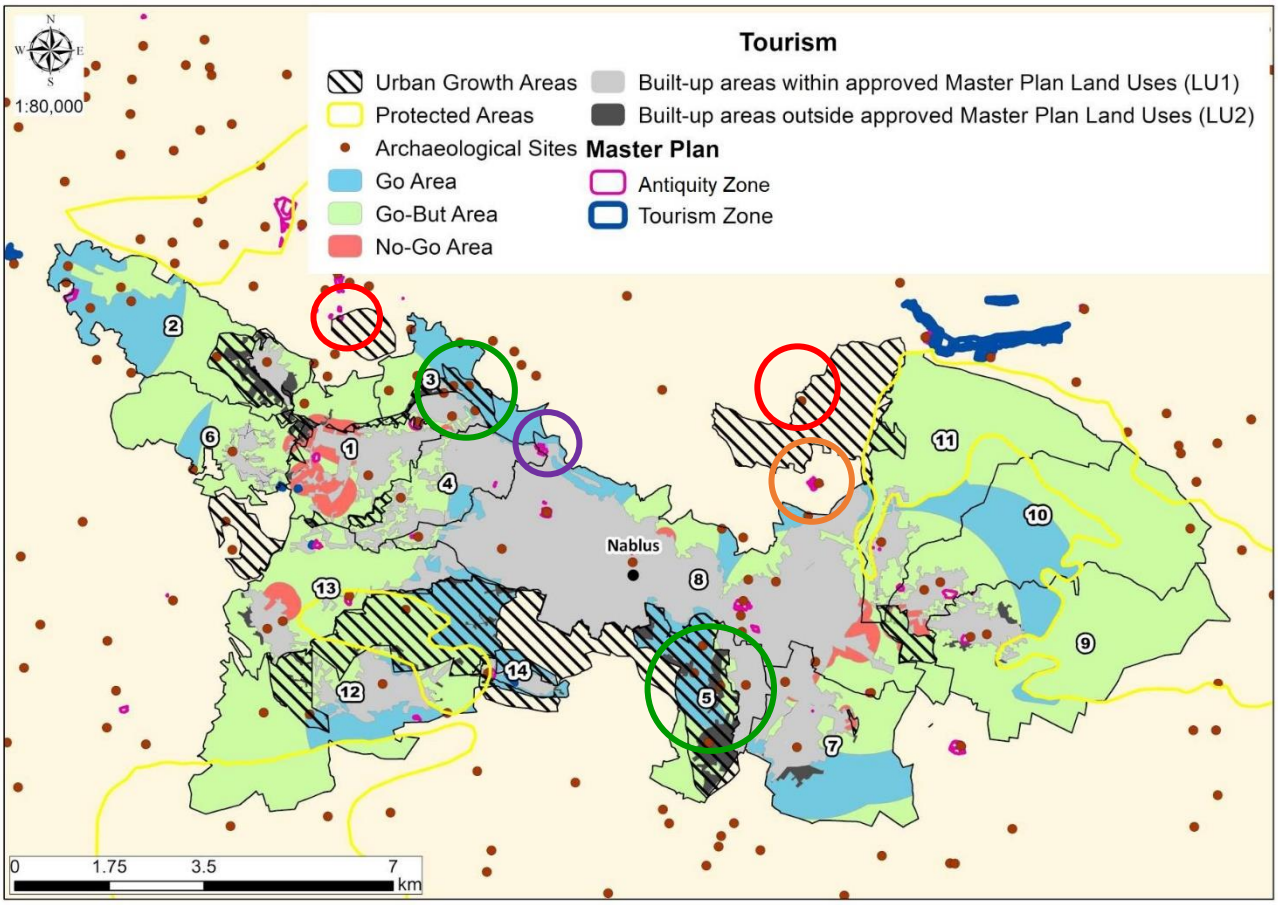


Figure 5.4.1-6: Urban Growth Boundaries & Priority and Exclusion areas for tourism development – Nablus Urban Area

Industry

Table 5.4.1-4 below presents the priority areas and exclusion areas for future high-nuisance industry development in Nablus Urban Area. All percentages in Table 5.4.1-4 are calculated based on the total surface of Nablus Urban Area (108.2 km²). The priority and exclusion areas for high-nuisance industry development within Area C are also presented, in order to allow for an overview of areas that can be developed in the short-term.

Table 5.4.1-4: Priority and Exclusion Areas for high-nuisance Industry Development - Nablus Urban Area

		Nablus Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total Surface	km²	108.2	32.92	6.15	9.77	59.36
	%	100%	30.43%	5.68%	9.03%	54.86%
Within Area C	km²	45.7	2.5	5.95	8.2	29.05
	%	42.3%	2.31%	5.52%	7.60%	26.87%

Legend

The sum of these areas are the priority areas for high-nuisance industry development.

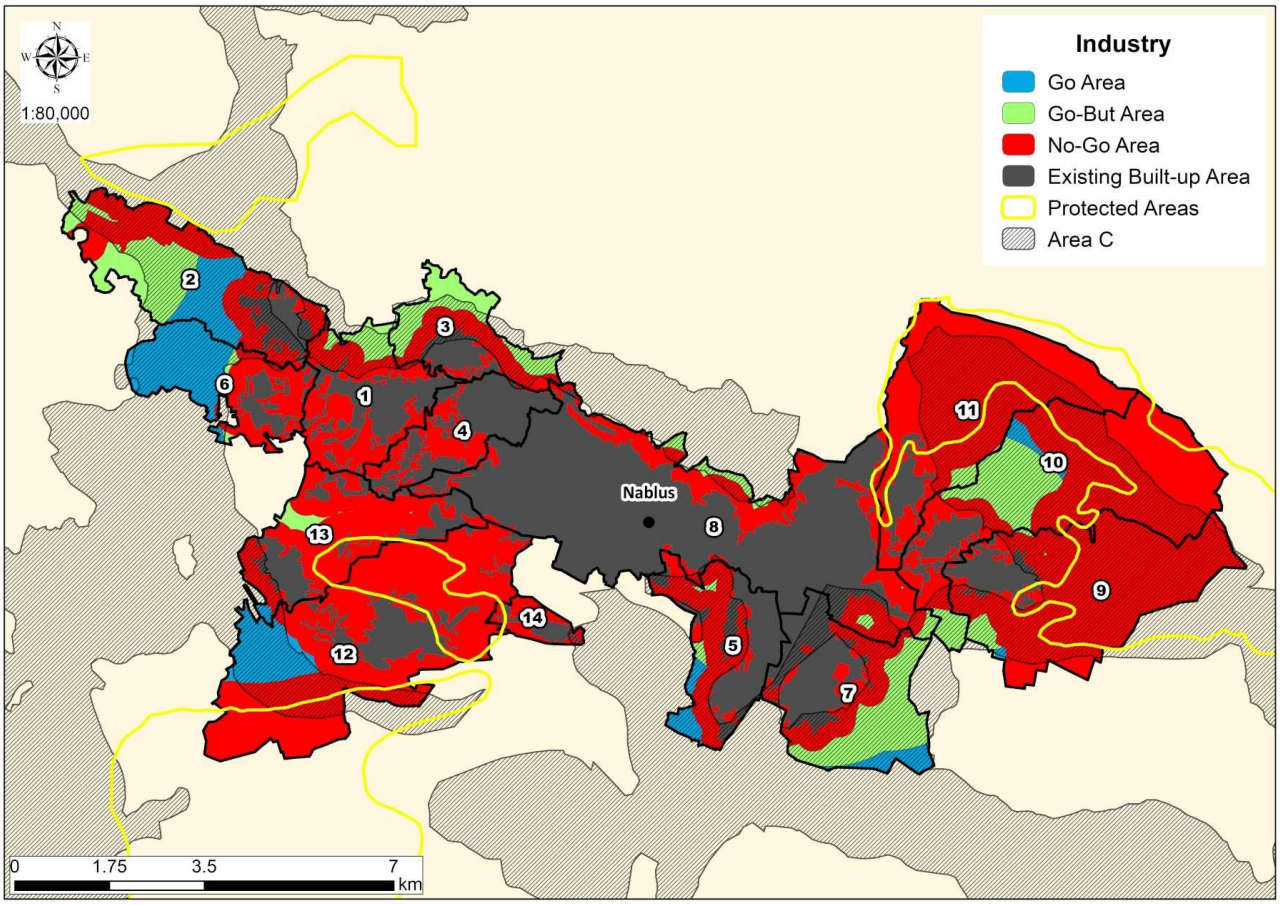


Figure 5.4.1-7: Priority and Exclusion Areas for high-nuisance Industry Development - Nablus Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 55% of Nablus Urban Area total surface is considered as an exclusion area and therefore not a priority for industry development. It must be noted that approximately 61% of this exclusion area (or approximately 33% of Nablus Urban Area total surface) are protected areas and therefore not suitable for industry development. This exclusion area includes buffer zones that have been applied between protected areas and any form of industrial development, taking into consideration the industry nuisance level; however, only the application of buffer zones between protected areas and high-nuisance industry are presented in the spatial mapping, as a worst-case scenario.

The proximity to existing built-up areas is the main reason for the exclusion of the remaining 22% of Nablus Urban Area total surface from the development of industrial activities; again, only the application of buffer zones (300 m) between existing built-up areas and high-nuisance industry are presented in the spatial mapping, as a worst-case scenario.

It must be noted that, as a result of the final ranking exercise, industry SDP are not within the top-5 priorities for Nablus Urban Area. However, since SDP 13 '*Support, rehabilitate and increase the establishment and development of small enterprises of a productive nature (craft areas)*' and SDP 12 '*Establish industrial zones, industrial compounds and industrial incubators*' have scored relatively high (9th and 12th respectively) in the final ranking exercise, it is proposed that, where appropriate, in approximately 15% of Nablus Urban Area total surface, priority may be given to the expansion of existing and the creation of new industrial zones as well as to the promotion of craft industries.

Within Nablus Urban Area there are industrial areas, industries and quarries in proximity to residential or commercial areas, thus increasing air, noise, soil and water pollution and health risks; this could have significant economic costs over the long-term in terms of reduced health of the population and increased demand for health-care.

Existing industrial areas can accommodate scattered industries as well as stone quarries from the west and also have the potential to invite new industries as drivers of economic development. The existing challenges in covering the water and energy demands of the industry sector and minimizing pollution and health risks can be partly addressed with industrial symbiosis initiatives such as the use of construction waste for the rehabilitation of abandoned quarries and the use of treated wastewater from the stone and marble industry for concrete production; treated industrial wastewater can be also used to cover water needs. The promotion of less water and energy-demanding as well as less polluting industries such as craft workshops is another promising option in this regard; these can be accommodated to the northwest of the urban area.

As shown in Figure 5.4.1-8 below, urban expansion outside urban area boundaries to the north and northwest of Nablus Urban area (marked in blue) seems to be in conflict with the priority ('go-but') areas for industrial development within urban area boundaries; future urban planning would have to incorporate adequate buffer zones from proposed industrial areas to ensure minimization of nuisances and likely implications on human health.

Existing quarries to the west of the urban area (marked in red) are located within exclusion areas for industry development but also within areas that have a high probability of becoming urban by 2035; minimization of this conflict could be achieved through the relocation of quarries to the nearest priority area for industry located to the west. Future urban planning to the southeast of the urban area (marked in pink) would also have to incorporate adequate buffer zones from industries and industrial areas in order to ensure minimization of any likely environmental and health impacts. The area allocated for light industry to the northwest of the urban area (marked in purple), seems to be preferable for the relocation or establishment of craft workshops; this is a priority area for industry, where there are no conflicts with urban growth boundaries.

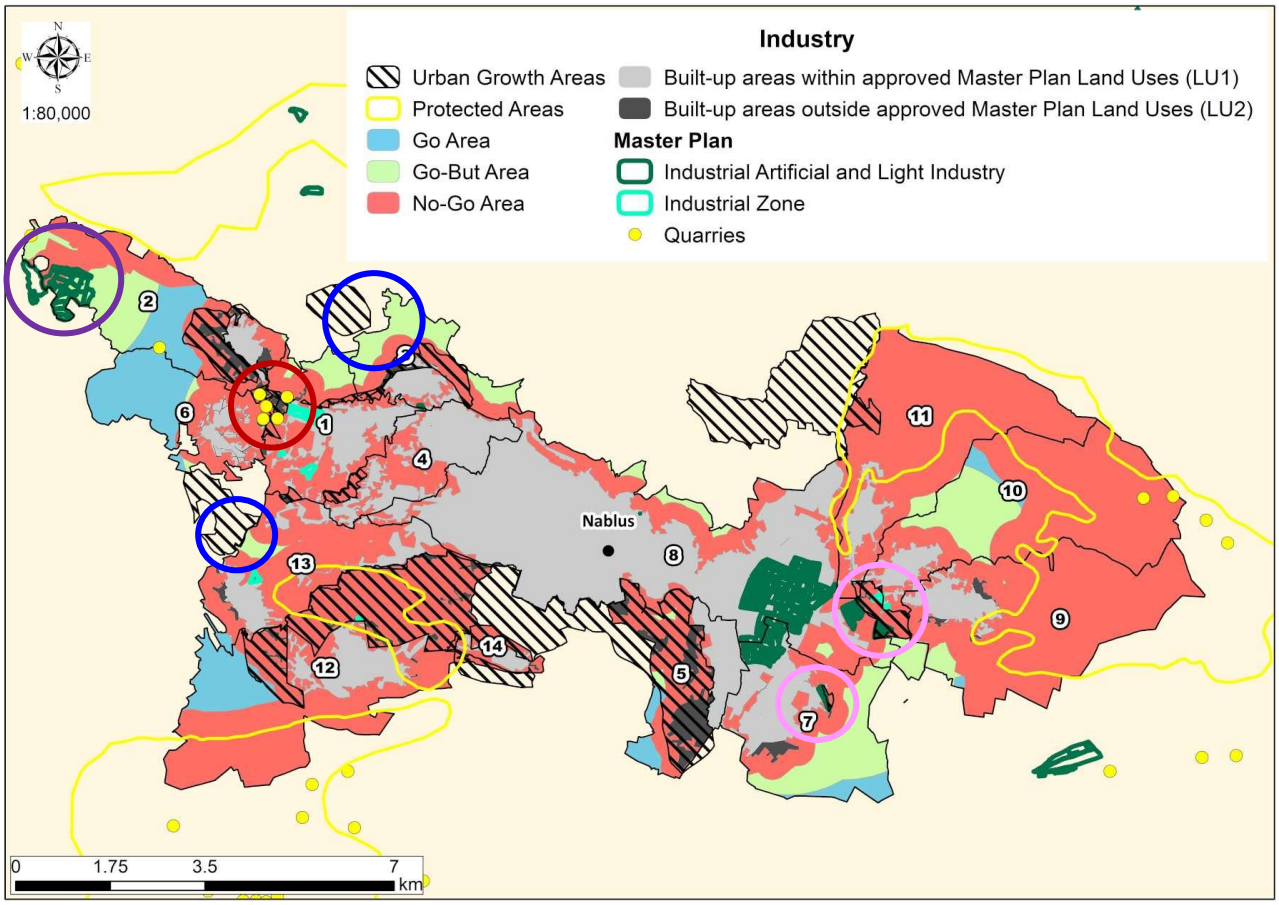


Figure 5.4.1-8: Urban growth scenario & Priority and Exclusion areas for industry development – Nablus Urban Area

5.4.1.2 Supporting sectors

Energy

As a result of the final ranking process for Nablus Urban Area, priority is given to the development of the **renewable energy sector**. The hilly regions of Nablus that are about 1000m above sea level have an annual average wind speed varying in the range of 4-8m/s[332], and are therefore considered as suitable for the development of windfarms. The values of wind speed are sufficient for using small wind turbines to electrify sites located far from the grid. In addition, another feasible application for small wind turbines is to use them for water pumping, especially for rural areas where diesel generators are used for this purpose. It must be noted that wind turbines are typically associated with a visual impact and this, combined with the potential impacts on birds, means that it may not be ideal to locate them within close proximity to eco-tourism sites or IBAs; in this context, environmental impact studies would need to be conducted prior to approving any wind energy facilities.

As Nablus Urban Area has solar radiation throughout most of the year, there is potential for the implementation of rooftop PV systems on public buildings and residences, however solar energy harvesting is still considered expensive for domestic use. The implementation of a PV/wind hybrid system to supply power is also considered a viable option.

[332] *Adel Juaidi, Francisco G. Montoya, Imad H. Ibrik, Francisco Manzano-Agugliaro, An overview of renewable energy potential in Palestine, Renewable and Sustainable Energy Reviews, 2015*

Solid waste

The promotion of advanced, sustainable **solid waste management** methods, the provision of sanitary landfills and the rehabilitation of existing dumpsites are included in the top-5 priorities as a result of the final ranking process. At present, most solid waste from Nablus Governorate is collected and transported for 40 km to Zahret El Finjan landfill in Jenin Governorate; as a result, random dumpsites accommodate solid waste management needs, thereby causing health concerns.

Most of the waste (85%) in Zahret El Finjan landfill is organic and recyclable therefore there is significant potential to reduce the volume of waste being disposed through recycling and to produce energy (composting, biogas generation, incineration). In the Eastern Industrial Area of Nablus, paper/cardboard is reused and a few plastic recycling facilities are located in the Nablus region, there is therefore potential for the reduction of waste volume (via sorting, recycling and composting), which would alleviate pressure on existing infrastructure and accommodate for growing solid waste management volumes as a result of population growth and urbanization trends. The high organic content in the solid waste generated implies good potential for composting (and using the compost for land rehabilitation).

The creation of a sanitary landfill would preferably be situated on flat land with gentle slopes, in or in the proximity of industrial areas, away from surface water wadis and areas that are extremely vulnerable to groundwater pollution and where the underlying geological formations are aquitards, thereby minimizing any likely impacts on groundwater from leachate contamination.

Water and Wastewater

With reference to the **water and wastewater infrastructure**, it must be noted that the existing WWTP in Nablus Urban area is operating at a good efficiency rate and is already utilizing sludge for anaerobic digestion and subsequent electricity generation. The Eastern WWTP, located outside urban area limits and aiming to serve the eastern area of Nablus, is still on standby due to oppositions from local residents. As wastewater generation is expected to increase substantially due to population growth and urbanisation trends, there is a need to promote the use of unconventional water resources for covering water demands for all uses; in the final ranking process, this is captured in the selection of the relevant SDP within the top-5 priorities in Nablus Urban Area.

In Nablus Urban Area, treated wastewater can be reused for agricultural production, for industry and urban applications (such as fire-fighting etc.); in this case, proximity to each proposed use/water demand would be considered preferable. Furthermore, agricultural rainwater harvesting may be promoted in order to address the area's limited water resources as the area receives a comparatively high amount of rainfall annually. Constructed wetlands may potentially be created for greywater treatment; such initiatives would preferably be situated in areas that have low or no vulnerability to groundwater pollution.

The existing sewage network is, in many cases, ineffective, consisting of a combined system for both sewage and rainwater; this causes floods and contamination of domestic water supply in some areas during rainy days. Where there are no sewerage networks, cesspits and open channels are most commonly used in the villages and camps, causing surface and groundwater pollution as well as serious public health concerns. Furthermore, the use of septic tanks can be promoted for rural communities.

Health

The development of new and the upgrading of existing **health-care facilities** are also within the top-5 priorities in Nablus Urban Area. Nablus Governorate has the highest rate of persons per primary healthcare facility in the West Bank; this has been captured in the final ranking exercise, as the creation of new and the upgrading of existing primary health facilities has been highlighted as a priority. Overall, there is an uneven distribution of health facilities between LGUs, with more than half of the existing primary health care facilities located in Nablus LGU. Creation of new health care facilities would preferably be located in areas that are have low vulnerability to floods and earthquakes; existing vacant and ignored buildings and/or public buildings and facilities may also be used for these purposes.

At the national level, it is estimated that most healthcare facilities are connected to public water networks and wastewater networks; medical wastewater is not treated before discharged to wastewater networks, thereby causing serious threats to public health. In most cases, there is no provision for the management of medical solid wastes, thus increasing health concerns.

Education

Nablus Urban Area has the second highest number of primary and secondary **education facilities** in the West Bank Urban Areas, however there is an uneven distribution of education facilities between LGUs, with most of them concentrated centrally, in Beit Wazan, Kafr Qallil and Nablus LGUs. For this reason, improvement of educational facilities is considered a priority in the area, as captured in the vertical ranking. However, this was not captured in the final ranking process due to limitations in the application of criteria in the horizontal ranking process for the education sector, which are discussed in section 5.3.3 of this report.

Transport

Even though there is poor connectivity between LGUs in Nablus Urban Area and high levels of congestion in the urban area core, the **transport sector** SDP (development of public transport and enhancement of connectivity) have scored low in the final ranking exercise, thus indicating that the planned and on-going road infrastructure projects (new ring road segments along with other connecting roads) are expected to alleviate existing limitations.

5.4.2 Ramallah and Al Bireh Urban Area

5.4.2.1 Key development sectors

Agriculture, Forestry and Fishing

Table 5.4.2-1 below presents the priority areas and exclusion areas for future agriculture development in Ramallah and Al Bireh Urban Area. All percentages in Table 5.4.2-1 are calculated based on the total surface of Ramallah and Al Bireh Urban Area (72.0 km²). The priority and exclusion areas for agriculture development within Area C are also presented, in order to allow for an overview of areas that can be developed in the short-term.

Table 5.4.2-1: Priority and Exclusion Areas for Agriculture Development - Ramallah and Al Bireh Urban Area

		Ramallah and Al Bireh Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority areas		Exclusion areas
				Go areas	Go-but areas	No-go areas
Total Surface	km²	72.0	26.06	0.02	5.38	40.58
	%	100%	36.17%	0.03%	7.47%	56.33%
Within Area C	km²	34.86	3.2	0.02	4.37	27.27
	%	48.4%	4.44%	0.03%	6.07%	37.85%

Legend

The sum of these areas are the priority areas for future agriculture development.

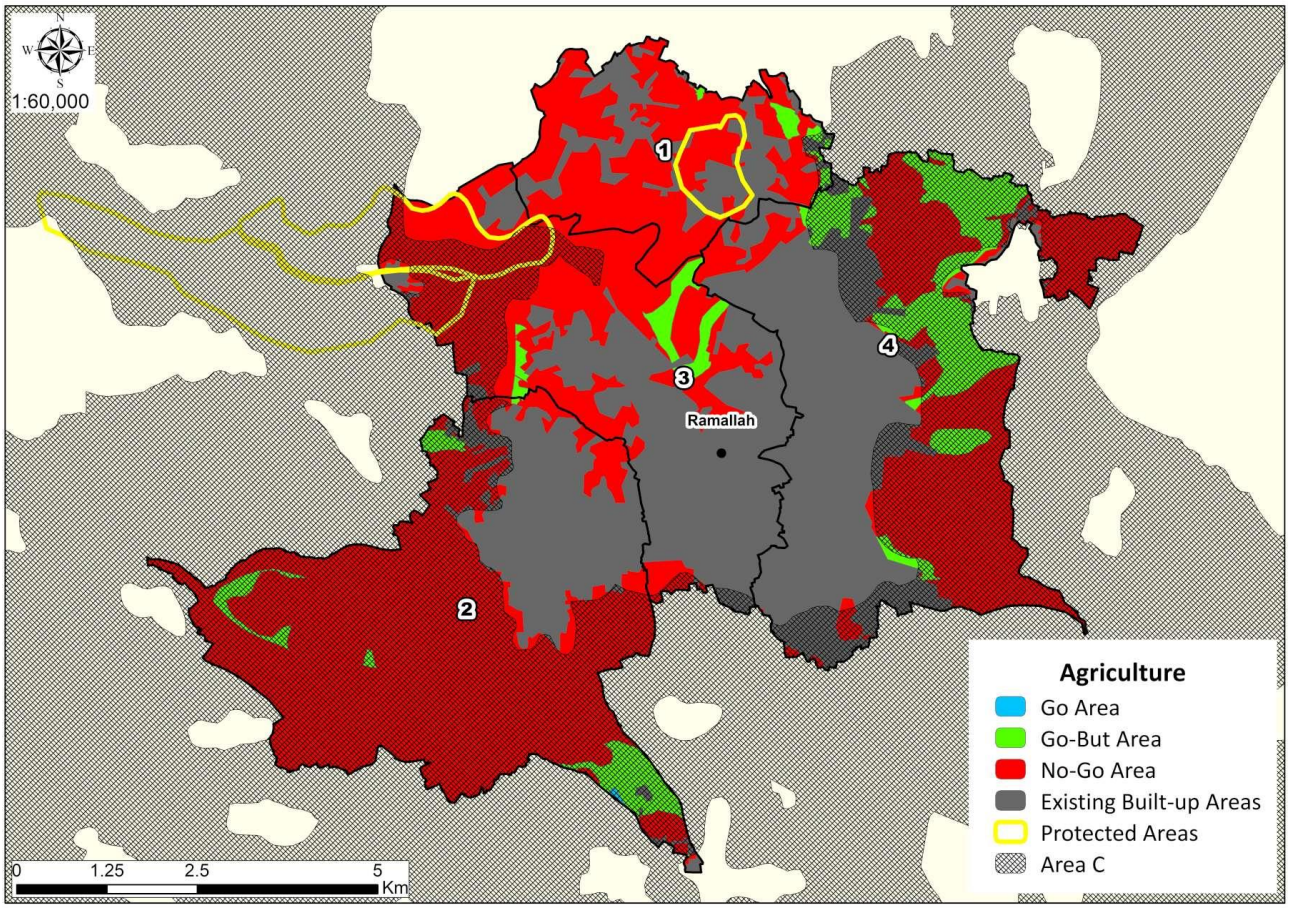


Figure 5.4.2-1: Priority and Exclusion Areas for Agriculture Development - Ramallah and Al Bireh Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 56% of Ramallah and Al Bireh Urban Area total surface is considered as an exclusion area and therefore not a priority for agricultural development. It must be noted that approximately 7% of this exclusion area (or approximately 4% of Ramallah and Al Bireh Urban Area total surface) is covered by protected areas.

Approximately 46% of Ramallah and Al Bireh Urban Area that is considered as an exclusion area for agricultural development has 'low agricultural productivity'. However, approximately 82% of this area (or 38% of Ramallah and Al Bireh Urban Area total surface) could, under certain conditions, be used for agricultural purposes; in areas of low agricultural productivity and where the underlying geological formations are aquifers, precision agriculture and closed-loop hydroponic farming could be implemented. The remaining 18% of this exclusion area that is of low agricultural productivity and

where the underlying geological formations are aquitards, located mostly to the east of Ramallah and Al Bireh Urban Area, cannot be used for agricultural development.

As in the case of Nablus Urban Area, water shortages can be addressed through the use of the existing WWTP's treated wastewater for agricultural production and the introduction of water-efficient and water-saving irrigation techniques, provided that this is cost-effective in terms of transferring water from the WWTW to the points of use (pipes, pumping etc.).

As a result of the final ranking exercise, SDP 1 '*Develop, promote and implement sustainable agricultural practices, including residential agriculture and support small-scale food producers in Palestine*' is within the top-5 priorities for Ramallah and Al Bireh Urban Area and SDP 3 '*Protect agricultural & forest lands from urban expansion and other forms of degradation*' has scored high (6th). As in the case of Nablus Urban Area, it is proposed that, in the 'priority areas for agriculture development', priority is given in the reclamation of non-agricultural land which would be of significant economic value to Ramallah and Al Bireh Urban Area.

As shown in Figure 5.4.2-2 below, approximately 14% of the areas that have a high probability of becoming urban by 2035 ('Urban Growth Boundary') within Ramallah and Al Bireh Urban Area fall within the priority area for agriculture development (marked in blue); given the fact that available land is limited, future urban planning would have to revisit the proposed Urban Growth Boundaries so as to protect agricultural land from urban expansion as much as possible. An option would be to promote residential agriculture interventions in these areas.

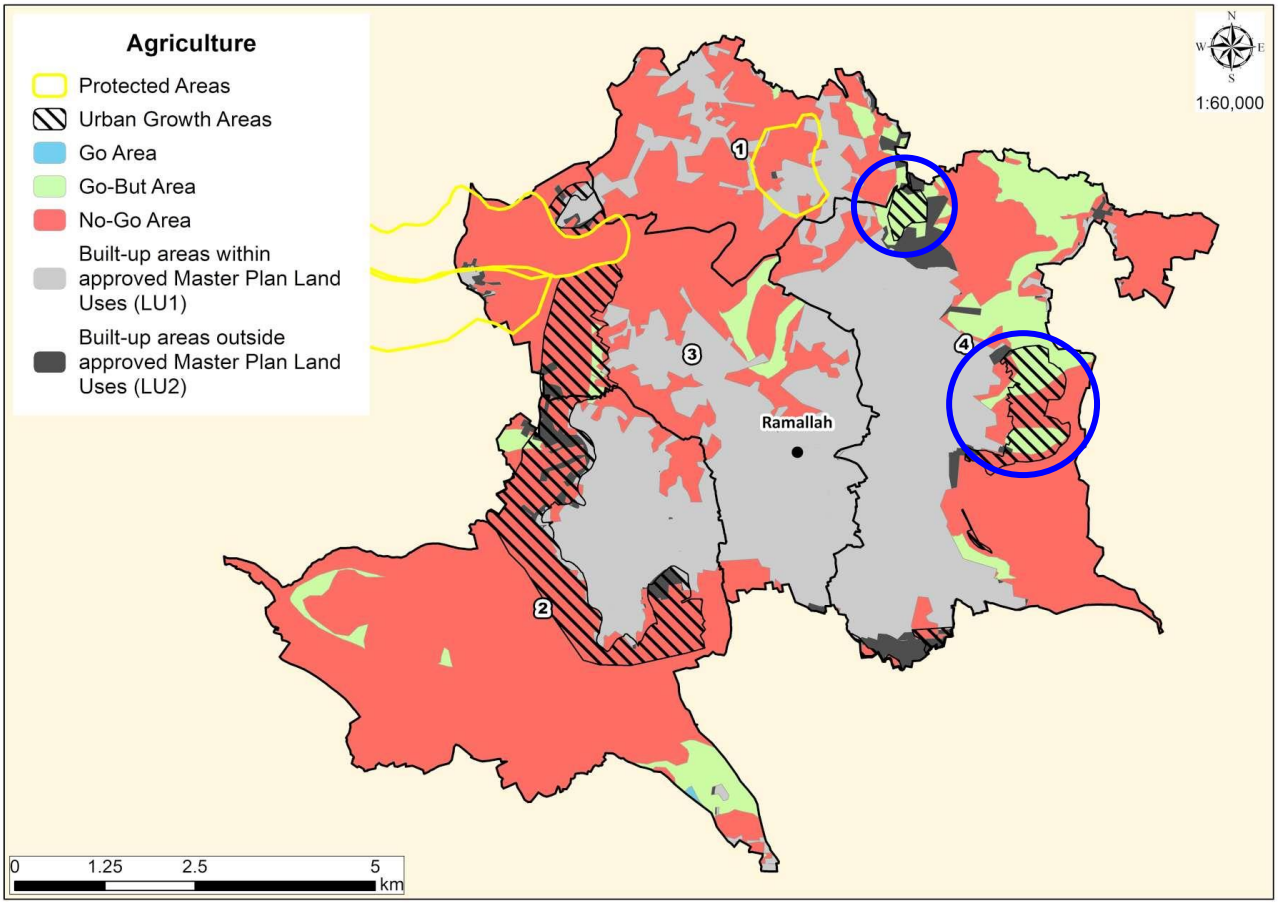


Figure 5.4.2-2: Urban Growth Boundaries & Priority and Exclusion areas for agriculture development – Ramallah and Al Bireh Urban Area

Urban and Strategic Planning

Table 5.4.2-2 below presents the priority areas and exclusion areas for urban and strategic planning development in Ramallah and Al Bireh Urban Area. All percentages in Table 5.4.2-2 are calculated based on the total surface of Ramallah and Al Bireh Urban Area (72. 0 km²). The priority and exclusion areas for urban and strategic planning development within Area C are also presented, in order to allow for an overview of areas that can be developed in the short-term.

Table 5.4.2-2: Priority and Exclusion Areas for Urban and Strategic Planning Development - Ramallah and Al Bireh Urban Area

		Ramallah and Al Bireh Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total Surface	km²	72.0	26.06	25.83	15.75	4.4
	%	100%	36.17%	35.86%	21.86%	6.11%
Within Area C	km²	34.86	3.2	16.73	12.37	2.52
	%	48.4%	4.44%	23.22%	17.17%	3.50%

Legend

The sum of these areas are the priority areas for urban and strategic planning development.

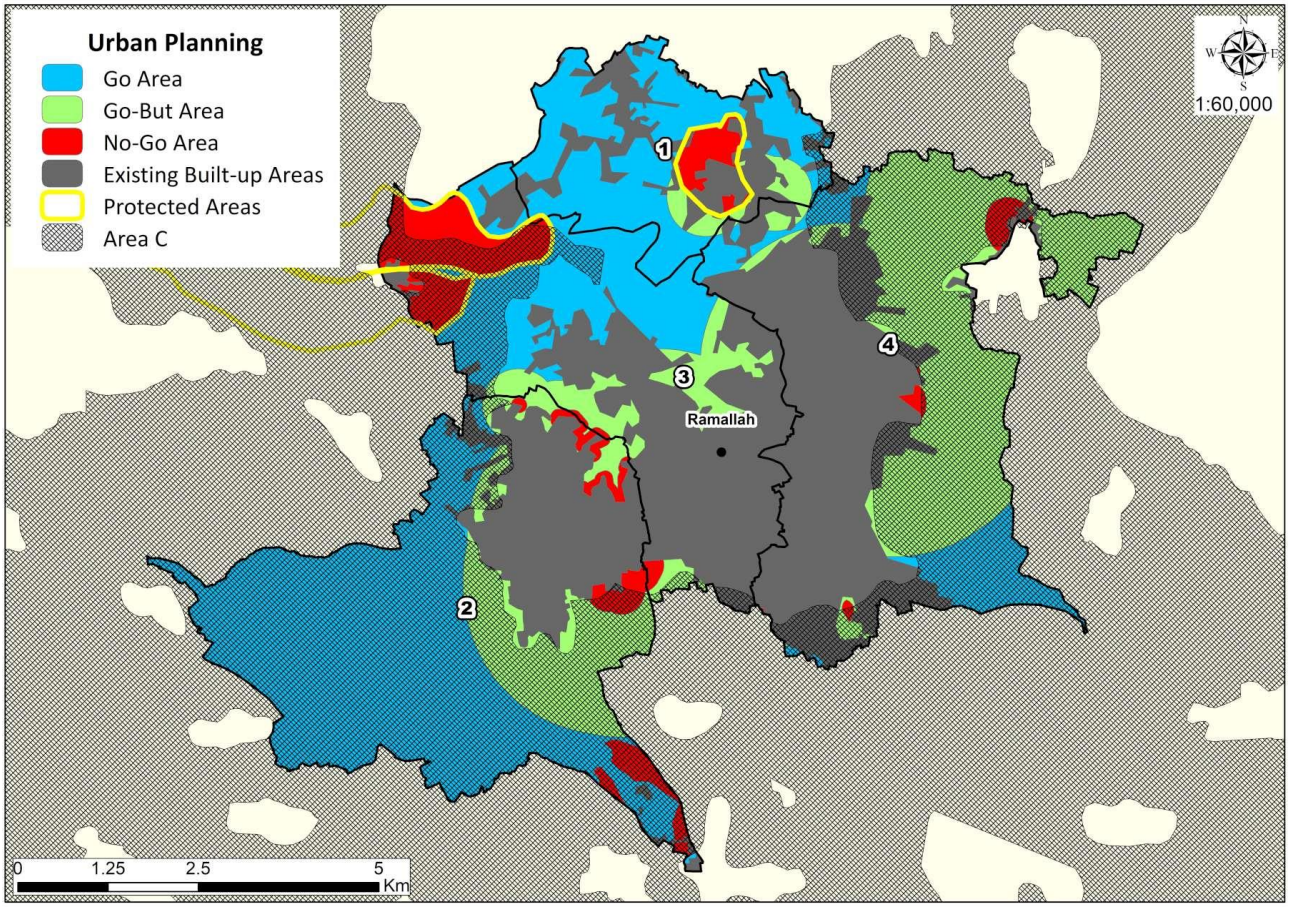


Figure 5.4.2-3: Priority and Exclusion Areas for Urban Planning Development - Ramallah and Al Bireh Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 6% of Ramallah and Al Bireh Urban Area total surface is considered as an exclusion area and therefore not a priority for urban planning development. It must be noted that approximately 64% of this exclusion area (or approximately 4% of Ramallah and Al Bireh Urban Area total surface) are protected areas and therefore not suitable for urban planning development.

It must be noted that, as a result of the final ranking exercise, urban planning SDP are not within the top-5 priorities for Ramallah and Al Bireh Urban Area. However, since SDP 23 '*Urban infill: dense construction in urban centers to take advantage of available land, taking into consideration sustainable planning and construction methods (smart city model)*' has scored relatively high (8th) in the final ranking exercise, as in the case of Nablus Urban Area, it is proposed that, where appropriate, in approximately 58% of Ramallah and Al Bireh Urban Area total surface where urban planning may be developed ('priority areas for urban planning development'), priority may be given to the reuse of existing vacant and ignored buildings to cover growing housing needs and the promotion of green infrastructure.

As in the case of Nablus Urban Area, in order to ensure that the 500m distance criterion from existing or proposed antiquities areas is met at all times, in go-but areas and in the vicinity of antiquities, public urban spaces (i.e., open areas, Urban Green Spaces etc.) would be preferable.

As shown in Figure 5.4.2-2 below, approximately 10% of the areas that have a high probability of becoming urban by 2035 fall within built-up areas that are not included in approved Master Plans (LU2) and approximately 66% of the built-up areas that are not included in approved Master Plans (LU2) fall *outside* the Urban Growth Boundary; in both cases, future urban planning (town planners) would have to revisit approved Master Plans and Urban Growth Boundaries so as to include areas that have already been developed (marked in blue). Furthermore, approximately 8% of total stream length within Ramallah and Al Bireh Urban Area falls within the Urban Growth Boundaries, thus posing limitations that would have to be taken into consideration for future urban development along riparian areas so as to minimize likely water pollution.

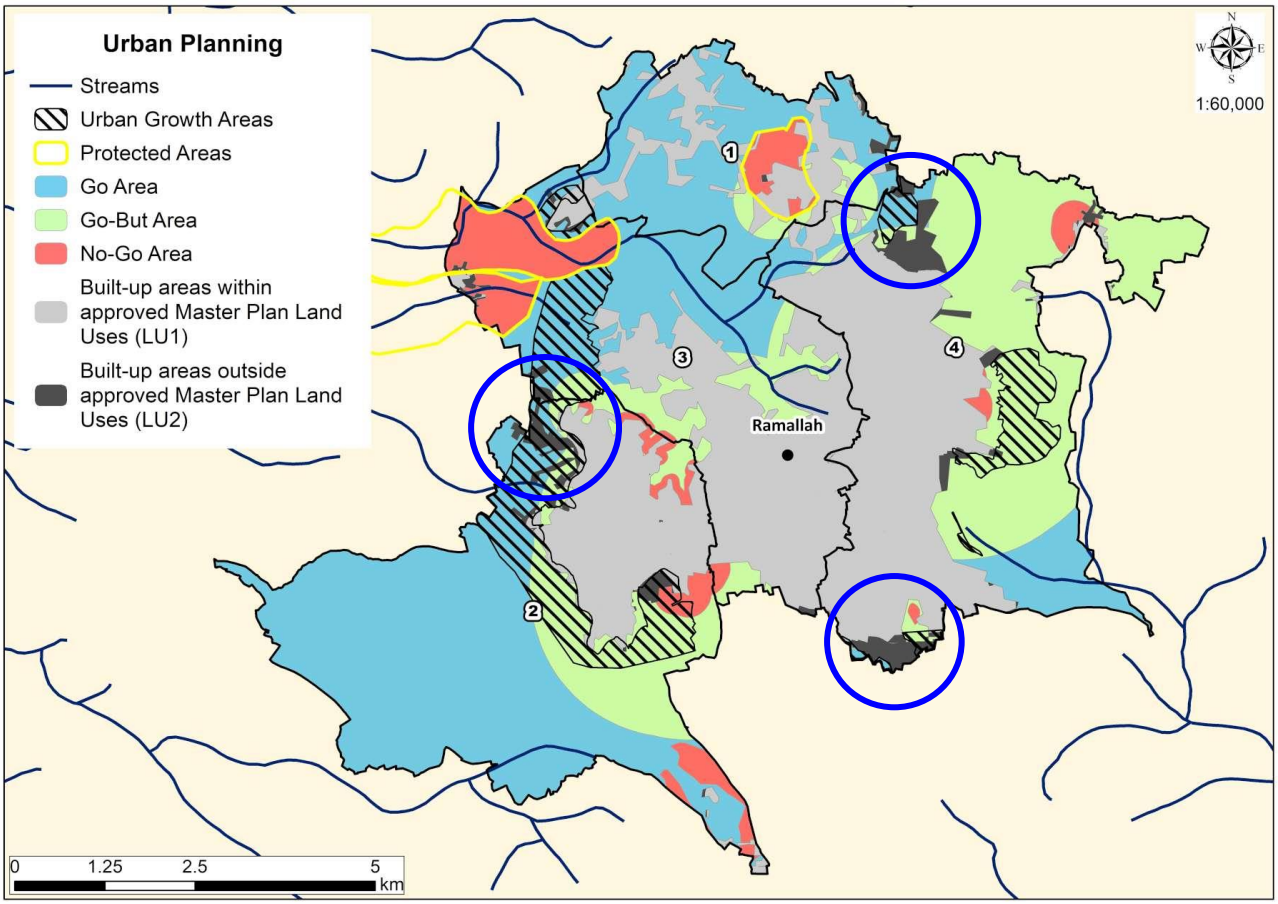


Figure 5.4.2-4: Urban Growth Boundaries & Priority and Exclusion areas for urban development – Ramallah and Al Bireh Urban Area

Tourism

Table 5.4.2-3 below presents the priority areas and exclusion areas for future tourism development in Ramallah and Al Bireh Urban Area. All percentages in Table 5.4.2-3 are calculated based on the total surface of Ramallah and Al Bireh Urban Area (72. 0 km²). The priority and exclusion areas for tourism development within Area C are also presented, in order to allow for an overview of areas that can be developed in the short-term.

Table 5.4.2-3: Priority and Exclusion Areas for Tourism Development - Ramallah and Al Bireh Urban Area

		Ramallah and Al Bireh Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total Surface	**km²**	72.0	26.06	12.53	32.50	0.91
	%	100%	36.17%	17.42%	45.15%	1.26%
Within Area C	**km²**	34.86	3.2	3.07	28.19	0.40
	%	48.4%	4.44%	4.26%	39.14%	0.56%

Legend

The sum of these areas are the priority areas for tourism development.

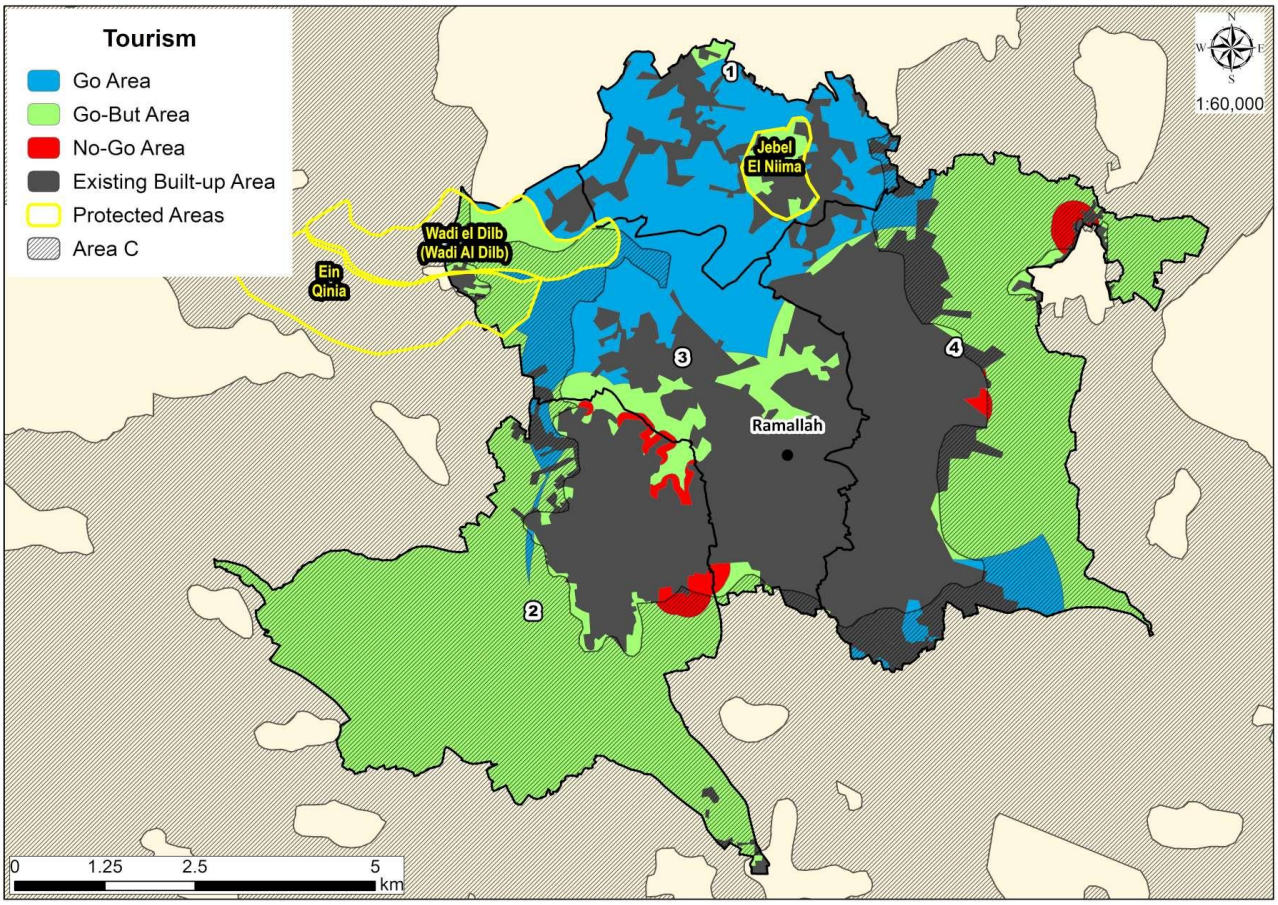


Figure 5.4.2-5: Priority and Exclusion Areas for Tourism Development - Ramallah and Al Bireh Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 1% of Ramallah and Al Bireh Urban Area total surface is considered as an exclusion area, due to application of buffer zones between existing industries and tourism, and therefore not a priority for tourism development. In approximately 63% of Ramallah and Al Bireh Urban Area total surface, tourism may be developed; however, within protected areas, covering approximately 6% of this area (and approximately 4% of Ramallah and Al Bireh Urban Area), *only* eco-tourism activities may be developed. As shown on Figure 5.4.2-5 above, approximately half of Jebel El Nijma Key Biodiversity Area is already built-up, therefore it is considered a priority to promote conservation tourism in the remaining area. Moreover, there is opportunity for the promotion of conservation tourism in the natural wetland (balou') in Al Bireh and Beitunia, which is not designated as a protected area.

In the vicinity of antiquities zones that are not built-up, as well as near existing cultural heritage sites located at the northeast (approximately 7 archaeological sites and one cultural landscape) and southwest (approximately 15 archaeological sites) of Ramallah and Al Bireh Urban area, there is significant potential for the creation of tourist facilities.

Overall, the tourist potential of Ramallah and Al Bireh Urban Area is neglected; this is captured in the results of the final ranking exercise, where tourism SDP are not within the top-5 priorities for Ramallah and Al Bireh Urban Area; SDP 19 '*Promote the diversification of the tourism to integrate alternative forms of tourism*' has scored moderately (11th) in the final ranking exercise.

As shown in Figure 5.4.2-6 below, approximately 84% of the areas that have a high probability of becoming urban by 2035 ('Urban Growth Boundary') within Ramallah and Al Bireh Urban Area fall within the priority area for tourism development. There is therefore opportunity for the development of tourist facilities in 'go' areas that fall within Urban Growth Boundaries; this is approximately in 27% of the total urban growth expansion surface.

Urban expansion within urban area boundaries does not seem to be in conflict with the existing antiquity or tourism zones. However, archaeological sites to the west of the urban area (marked in green in Figure 5.4.2-6) are located within urban growth boundaries; all reasonable care (i.e., buffer zones etc.) should be taken into consideration for the minimization of any likely impacts of future urban growth on these archaeological sites.

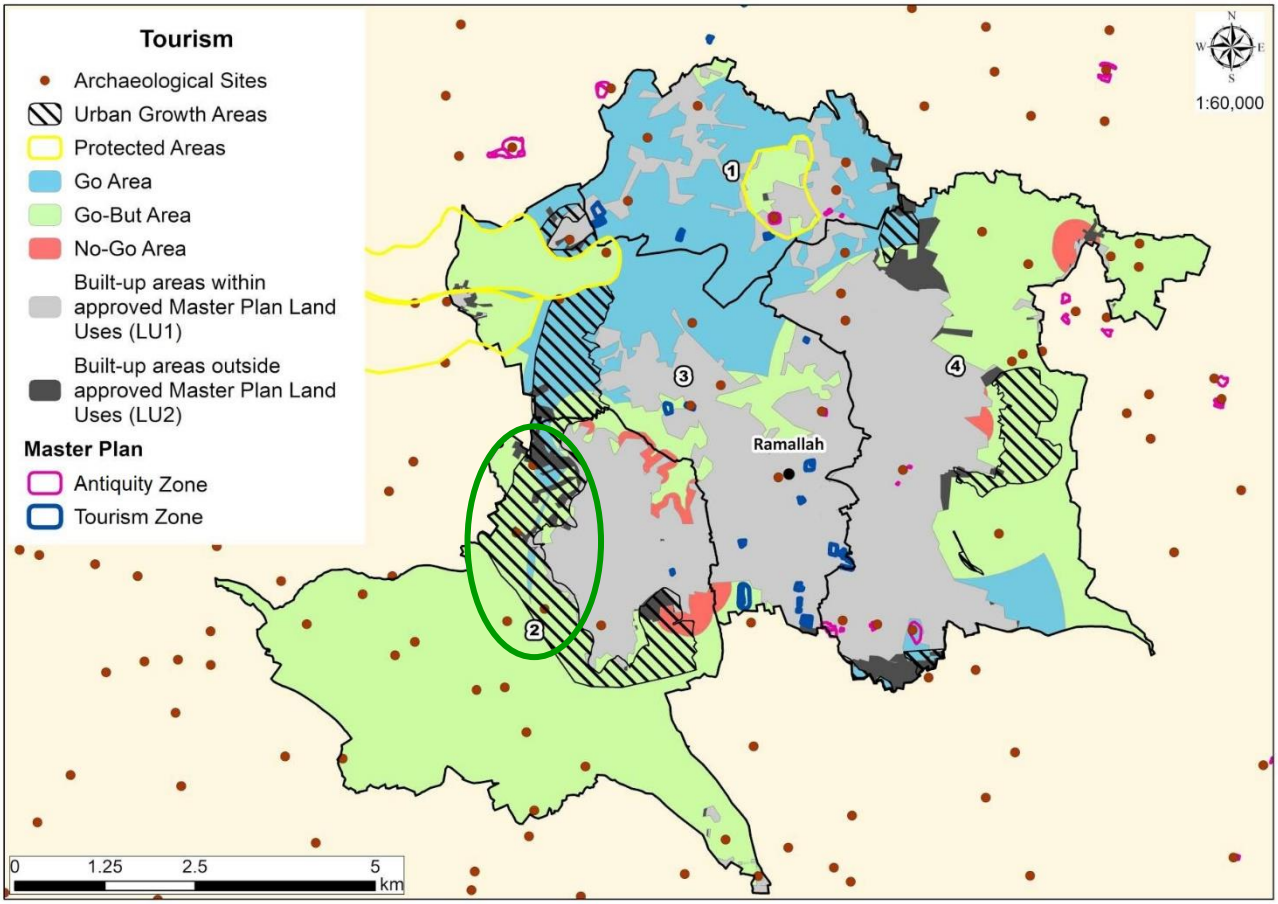


Figure 5.4.2-6: Urban Growth Boundaries & Priority and Exclusion areas for tourism development – Ramallah and Al Bireh Urban Area

Industry

Table 5.4.2-4 below presents the priority areas and exclusion areas for future high-nuisance industry development in Ramallah and Al Bireh Urban Area. All percentages in Table 5.4.2-4 are calculated based on the total surface of Ramallah and Al Bireh Urban Area (72. 0 km²). The priority and exclusion areas for high-nuisance industry development within Area C are also presented, in order to allow for an overview of areas that can be developed in the short-term.

Table 5.4.2-4: Priority and Exclusion Areas for high-nuisance Industry Development - Ramallah and Al Bireh Urban Area

		Ramallah and Al Bireh Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total Surface	km²	72.0	26.06	5.68	17.20	23.06
	%	100%	36.17%	7.90%	23.90%	32.03%
Within Area C	km²	34.86	3.2	5.68	15.50	10.48
	%	48.4%	4.44%	7.90%	21.51%	14.55%

Legend

The sum of these areas are the priority areas for high-nuisance industry development.

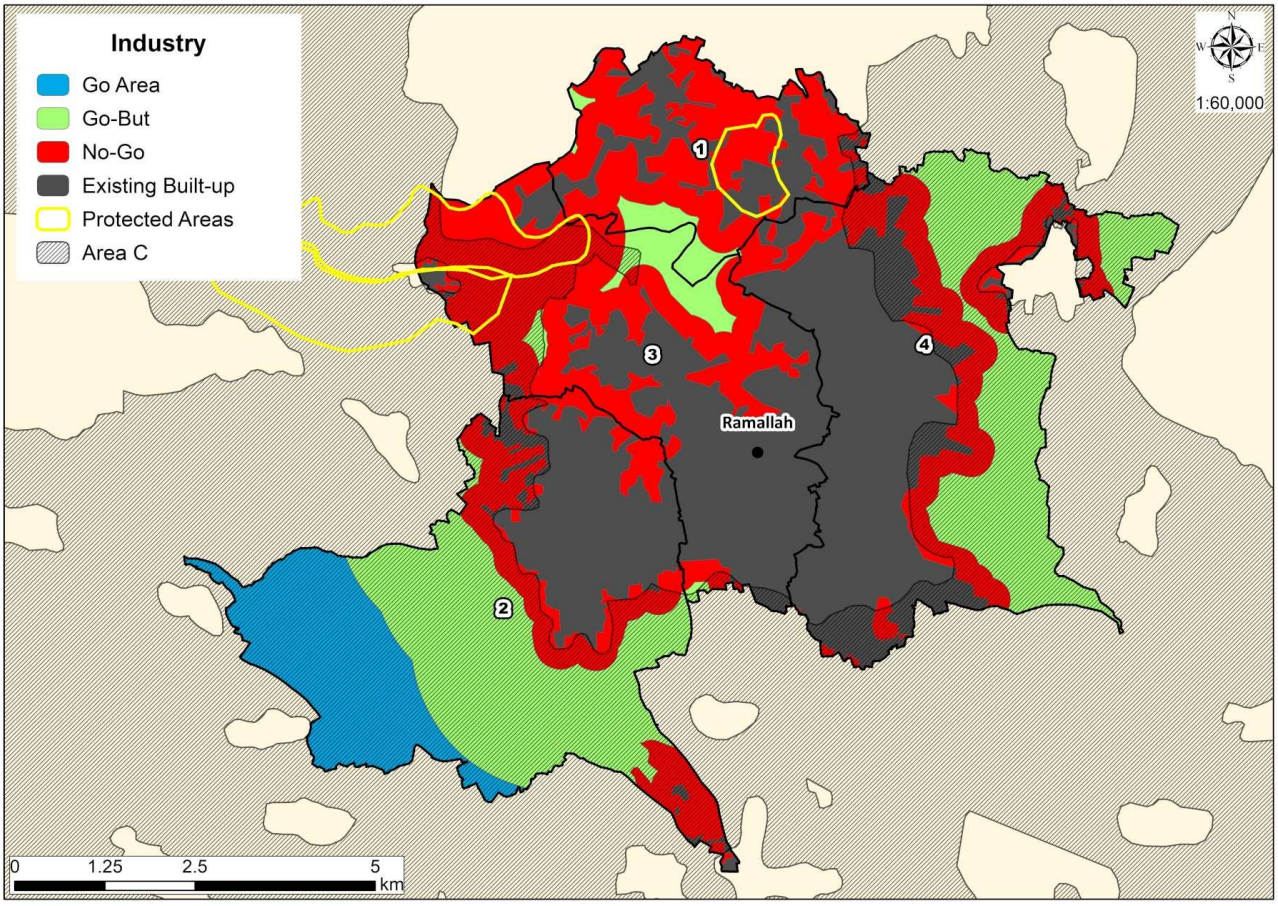


Figure 5.4.2-7: Priority and Exclusion Areas for high-nuisance Industry Development - Ramallah and Al Bireh Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 32% of Ramallah and Al Bireh Urban Area total surface is considered as an exclusion area and therefore not a priority for industry development. It must be noted that approximately 12% of this exclusion area (or approximately 4% of Ramallah and Al Bireh Urban Area total surface) are protected areas, including buffer zones, and therefore not suitable for industry development.

As in the case of Nablus Urban Area, the proximity to existing built-up areas is the main reason for the exclusion of the remaining 28% of Ramallah and Al Bireh Urban Area total surface from the development of industrial activities; as mentioned above, even though different buffer zones have been applied per industry nuisance level, only the environmental criteria for high-nuisance industry are presented in the spatial mapping, as a worst-case scenario.

It must be noted that, as a result of the final ranking exercise, industry SDP are not within the top-5 priorities for Ramallah and Al Bireh Urban Area. However, since SDP 13 '*Support, rehabilitate and increase the establishment and development of small enterprises of a productive nature (craft areas)*' and SDP 12 '*Establish industrial zones, industrial compounds and industrial incubators*' have scored moderately to low (12th and 17th respectively) in the final ranking exercise, it is proposed that, where appropriate, in approximately 32% of Ramallah and Al Bireh Urban Area total surface, priority may be given to the promotion of less water and energy-demanding as well as less polluting industries such as craft workshops. Moreover, separating industrial clusters from residential areas can reduce their ecological impact and maximize utilization of land use; as an example, the Ramallah and Al Bireh Industrial Zone can accommodate scattered industries and also have the potential to invite new industries as drivers of economic development. As in the case of Nablus Urban Area, the existing challenges in covering the water and energy demands of the industry sector and minimizing pollution and health risks can be partly addressed with industrial symbiosis initiatives.

As shown in Figure 5.4.2-8 below, approximately 22% of the areas that have a high probability of becoming urban by 2035 ('Urban Growth Boundary') within Ramallah and Al Bireh Urban Area fall within the priority area for industry development (marked in blue); future urban planning would have to incorporate adequate buffer zones from proposed industrial areas to ensure minimization of nuisances and likely implications on human health.

Existing quarries to the west of the urban area (marked in red) are located within areas that have a high probability of becoming urban by 2035; minimization of this conflict could be achieved through the relocation of quarries to the nearest priority area for industry located to the west. Future urban planning would also have to incorporate adequate buffer zones between industries and urban areas in the south of the urban area (marked in pink) in order to ensure minimization of any likely environmental and health impacts.

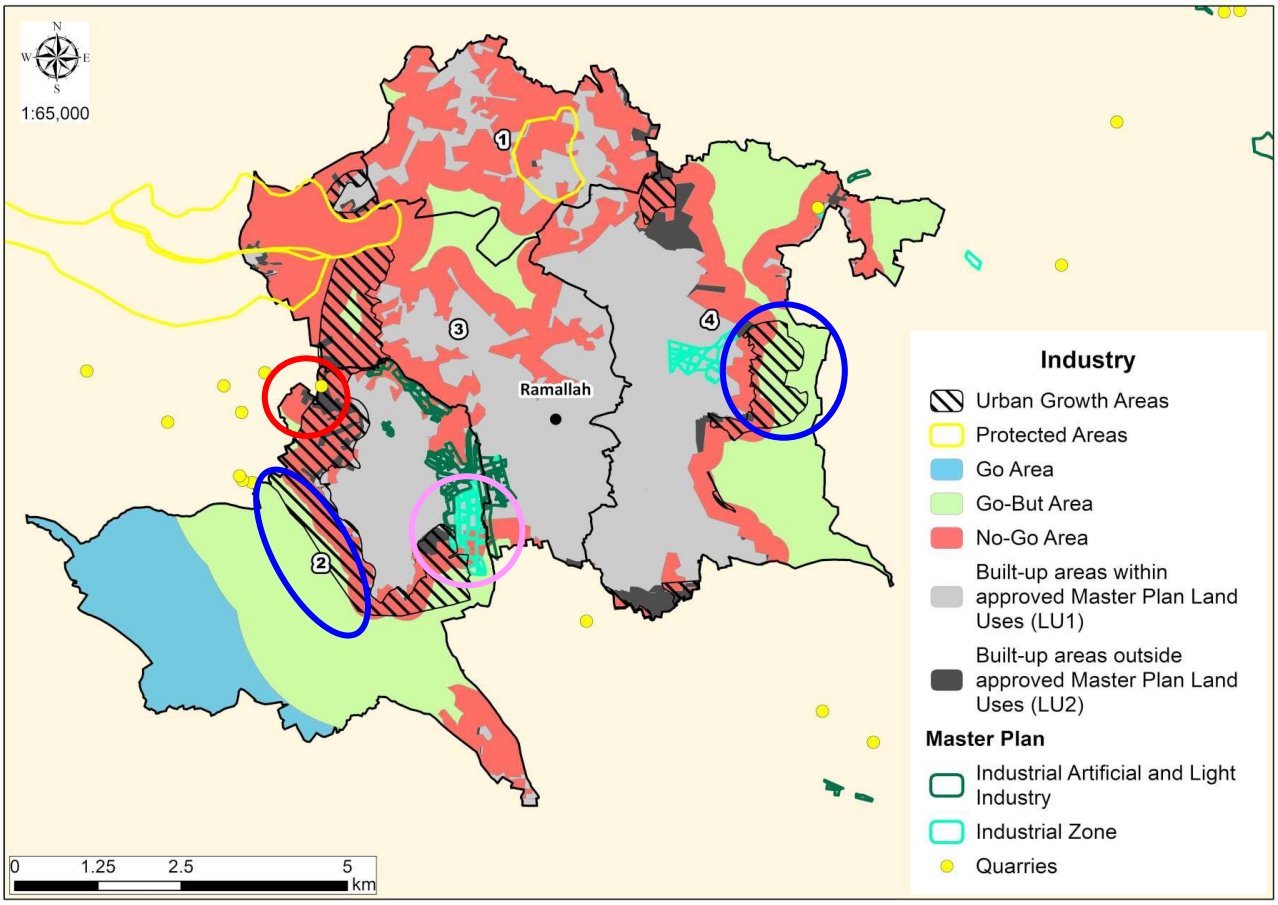


Figure 5.4.2-8: Urban Growth Boundaries & Priority and Exclusion areas for industry development – Ramallah and Al Bireh Urban Area

5.4.2.2 Supporting sectors

Energy

As a result of the final ranking process for Ramallah and Al Bireh Urban Area, priority is given to the development of the **renewable energy sector**. As is the case for Nablus Urban Area, wind conditions in the hilly regions of Ramallah and Al Bireh Urban Area are encouraging for the use of small wind turbines.

Ramallah and Al Bireh Urban Area has high solar energy potential, therefore the implementation of rooftop PV systems on public buildings and residences is highly recommended, even though solar energy harvesting for domestic use is considered expensive. Utility-scale PV production may also be promoted.

Solid waste

The promotion of advanced, sustainable **solid waste management** methods is included in the top-5 priorities as a result of the final ranking process. At present, approximately half of the solid waste from Ramallah and Al Bireh Governorate is collected and transported for 100 km to Zahret El Finjan landfill in Jenin Governorate and the other half is disposed of in random dumpsites thereby causing serious health concerns. At the time of writing this report, Ramallah and Al Bireh has the highest number of operational random dumpsites among the targeted urban areas.

As mentioned previously, most of the waste (85%) in Zahret El Finjan landfill is organic and recyclable therefore there is significant potential to reduce the volume of waste being disposed through recycling and to produce energy (composting, biogas generation, incineration).

In order to accommodate solid waste management needs, the Rammun Sanitary Landfill is proposed to be established in Ramallah and Al Bireh Governorate; this would alleviate pressure from existing dumpsites. However, this project is at present on hold, as it faces strong opposition from the Palestinians living in the area; this is captured in the vertical ranking results, where the creation of a sanitary landfill (SDP 18) is ranked 18th from stakeholders at a local level. Overall, as the project's significance is acknowledged by national and international experts, it has scored 10th in the final ranking process.

Water and Wastewater

With reference to the **water and wastewater infrastructure**, the existing WWTPs in Al Bireh and in Ramallah operate with no sludge management/utilization scheme; this poses a threat to public health and the environment including potential for contamination of surface and groundwater. Even though annual aquifer balances are high in Ramallah and Al Bireh, there is still potential for wastewater reuse for all purposes. The existing sewage network is inefficient and, as in the case of Nablus Urban Area, is combined. Most of the industrial waste is discharged into cesspits or sewage collection networks without any consideration for the potential to pollute.

Upgrading of existing wastewater treatment infrastructure is therefore considered a priority; this is captured by the fact that SDP 27 on increasing the efficiency of wastewater treatment systems has scored relatively high (9th) in the final ranking exercise.

Domestic water is supplied intermittently to consumers, who rely on roof tanks to cover the deficit in water supply; domestic water supply is groundwater that requires disinfection only. The use of unconventional water resources for covering water demands for all uses (SDP 25) is also within the top-5 priorities of the final ranking in Ramallah and Al Bireh Urban Area. As the area receives a comparatively high amount of rainfall annually, rainwater collection systems can also be implemented to address inefficiencies in the existing water network.

Health

The development of new and the upgrading of existing **health-care facilities** are also within the top-5 priorities in Ramallah and Al Bireh Urban Area. Ramallah and Al Bireh Urban Area has the highest number of hospitals among West Bank Urban Areas. There is an uneven distribution of hospitals in the Urban Area, as these are located in Ramallah and in Al Bireh LGUs. Primary health care facilities are also distributed unevenly in the Urban Area, as in Surda Abu Qash LGU there is none; as captured in the final ranking exercise, the creation of new health facilities would be a priority in this area. Upgrading of existing infrastructure, as in the case of Nablus Urban Area would have to focus on the management of medical waste.

Education

With reference to primary and secondary **education,** Ramallah and Al Bireh Urban Area has the highest classroom performance among the targeted urban areas. Furthermore, Ramallah and Al Bireh Urban Area has the largest concentration of international and local tertiary educational institutions among the West Bank Urban Areas, thus attracting internal migration of motivated

Palestinians looking to improve their skills and take advantage of employment opportunities. In this respect, tertiary education constitutes an asset of Ramallah and Al Bireh Urban Area, attracting human capital and eventually creating revenue; the importance of the education sector is captured in the vertical ranking exercise, where SDP 5 is among the top-5 priorities. However, this was not captured in the final ranking process due to limitations in the application of criteria in the horizontal ranking process for the education sector, which are discussed in section 5.3.3 of this report.

Transport

As in the case of Nablus Urban Area, even though there is poor connectivity between LGUs in Ramallah and Al Bireh Urban Area and high traffic volumes, the transport sector SDP (development of public transport and enhancement of connectivity) have scored low in the final ranking exercise, thus indicating that the planned and on-going road infrastructure projects are expected to alleviate existing limitations.

5.4.3 Bethlehem Urban Area

5.4.3.1 Key development sectors

Agriculture, Forestry and Fishing

Table 5.4.3-1 below presents the priority areas and exclusion areas for future agriculture development in Bethlehem Urban Area. All percentages in Table 5.4.3-1 are calculated based on the total surface of Bethlehem Urban Area (55.1 km²). The priority and exclusion areas for agriculture development within Area C are also presented, in order to allow for an overview of areas that can be developed in the short-term.

Table 5.4.3-1: Priority and Exclusion Areas for Agriculture Development - Bethlehem Urban Area

		Bethlehem Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total Surface	**km²**	55.1	19.57	0.71	23.44	11.34
	%	100%	35.51%	1.29%	42.56%	20.59%
Within Area C	**km²**	35.21	3.04	0.71	20.75	10.71
	%	63.9%	5.52%	1.29%	37.68%	19.45%

Legend

The sum of these areas are the priority areas for future agriculture development.

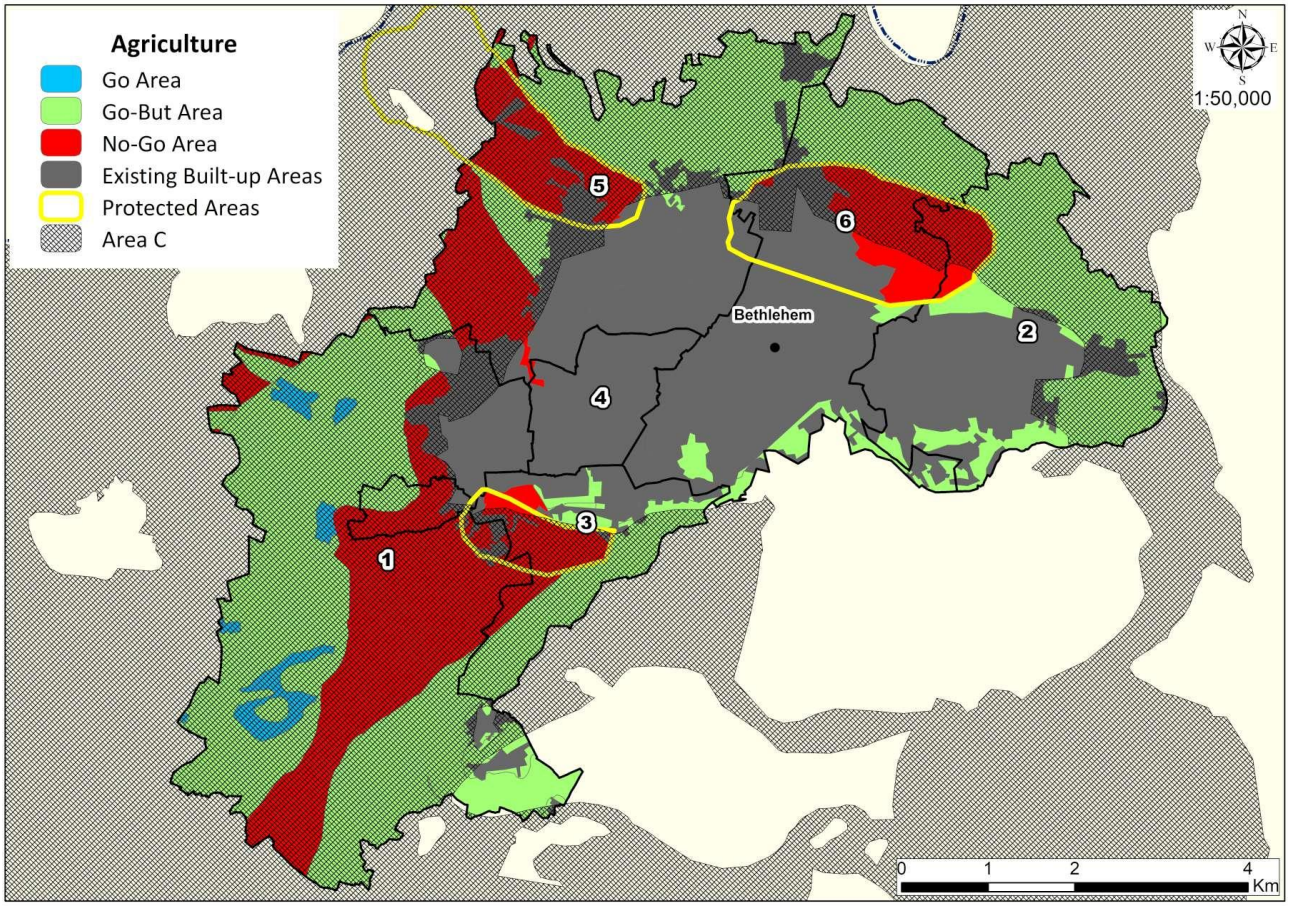


Figure 5.4.3-1: Priority and Exclusion Areas for Agriculture Development - Bethlehem Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 21% of Bethlehem Urban Area total surface is considered as an exclusion area and therefore not a priority for agricultural development. It must be noted that approximately 37% of this exclusion area (or approximately 8% of Bethlehem Urban Area total surface) is covered by protected areas and therefore is not suitable for agriculture.

Approximately 61% of Bethlehem Urban Area that is considered as an exclusion area for agricultural development has 'extreme groundwater vulnerability'. However, approximately one third of this area (or 4% of Bethlehem Urban Area total surface) could, under certain conditions, be used for agricultural purposes. The remaining two thirds of this exclusion area that is of extreme groundwater vulnerability and where the underlying geological formations are aquitards (mostly to the west/south west of Bethlehem Urban Area) cannot be used for agricultural development.

As a result of the final ranking exercise, SDP 1 '*Develop, promote and implement sustainable agricultural practices, including residential agriculture and support small-scale food producers in Palestine*' is within the top-5 priorities for Bethlehem Urban Area. In areas of extreme groundwater vulnerability and where the underlying geological formations are aquifers, precision agriculture and closed-loop hydroponic farming could be implemented. Water shortages can be addressed through the introduction of water- efficient and water-saving irrigation techniques. Agroforestry is also an option, given the fact that approximately 1% of Bethlehem Urban Area is covered by forests.

As shown in Figure 5.4.3-2 below, approximately 58% of the areas that have a high probability of becoming urban by 2035 ('Urban Growth Boundary') within Bethlehem Urban Area falls within the

priority area for agriculture development (marked in blue); given the fact that available land is limited, future urban planning would have to revisit the proposed Urban Growth Boundaries so as to protect agricultural land from urban expansion as much as possible. An option would be to promote residential agriculture interventions in these areas.

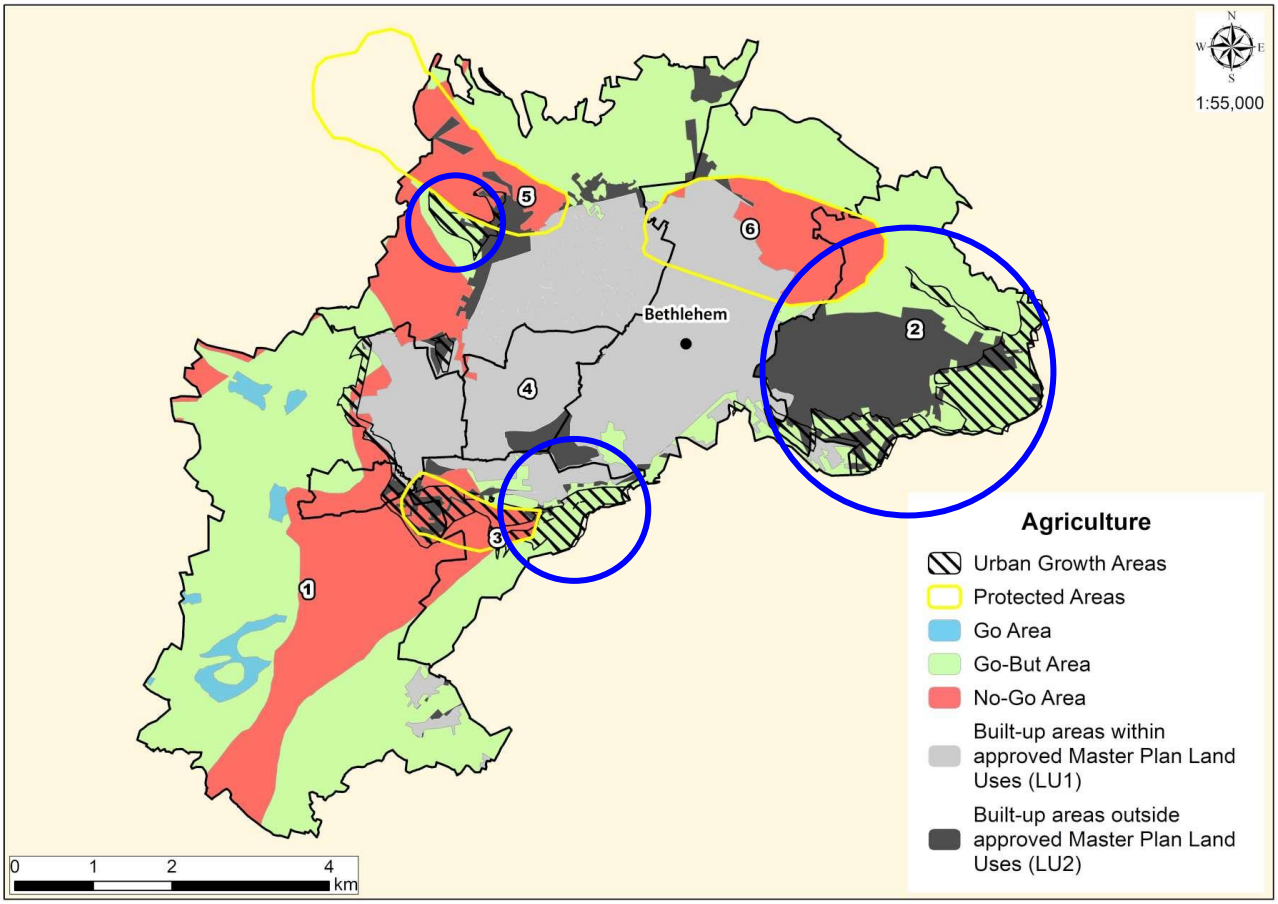


Figure 5.4.3-2: Urban Growth Boundaries & Priority and Exclusion areas for agriculture development – Bethlehem Urban Area

Urban and Strategic Planning

Table 5.4.3-2 below presents the priority areas and exclusion areas for urban planning development in Bethlehem Urban Area. All percentages in Table 5.4.3-2 are calculated based on the total surface of Bethlehem Urban Area (55.1 km²). The priority and exclusion areas for urban planning development within Area C are also presented, in order to allow for an overview of areas that can be developed in the short-term.

Table 5.4.3-2: Priority and Exclusion Areas for Urban Planning Development – Bethlehem Urban Area

		Bethlehem Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total Surface	**km²**	55.1	19.57	16.97	10.32	8.2
	%	100%	35.51%	30.82%	18.74%	14.89%
Within Area C	**km²**	35.21	3.04	16.23	8.87	7.07
	%	63.9%	5.52%	29.47%	16.11%	12.84%

Legend

The sum of these areas are the priority areas for urban planning development.

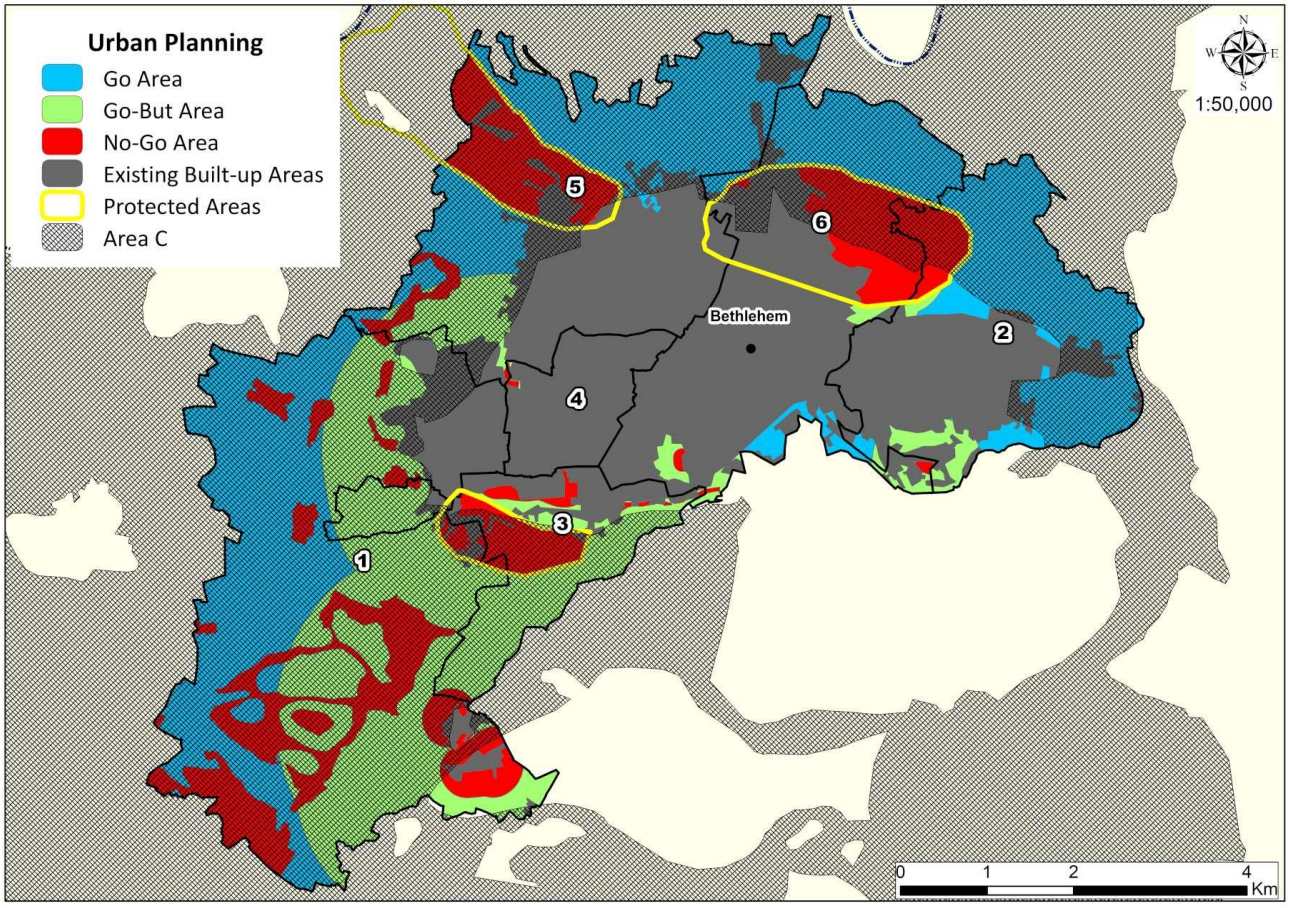


Figure 5.4.3-3: Priority and Exclusion Areas for Urban Planning Development – Bethlehem Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 15% of Bethlehem Urban Area total surface is considered as an exclusion area and therefore not a priority for urban planning development. It must be noted that approximately 51% of this exclusion area (or approximately 8% of Bethlehem Urban Area total surface) are protected areas and therefore not suitable for urban planning development.

It must be noted that, as a result of the final ranking exercise, urban planning SDP are not within the top-5 priorities for Bethlehem Urban Area. However, since SDP 23 '*Urban infill: dense construction in urban centers to take advantage of available land, taking into consideration sustainable planning and construction methods (smart city model)*' has scored moderately (10th) in the final ranking exercise, it is proposed that, where appropriate, in approximately 50% of Bethlehem Urban Area total surface where urban planning may be developed, priority may be given to the reuse of existing vacant and ignored buildings to cover growing housing needs and the promotion of green infrastructure.

As in the case of Nablus Urban Area and in order to ensure that the 500m distance criterion from existing or proposed antiquities areas is met at all times, in go-but areas and in the vicinity of antiquities, public urban spaces (i.e., open areas, Urban Green Spaces etc.) would be preferable.

High land and permitting prices within approved Master Plan areas have resulted in urban development expansion outside the designated urban edge, which, as mentioned in Table 4.3.1-6 of this report is quite high in Bethlehem Area.

As shown in Figure 5.4.3-4 below, approximately 80% of the areas that have a high probability of becoming urban by 2035 fall within built-up areas that are not included in approved Master Plans (LU2) and approximately 86% of the built-up areas that are not included in approved Master Plans (LU2) fall *outside* the Urban Growth Boundary; in both cases, future urban planning (town planners) would have to revisit approved Master Plans and Urban Growth Boundaries so as to include areas that have already been developed (marked in blue).

Approximately 20% of the Urban Growth Boundary falls within protected areas (nature reserves and key biodiversity areas) (marked in pink in Figure 5.4.3-4); future urban planning would have to revisit the proposed Urban Growth Boundaries so as to minimize likely impacts of urban expansion into sensitive areas. It must be noted that, approximately 34% of protected areas (or 31% of protected areas within the Urban Growth Boundary) are already built-up, therefore it is considered a priority to prevent further encroachment of urban development into protected areas. Furthermore, approximately 18% of total stream length within Bethlehem Urban Area falls within the Urban Growth Boundaries, thus posing limitations that would have to be taken into consideration for future urban development along riparian areas so as to minimize likely water pollution.

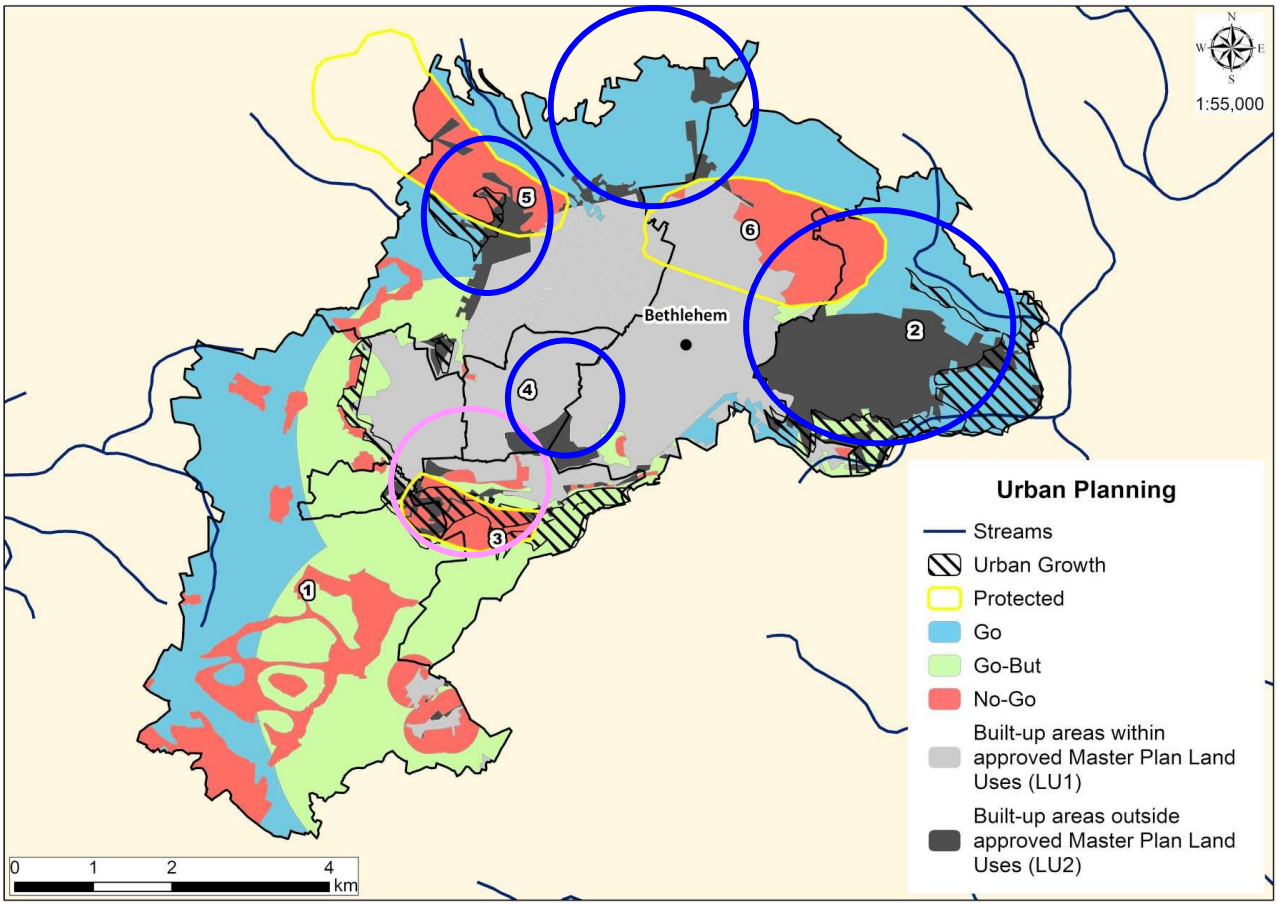


Figure 5.4.3-4: Urban Growth Boundaries & Priority and Exclusion areas for urban development – Bethlehem Urban Area

Tourism

Table 5.4.3-3 below presents the priority areas and exclusion areas for future tourism development in Bethlehem Urban Area. All percentages in Table 5.4.3-3 are calculated based on the total surface of Bethlehem Urban Area (55.1 km²). The priority and exclusion areas for tourism development within

Area C are also presented, in order to allow for an overview of areas that can be developed in the short-term.

Table 5.4.3-3: Priority and Exclusion Areas for Tourism Development - Bethlehem Urban Area

		Bethlehem Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total Surface	km²	55.1	19.57	9.95	24.78	0.8
	%	100%	35.51%	18.07%	44.97%	1.45%
Within Area C	km²	35.21	3.04	8.78	23.09	0.3
	%	63.9%	5.52%	15.93%	41.91%	0.54%

Legend

The sum of these areas are the priority areas for tourism development.

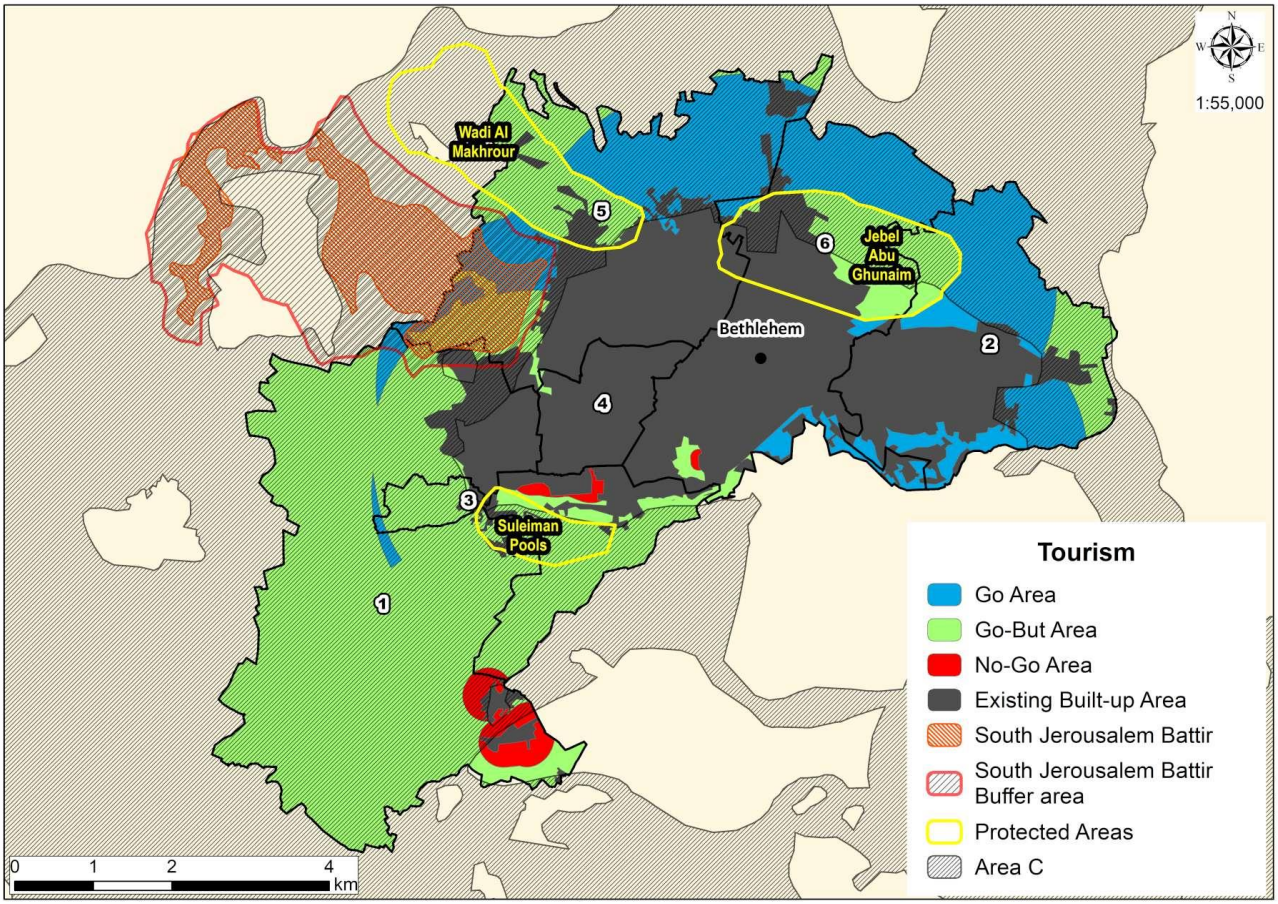


Figure 5.4.3-5: Priority and Exclusion Areas for Tourism Development - Bethlehem Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 1.5% of Bethlehem Urban Area total surface is considered as an exclusion area, due to application of buffer zones between existing industries and tourism, and therefore not a priority for tourism development. In approximately 63% of Bethlehem Urban Area total surface, tourism may be developed; however, within protected areas, covering approximately 12% of this area only eco-tourism activities may be developed. More specifically, within protected areas (covering approximately 8% of Bethlehem Urban Area) such as Wadi Al-Makhrour valley, a biodiversity-rich area which is designated by the Palestinian authority as a biodiversity hotspot, but not as a protected area, there are opportunities for the promotion of conservation tourism. As shown

on

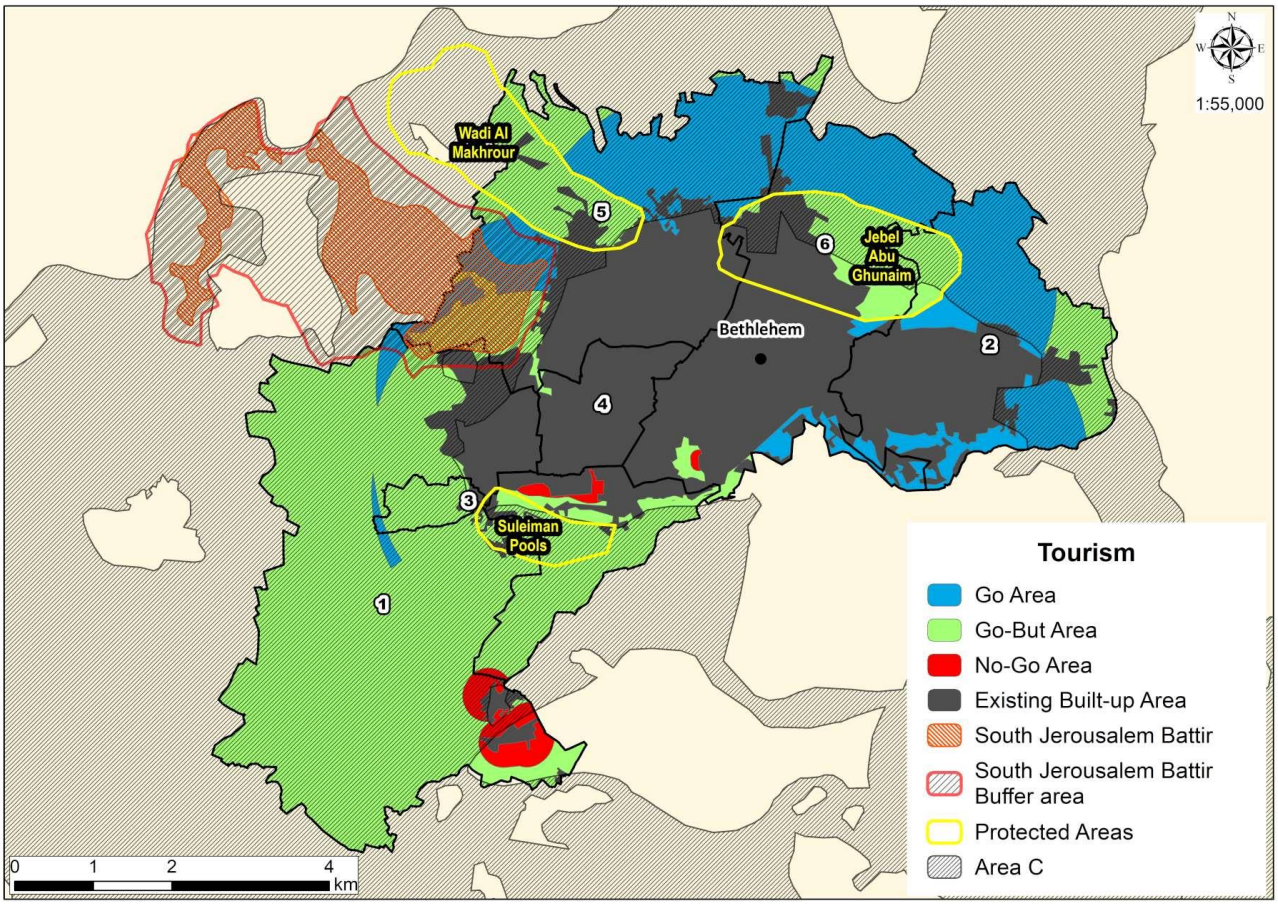


Figure 5.4.3-5 above, approximately one quarter or this area is already built-up, therefore it is considered a priority to protect the remaining area from urban expansion; to a lesser extent, this is also the case for Suleiman Pools. The same applies for Jebel Abu Ghunaim key biodiversity area, which is currently converted into urban areas. Existing forests as well as land suitable for forestation can also be used for recreation and eco-tourism purposes, thus contributing in the abatement of forest land degradation.

In the vicinity of tourism zones and antiquities zones that are not built-up, as well as near existing archaeological sites and cultural landscapes (Battir, under UNESCO's World Heritage List), as shown on Figure 5.4.3-6 below, there is potential for the creation and renovation of tourist facilities and hospitality services infrastructure (food, hotels, retail, attraction and tours) as well as for the repair and expansion of city infrastructure to adequately handle increased volume.

The inherent desirability of the Holy Land for pilgrim and heritage tourism endows Bethlehem, and tourism-related businesses located there, with an opportunity for economic growth. In order to sustain this window of opportunity and prolong the touristic period, the promotion of alternative forms of tourism is a viable option; this is captured in the results of the final ranking exercise, where SDP 19 '*Promote the diversification of the tourism to integrate alternative forms of tourism*' is within the top-5 priorities for Bethlehem Urban Area.

As shown in Figure 5.4.3-6 below, approximately 75% of the areas that have a high probability of becoming urban by 2035 ('Urban Growth Boundary') within Bethlehem Urban Area fall within the priority area for tourism development. There is therefore opportunity for the development of tourist

facilities in 'go' areas that fall within Urban Growth Boundaries; this is approximately in 32% of the total urban growth expansion surface.

Urban expansion within urban area boundaries does not seem to be in conflict with the existing antiquity or tourism zones located within or outside urban area limits (marked in orange). However, archaeological sites and Buffer zone of Battir Cultural Landscape, which is under UNESCO's World Heritage List, are located within urban growth boundaries; all reasonable care (i.e., buffer zones etc.) should be taken into consideration for the minimization of any likely impacts of future urban growth on these sites (marked in green). Furthermore, part of the tourism zone to the south of Bethlehem Urban Area (marked in red) falls within the exclusion area for tourism development as per SESA recommendations; review of approved Master Plans would preferably take this into consideration.

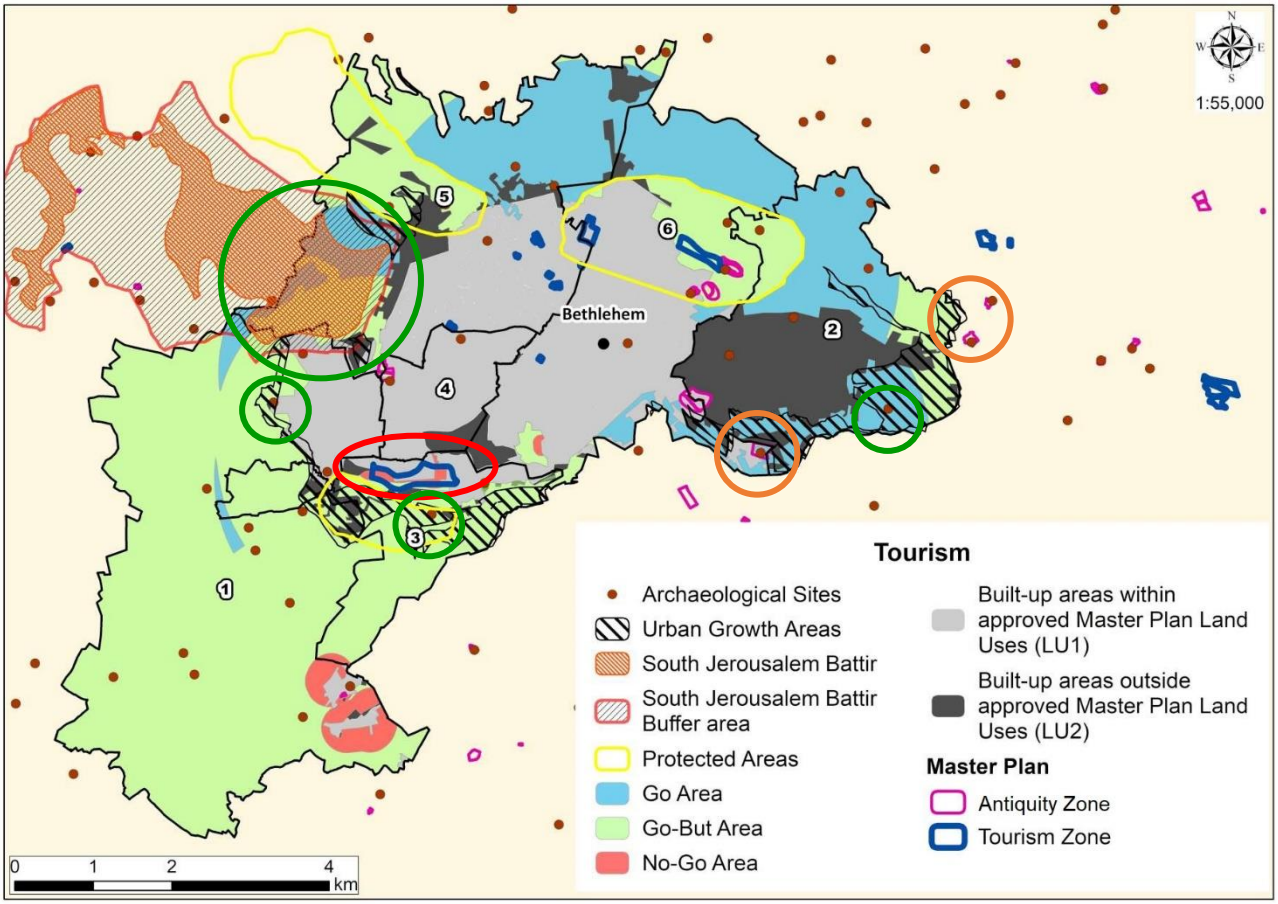


Figure 5.4.3-6: Urban Growth Boundaries & Priority and Exclusion areas for tourism development – Bethlehem Urban Area

Industry

Table 5.4.3-4 below presents the priority areas and exclusion areas for future high-nuisance industry development in Bethlehem Urban Area. All percentages in Table 5.4.3-4 are calculated based on the total surface of Bethlehem Urban Area (55.1 km²). The priority and exclusion areas for high-nuisance industry development within Area C are also presented, in order to allow for an overview of areas that can be developed in the short-term.

Table 5.4.3-4: Priority and Exclusion Areas for high-nuisance Industry Development - Bethlehem Urban Area

		Bethlehem Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total Surface	km²	55.1	19.57	2.17	13.28	20.08
	%	100%	35.51%	3.94%	24.11%	36.44%
Within Area C	km²	35.21	3.04	2.17	13.22	16.78
	%	63.9%	5.52%	3.94%	23.99	30.45%

Legend

The sum of these areas are the priority areas for high-nuisance industry development.

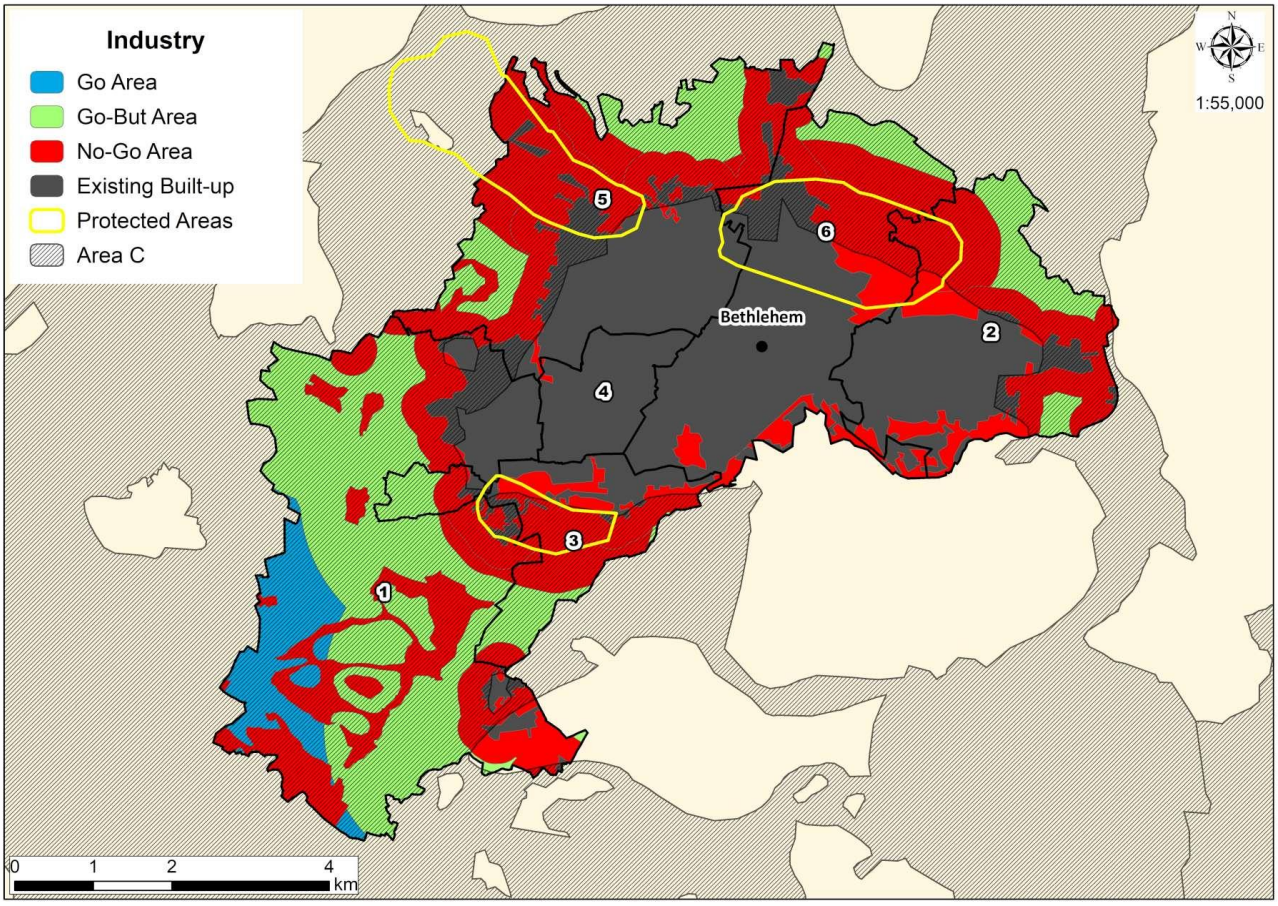


Figure 5.4.3-7: Priority and Exclusion Areas for high-nuisance Industry Development - Bethlehem Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 36% of Bethlehem Urban Area total surface is considered as an exclusion area and therefore not a priority for industry development. It must be noted that approximately 52% of this exclusion area (or approximately 19% of Bethlehem Urban Area total surface) are protected areas, including buffer zones, and therefore not suitable for industry development.

The proximity to existing built-up areas is the main reason for the exclusion of the remaining 18% of Bethlehem Urban Area total surface from the development of industrial activities; as mentioned above, even though different buffer zones have been applied per industry nuisance level, only the environmental criteria for high-nuisance industry are presented in the spatial mapping, as a worst-case scenario.

It must be noted that, as a result of the final ranking exercise, industry SDP are not within the top-5 priorities for Bethlehem Urban Area. However, since SDP 13 '*Support, rehabilitate and increase the establishment and development of small enterprises of a productive nature (craft areas')*' and SDP 12 '*Establish industrial zones, industrial compounds and industrial incubators*' have scored relatively high (7th and 12th respectively) in the final ranking exercise, it is proposed that, where appropriate, in approximately 28% of Bethlehem Urban Area total surface, priority may be given to the promotion of craft industries and the creation of new industrial zones.

Within Bethlehem Urban Area there are industries and quarries in proximity to residential or commercial areas, thus increasing air, noise, soil and water pollution and health risks; this could have significant economic costs over the long-term in terms of reduced health of the population and increased demand for health-care.

As is the case for all targeted urban areas, the challenges in covering water and energy demands of the industry sector and minimizing pollution and health risks can be addressed with industrial symbiosis initiatives and with the promotion of less water and energy-demanding as well as less polluting industries such as craft workshops.

As shown in Figure 5.4.3-8 below, approximately 6% of the areas that have a high probability of becoming urban by 2035 ('Urban Growth Boundary') within Bethlehem Urban Area fall within the priority area for industry development (marked in blue). Urban expansion within urban area boundaries does not seem to be in conflict with the existing quarries or industrial zones. Guidance should be provided regarding the location of new quarries, based on the identified exclusion zones.

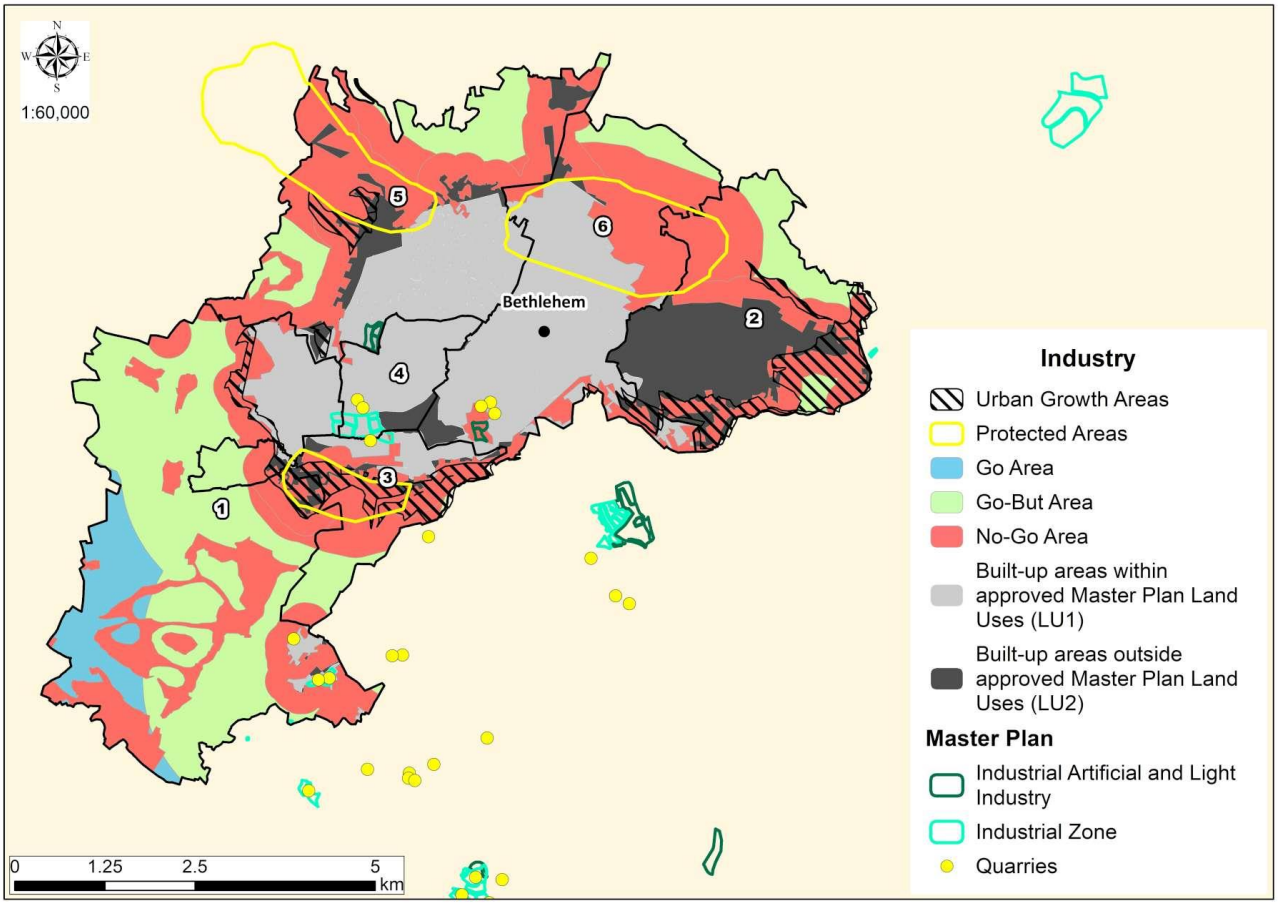


Figure 5.4.3-8: Urban Growth Boundaries & Priority and Exclusion areas for industry development – Bethlehem Urban Area

5.4.3.2 Supporting sectors

Energy

As a result of the final ranking process for Bethlehem Urban Area, priority is given to the development of the **renewable energy sector**. Wind conditions are not as favourable in Bethlehem Urban Area; therefore, windfarms would not be a preferable renewable energy option. However, Bethlehem Urban Area has high solar energy potential, therefore the implementation of rooftop PV systems on public buildings and residences is highly recommended even though solar energy harvesting for domestic use is considered expensive. Utility-scale PV production may also be promoted.

Solid waste

At present, all **solid waste** from Bethlehem Urban Area is collected and transported to Al Menya landfill, located in Bethlehem Governorate. Most of the waste in Al Menya landfill is organic (45-50%) and recyclable (30-35%) therefore there is significant potential to reduce the volume of waste being disposed through recycling and to produce energy (composting, biogas generation, incineration); this is captured in the final ranking results, where the promotion of advanced, sustainable solid waste management methods (SDP 16) is included in the top-5 priorities. The high organic content in the solid waste generated implies good potential for composting (and using the compost for land rehabilitation). Reduction of waste volume (via sorting, recycling and composting), would alleviate pressure on existing infrastructure and accommodate for growing solid waste management volumes.

Water and Wastewater

With reference to the **water and wastewater infrastructure**, there is no WWTP within the boundaries of Bethlehem Urban Area; communities are serviced by Bethlehem WTTP which is outside urban area limits and is operating with acceptable efficiency. In Bethlehem Urban Area water scarcity is severe, with low annual aquifer balances and low annual rainfall quantities. As in all targeted urban areas, in Bethlehem Urban Area, the existing sewage network is, in many cases, ineffective, consisting of a combined system for both sewage and rainwater. Where there are no sewerage networks, cesspits and open channels are most commonly used in the villages and camps, causing surface and groundwater pollution as well as serious public health concerns. Few industrial facilities dispose of their wastewater into the municipal wastewater network, the majority dumping their wastewater in the cesspits. Domestic water is supplied intermittently to consumers, who rely on roof tanks to cover the deficit in water supply; domestic water supply is groundwater that requires disinfection only. This is captured in the final ranking exercise, as the use of unconventional water resources for covering water demands for all uses (SDP 25) has ranked 6th. As wastewater generation is expected to increase substantially due to population growth and urbanisation trends, there is a need to promote the use of unconventional water resources for covering water demands for all uses. Furthermore, the use of septic tanks can be promoted for rural communities.

As in the case of Nablus Urban Area, treated wastewater can be reused for agricultural production, for industry and urban applications (such as fire-fighting etc.). Furthermore, agricultural rainwater harvesting may be promoted in order to address the area's extremely limited water resources. Constructed wetlands may potentially be created for greywater treatment; such initiatives would preferably be situated in areas that have low or no vulnerability to groundwater pollution and where the underlying geological formations are aquitards.

Health

Bethlehem Governorate has the second highest rate of persons per primary **healthcare facility** in the West Bank; this has been captured in the final ranking exercise, as the creation of new and the upgrading of existing primary health facilities has been highlighted as a top-5 priority. Overall, there is an uneven distribution of health facilities between LGUs, with more 80% of the existing primary health care facilities concentrated in Beit Sahur, Beit Jala and Bethlehem LGUs. Upgrading of existing infrastructure would have to focus on the management of medical waste.

Education

Bethlehem Urban Area has the lowest number of **education facilities** from the West Bank Urban Areas and there is an uneven distribution of education facilities between LGUs, with Al Khader and Artas LGUs lagging behind; therefore, the improvement of educational facilities is among high priorities in the area. The importance of the education sector is captured in the vertical ranking exercise, where SDP 5 is among the top-5 priorities. However, this was not captured in the final ranking process due to limitations in the application of criteria in the horizontal ranking process for the education sector, which are discussed in section 5.3.3 of this report.

Transport

As in the case of Nablus and Ramallah and Al Bireh Urban Areas, even though there is poor connectivity between LGUs in Bethlehem Urban Area and high traffic volumes, the **transport sector** SDP (development of public transport and enhancement of connectivity) have scored low in the final ranking exercise, thus indicating that the planned and on-going road infrastructure projects are expected to alleviate existing limitations.

5.4.4 Hebron Urban Area

5.4.4.1 Key development sectors

Agriculture, Forestry and Fishing

Table 5.4.4-1 below presents the priority areas and exclusion areas for future agriculture development in Hebron Urban Area. All percentages in Table 5.4.4-1 are calculated based on the total surface of Hebron Urban Area (162.8 km²). The priority and exclusion areas for agriculture development within Area C and within Area H2 are also presented, in order to allow for an overview of areas that can be developed in the short-term.

Table 5.4.4-1: Priority and Exclusion Areas for Agriculture Development - Hebron Urban Area

		Hebron Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total Surface	**km²**	162.8	76.73	5.94	26.8	53.31
	%	100%	47.14%	3.65%	16.46%	32.75%
Within Area C	**km²**	52.7	12.03	0.96	13.77	25.91
	%	32.4%	7.39%	0.59%	8.46%	15.92%
Within H2	**km²**	4.5	4.4	0	0.02	0.08
	%	2.8%	2.73%	0%	0.01%	0.05%

Legend

The sum of these areas are the priority areas for future agriculture development.

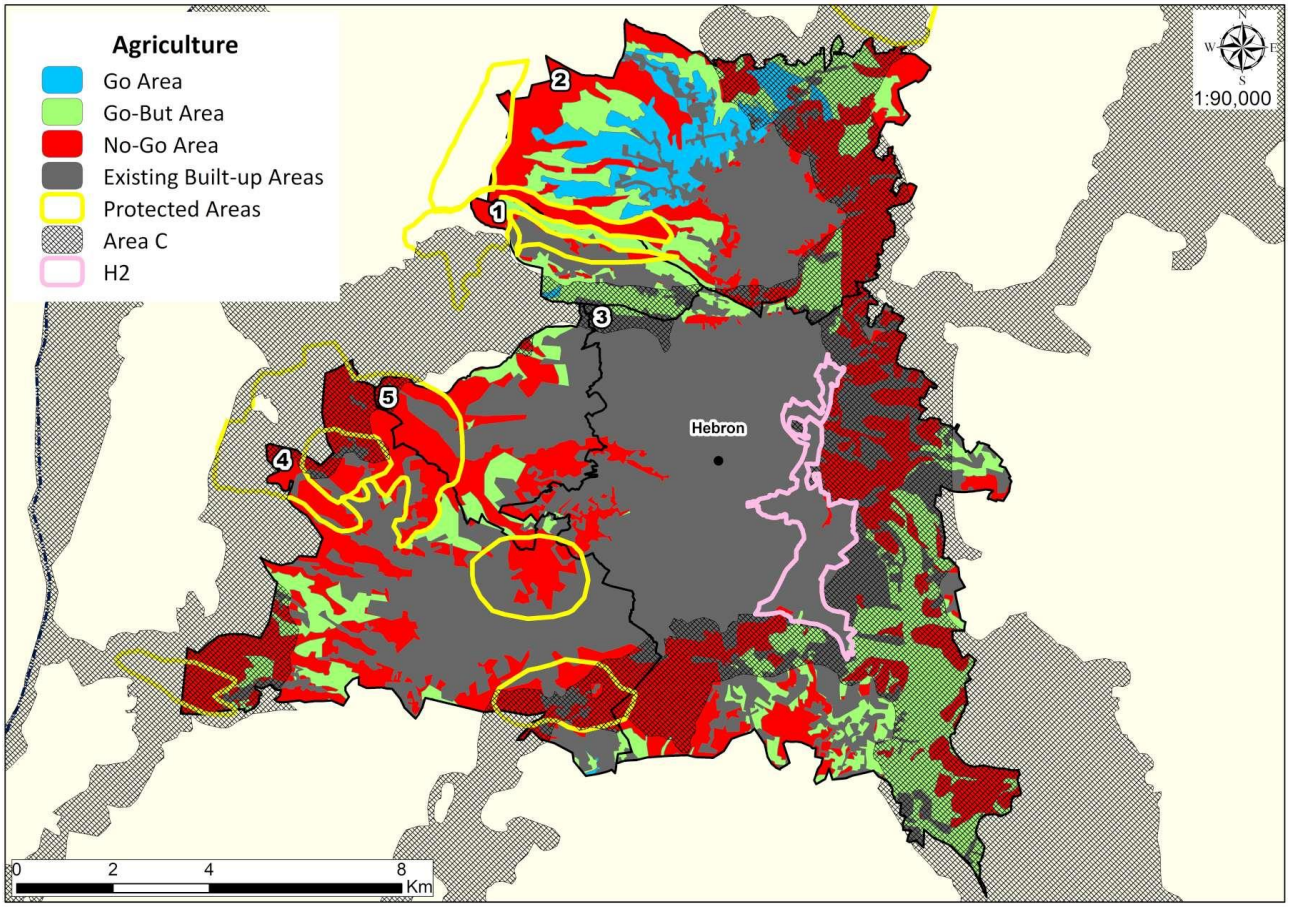


Figure 5.4.4-1: Priority and Exclusion Areas for Agriculture Development - Hebron Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 33% of Hebron Urban Area total surface is considered as an exclusion area and therefore not a priority for agricultural development. It must be noted that approximately 25% of this exclusion area (or approximately 8% of Hebron Urban Area total surface) is covered by protected areas and therefore is not suitable for agriculture.

Approximately 44% of Hebron Urban Area that is considered as an exclusion area for agricultural development has 'low agricultural productivity'. However, approximately 65% of this area (or 10% of Hebron Urban Area total surface) could, under certain conditions, be used for agricultural purposes; in areas of low agricultural productivity and where the underlying geological formations are aquifers, precision agriculture and closed-loop hydroponic farming could be implemented. The remaining 35% of this exclusion area (or 5% of Hebron Urban Area total surface) that is of low agricultural productivity and where the underlying geological formations are aquitards (mostly to the west of Hebron Urban Area) cannot be used for agricultural development.

Given the fact that approximately 2% of Hebron Urban Area is covered by forests and taking into consideration water availability, agroforestry is also an option. Finally, there is potential for expansion of existing freshwater aquafarms.

As in the case of other targeted urban areas, water shortages can be addressed through the introduction of water- efficient and water-saving irrigation techniques.

As a result of the final ranking exercise, SDP 1 '*Develop, promote and implement sustainable agricultural practices, including residential agriculture and support small-scale food producers in Palestine*' is within the top-5 priorities for Hebron Urban Area and SDP 3 '*Protect agricultural & forest lands from urban expansion and other forms of degradation*' has scored high (7th). As in the case of Ramallah and Al Bireh Urban Area, it is proposed that, in the 'priority areas for agriculture development', priority is given in the reclamation of non-agricultural land which would be of significant economic value to Hebron Urban Area.

As shown in Figure 5.4.4-2 below, approximately 27% of the areas that have a high probability of becoming urban by 2035 ('Urban Growth Boundary') within Hebron Urban Area fall within the priority area for agriculture development (marked in blue); given the fact that available land is limited, future urban planning would have to revisit the proposed Urban Growth Boundaries so as to protect agricultural land from urban expansion as much as possible. An option would be to promote residential agriculture interventions in these areas.

Approximately 14% of the Urban Growth Boundary for Hebron Urban Area, falls *outside* the Hebron Urban Area limits. To the south west of Hebron Urban Area where, according to SESA recommendations, agriculture can be developed within the Urban Area boundary, urban expansion outside urban area boundaries would be in conflict with adjacent agricultural uses within urban area boundaries; these areas are marked in orange in Figure 5.4.4-2.

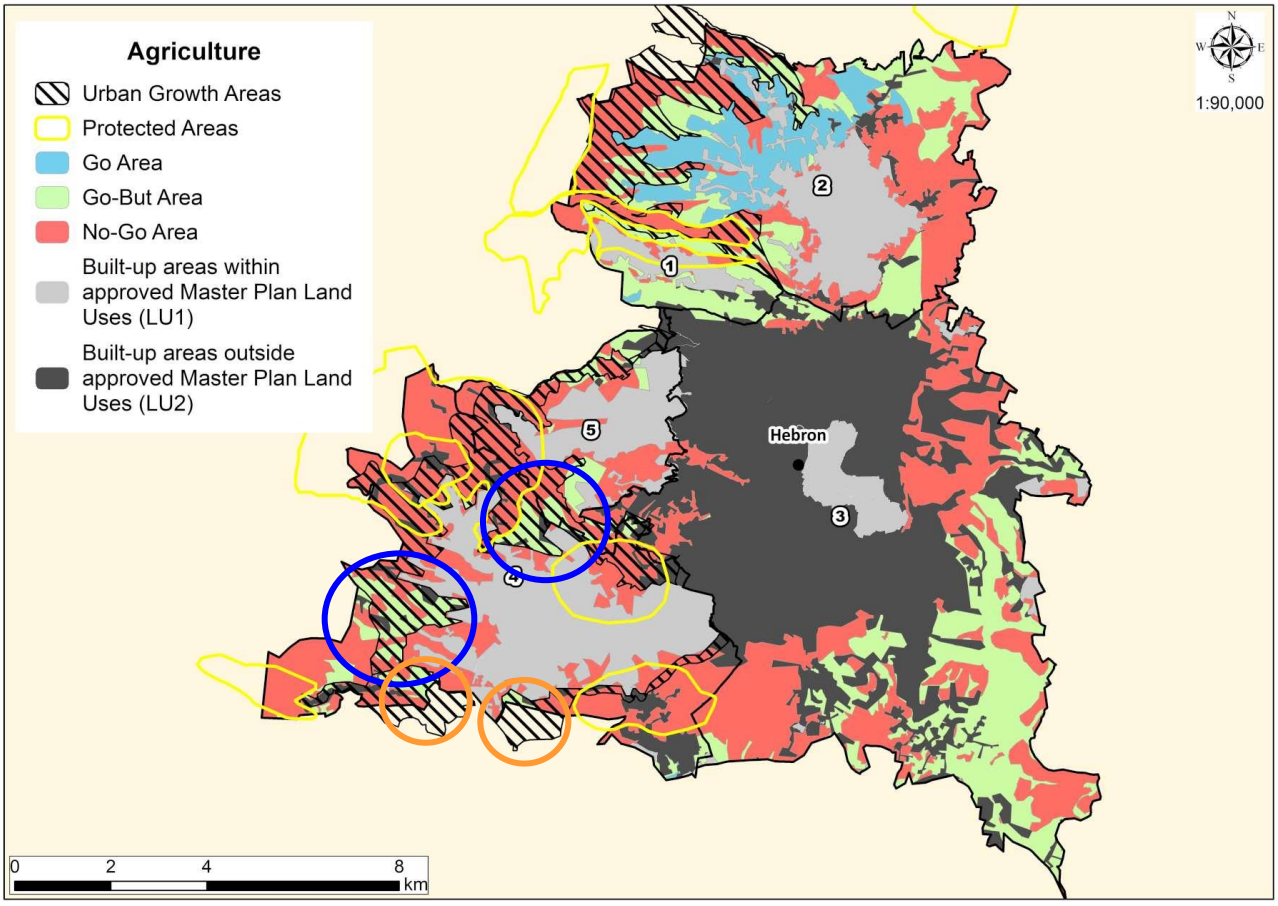


Figure 5.4.4-2: Urban Growth Boundaries & Priority and Exclusion areas for agriculture development – Hebron Urban Area

Urban and Strategic Planning

Table 5.4.4-2 below presents the priority areas and exclusion areas for urban planning development in Hebron Urban Area. All percentages in Table 5.4.4-2 are calculated based on the total surface of Hebron Urban Area (162.8 km²). The priority and exclusion areas for urban planning development within Area C and within Area H2 are also presented, in order to allow for an overview of areas that can be developed in the short-term.

Table 5.4.4-2: Priority and Exclusion Areas for Urban Planning Development - Hebron Urban Area

		Hebron Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total Surface	**km²**	162.8	76.73	38.29	20.17	27.59
	%	100%	47.14%	23.52%	12.39%	16.95%
Within Area C	**km²**	52.7	12.03	22.45	6.2	11.99
	%	32.4%	7.39%	13.79%	3.81%	7.37%
Within H2	**km²**	4.5	4.4	0.11	0	0
	%	2.8%	2.73%	0.07%	0%	0%

Legend

The sum of these areas are the priority areas for urban planning development.

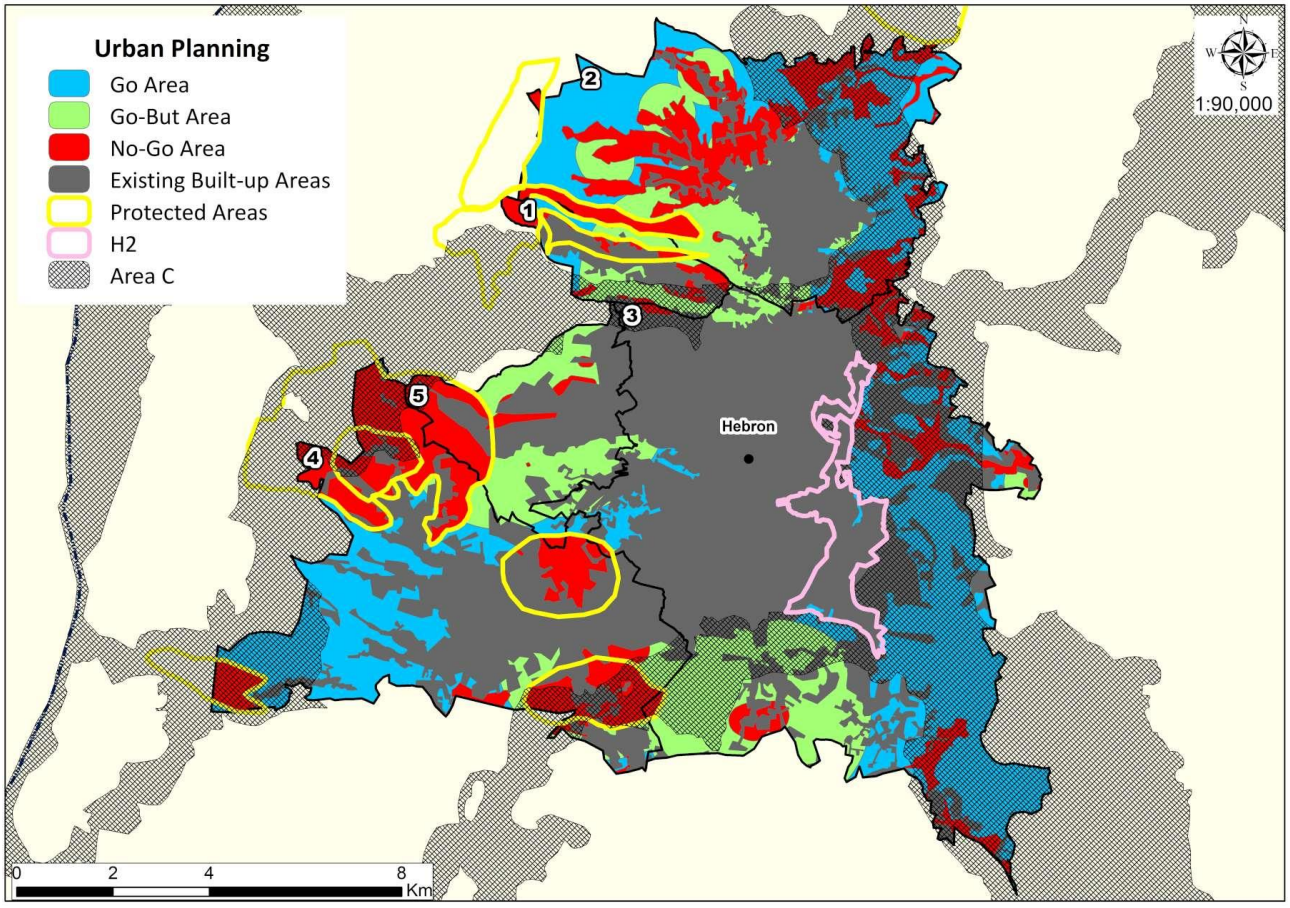


Figure 5.4.4-3: Priority and Exclusion Areas for Urban Planning Development - Hebron Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 17% of Hebron Urban Area total surface is considered as an exclusion area and therefore not a priority for urban planning development. It must be noted that

approximately 48% of this exclusion area (or approximately 8% of Hebron Urban Area total surface) are protected areas and therefore not suitable for urban planning development.

It must be noted that, as a result of the final ranking exercise, urban planning SDP are not within the top-5 priorities for Hebron Urban Area. However, SDP 23 '*Urban infill: dense construction in urban centers to take advantage of available land, taking into consideration sustainable planning and construction methods (smart city model)'* and SDP 24 '*Urban periphery: construction around existing urban centers to increase city size, and development of decentralized areas taking into consideration sustainable planning and construction methods (smart city model)'* have scored relatively low (16th and 18th respectively) in the final ranking exercise. Therefore, it is proposed that, where appropriate, in approximately 36% of Hebron Urban Area total surface where urban planning may be developed, the construction around existing urban centers to increase city size as well as the potential reuse of existing vacant and ignored buildings may be applied to cover growing housing needs.

In order to ensure that the 500m distance criterion from existing or proposed antiquities areas, as presented in Table 2.3.2-2 of this report, is met at all times, in go-but areas and in the vicinity of antiquities, public urban spaces (i.e., open areas, Urban Green Spaces etc.) would be preferable.

High land and permitting prices within approved Master Plan areas have resulted in urban development expansion outside the designated urban edge, which, as mentioned in Table 4.3.1-6 of this report is quite high in Hebron Area.

As shown in Figure 5.4.4-4 below, approximately 12% of the areas that have a high probability of becoming urban by 2035 fall within built-up areas that are not included in approved Master Plans (LU2) and approximately 94% of the built-up areas that are not included in approved Master Plans (LU2) fall *outside* the Urban Growth Boundary; in both cases, future urban planning (town planners) would have to revisit approved Master Plans and Urban Growth Boundaries so as to include areas that have already been developed (marked in blue).Approximately 31% of the Urban Growth Boundary falls within protected areas (nature reserves and key biodiversity areas) (marked in pink in Figure 5.4.4-4); future urban planning would have to revisit the proposed Urban Growth Boundaries so as to minimize likely impacts of urban expansion into sensitive areas. It must be noted that, approximately 28% of protected areas (or 15% of protected areas within the Urban Growth Boundary) are already built-up, therefore it is considered a priority to prevent further encroachment of urban development into protected areas. Furthermore, approximately 53% of total stream length within Hebron Urban Area falls within the Urban Growth Boundaries, thus posing limitations that would have to be taken into consideration for future urban development along riparian areas so as to minimize likely water pollution.

Urban planning development to the north and south of Hebron Urban Area within the Urban Area boundary does not seem to be in conflict with future urban expansion outside urban area boundaries (marked in orange). However, to the south of Hebron Urban Area, urban expansion outside urban area boundaries would be in conflict with the adjacent exclusion area for urban development within urban area boundaries (marked in green).

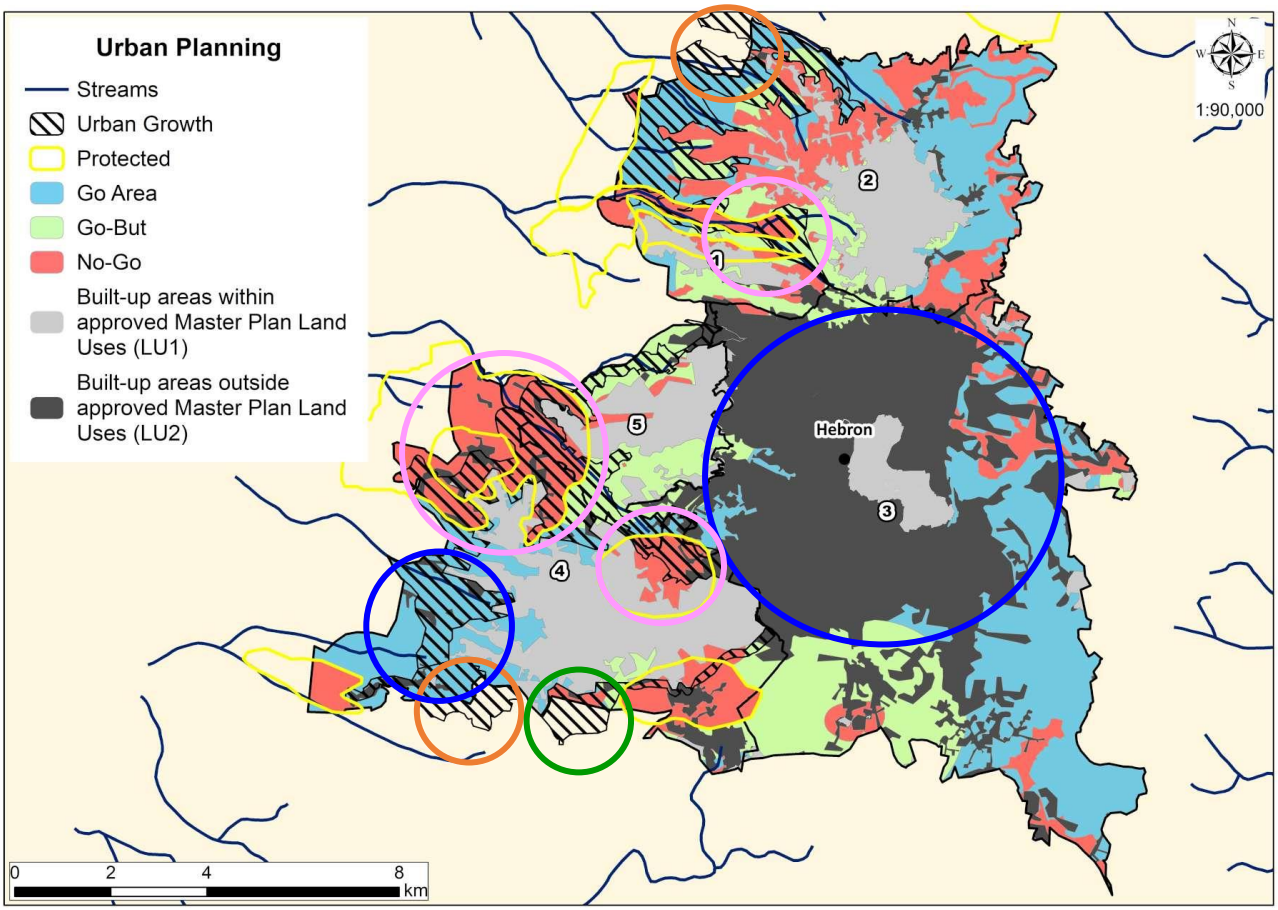


Figure 5.4.4-4: Urban Growth Boundaries & Priority and Exclusion areas for urban development – Nablus Urban Area

Tourism

Table 5.4.4-3 below presents the priority areas and exclusion areas for future tourism development in Hebron Urban Area. All percentages in Table 5.4.4-3 are calculated based on the total surface of Hebron Urban Area (162.8 km²). The priority and exclusion areas for tourism development within Area C and within Area H2 are also presented, in order to allow for an overview of areas that can be developed in the short-term.

Table 5.4.4-3: Priority and Exclusion Areas for Tourism Development - Hebron Urban Area

		Hebron Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total Surface	km²	162.8	76.73	12.60	71.57	1.90
	%	100%	47.14%	7.74%	43.95%	1.17%
Within Area C	km²	52.7	12.03	4.90	35.57	0.20
	%	32.4%	7.39%	3.03%	21.85%	0.13%
Within H2	km²	4.5	4.4	0	0.07	00.3
	%	2.8%	2.73%	0%	0.05%	0.02%

Legend

The sum of these areas are the priority areas for tourism development.

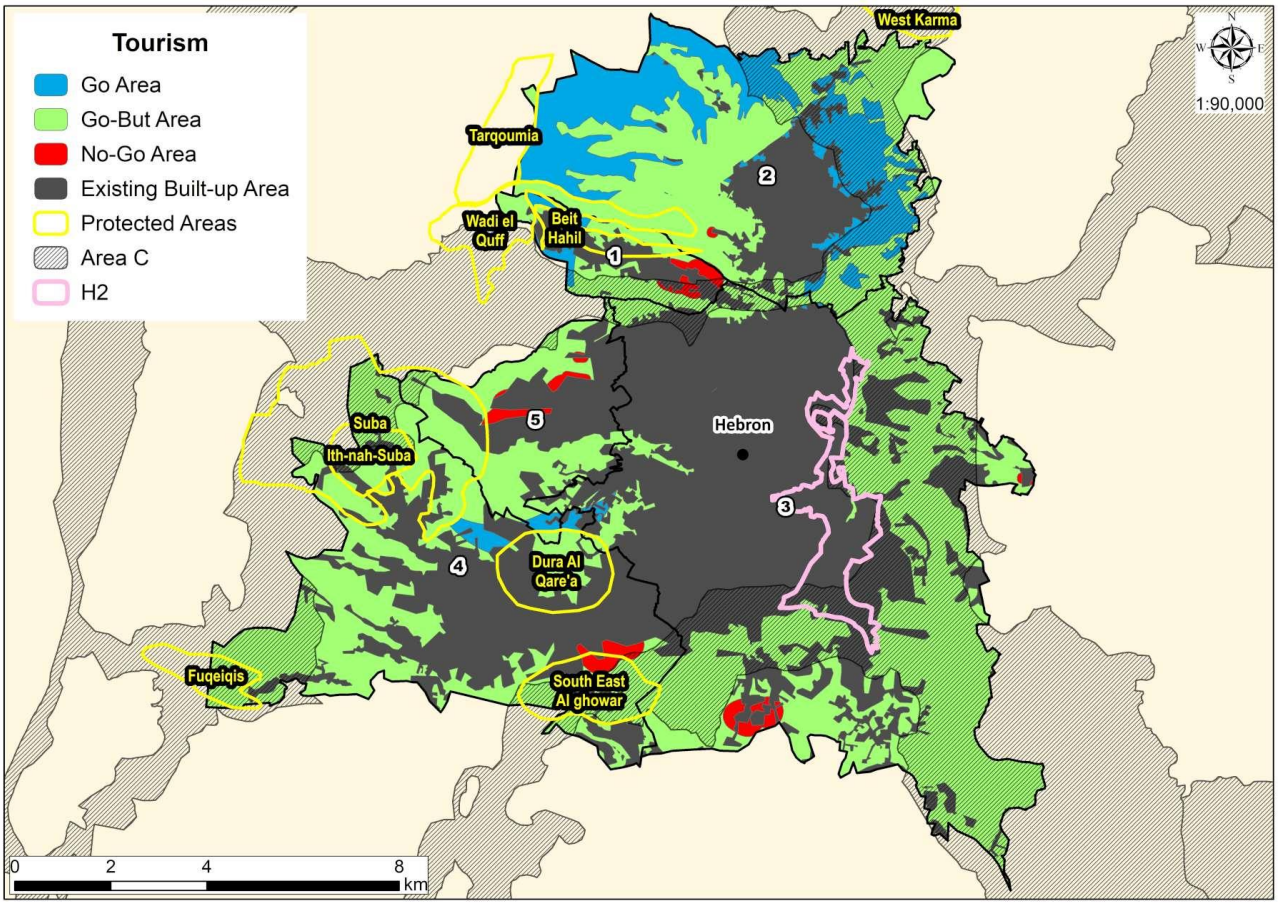


Figure 5.4.4-5: Priority and Exclusion Areas for Tourism Development - Hebron Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 1% of Hebron Urban Area total surface is considered as an exclusion area and therefore not a priority for tourism development. In approximately 52% of Hebron Urban Area total surface, tourism may be developed; however, within protected areas, covering approximately 16% of this area (and approximately 8% of Hebron Urban Area), *only* eco-tourism activities may be developed. As shown in Figure 5.4.4-5 above, with the exception of Wadi el Quff protected area, within all other protected areas of Hebron Urban Area, built-up areas have already been developed, therefore it is considered a priority to promote conservation tourism in the remaining area. Existing forests as well as land suitable for forestation can also be used for recreation and eco-tourism purposes, thus contributing in the abatement of forest land degradation.

In the vicinity of tourism zones and antiquities zones that are not built-up, as well as near existing archaeological sites, there is potential for the creation and renovation of tourist facilities.

Overall, the tourist potential of Hebron Urban Area is neglected; this is captured in the results of the final ranking exercise, where tourism SDP are not within the top-5 priorities for Hebron Urban Area. SDP 19 '*Promote the diversification of the tourism to integrate alternative forms of tourism*' has scored relatively high (9th) in the final ranking exercise, indicating that there is growing interest for alternative tourism in the area.

As shown in Figure 5.4.4-6 below, approximately 87% of the areas that have a high probability of becoming urban by 2035 ('Urban Growth Boundary') within Hebron Urban Area fall within the priority area for tourism development. Urban expansion outside urban area boundaries to the south of

Hebron Urban Area does not seem to be in conflict with the existing antiquity zones located within or outside urban area limits (marked in orange). In 'go' areas that fall within Urban Growth Boundaries, located mostly to the northwest of the urban area (i.e., in approximately 29% of the urban expansion surface), there is opportunity for the development of tourist facilities. All reasonable care (i.e., buffer zones etc.) should be taken into consideration for the minimization of any likely impacts of future urban growth on archaeological sites located within urban growth boundaries, located mostly to the west/northwest of the urban area; these areas are marked in green.

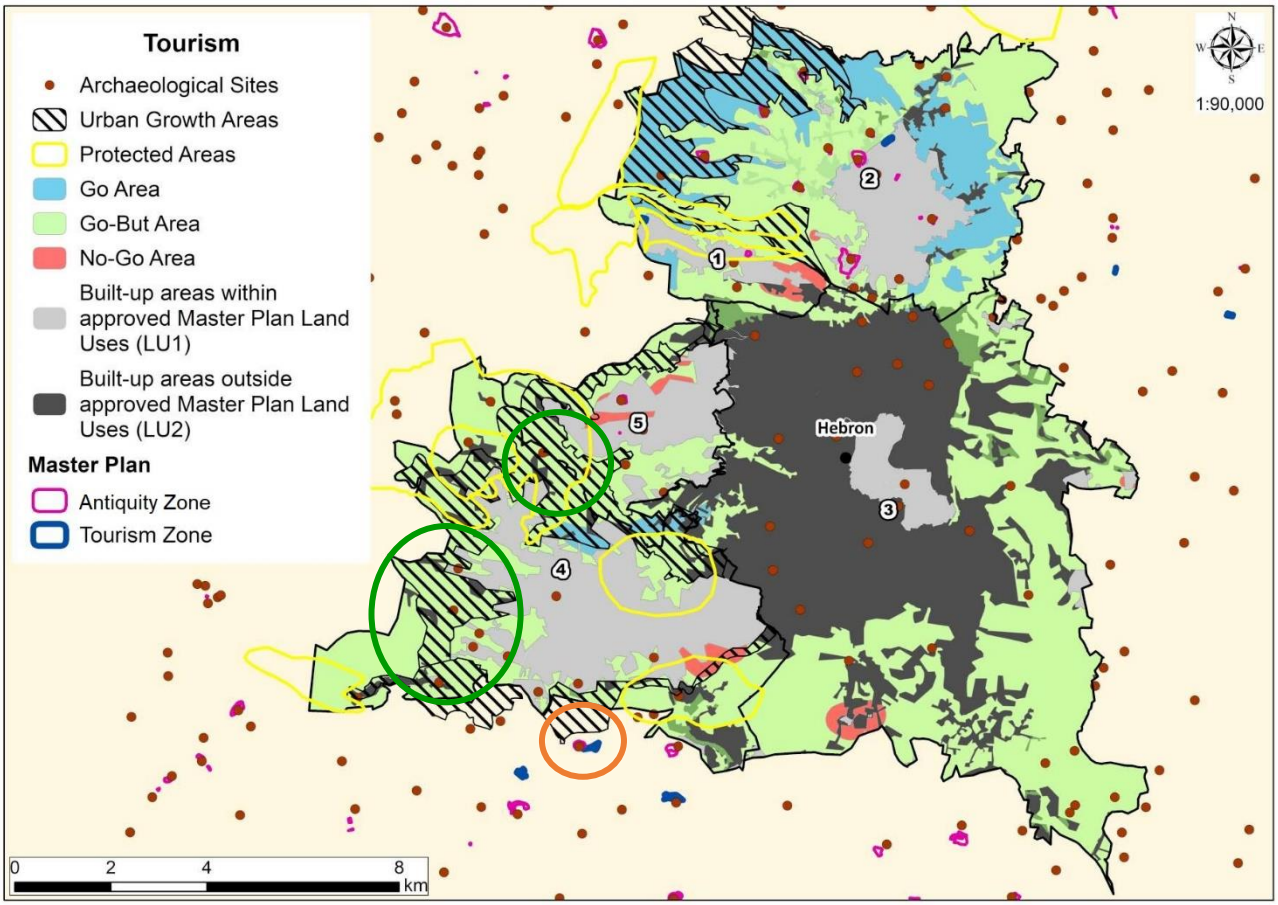


Figure 5.4.4-6: Urban Growth Boundaries & Priority and Exclusion areas for tourism development – Hebron Urban Area

Industry

Table 5.4.4-4 below presents the priority areas and exclusion areas for future high-nuisance industry development in Hebron Urban Area. All percentages in Table 5.4.4-4 are calculated based on the total surface of Hebron Urban Area (162.8 km²). The priority and exclusion areas for high-nuisance industry development within Area C and Area H2 are also presented, in order to allow for an overview of areas that can be developed in the short-term.

Table 5.4.4-4: Priority and Exclusion Areas for high-nuisance Industry Development - Hebron Urban Area

		Hebron Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total Surface	**km²**	162.8	76.73	0	13.90	72.17
	%	100%	47.14%	0%	8.53%	44.33%
Within Area C	**km²**	52.7	12.03	0	9.09	31.58

		Hebron Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
	%	32.4%	7.39%	0%	5.60%	19.41%
Within H2	km²	4.5	4.4	0	0	0.10
	%	2.8%	2.73%	0%	0%	0.07%

Legend

The sum of these areas are the priority areas for high-nuisance industry development.

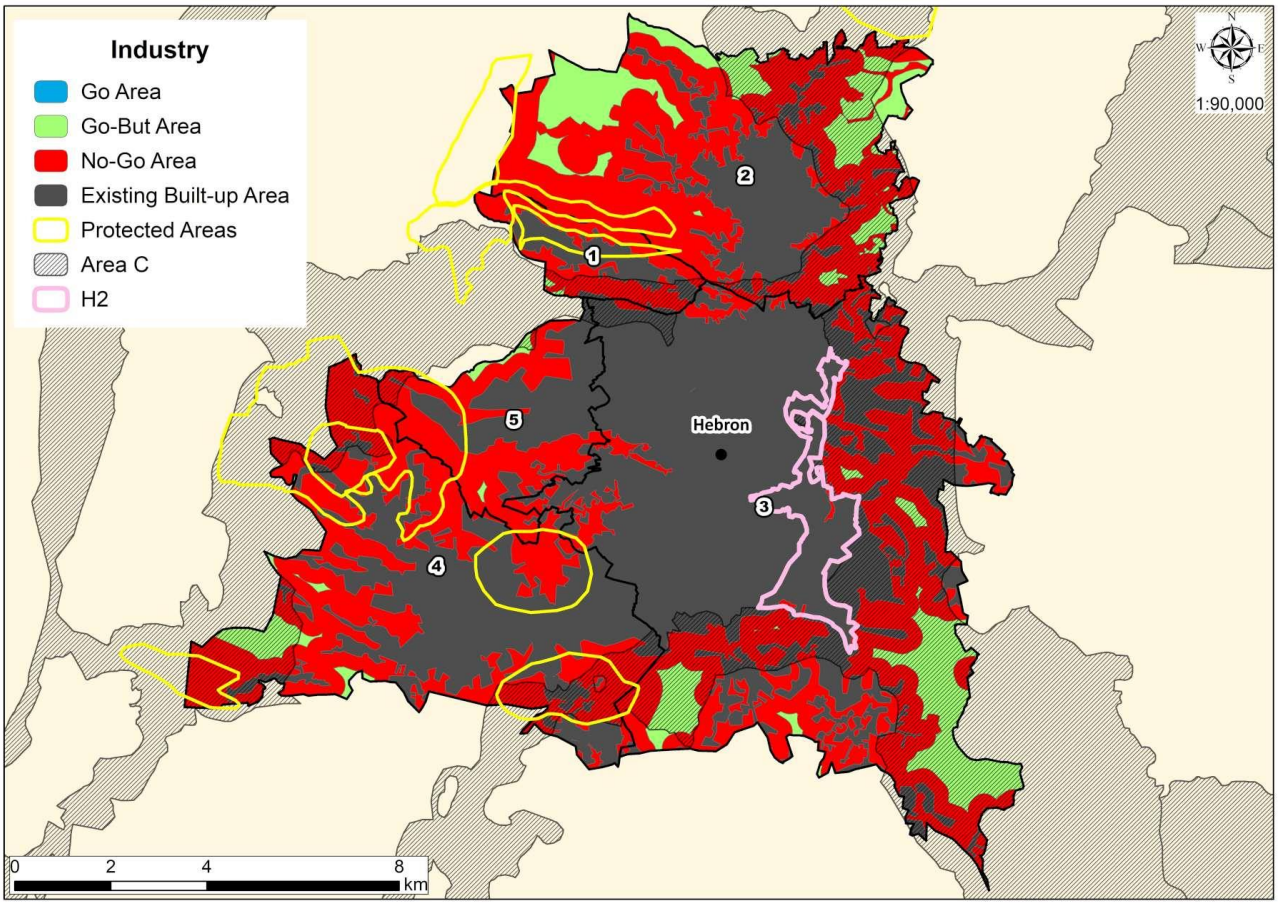


Figure 5.4.4-7: Priority and Exclusion Areas for high-nuisance Industry Development - Hebron Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 44% of Hebron Urban Area total surface is considered as an exclusion area and therefore not a priority for industry development. It must be noted that approximately 35% of this exclusion area (or approximately 15% of Hebron Urban Area total surface) are protected areas, including buffer zones, and therefore not suitable for industry development.

The proximity to existing built-up areas is the main reason for the exclusion of the remaining 29% of Hebron Urban Area total surface from the development of industrial activities; as mentioned above, even though different buffer zones have been applied per industry nuisance level, only the environmental criteria for high-nuisance industry are presented in the spatial mapping, as a worst-case scenario.

In the industrial zone of Hebron, there are approximately 170 industrial facilities; however, there is lack of basic services such as water, and deteriorated infrastructure. Within Hebron Urban Area industrial areas, industries and quarries are in proximity to residential or commercial areas, thus increasing air,

noise, soil and water pollution and health risks; this could have significant economic costs over the long-term in terms of reduced health of the population and increased demand for health-care.

This is captured in the results of the final ranking exercise, where SDP 12 "*Establish industrial zones, industrial compounds and industrial incubators*" was ranked within the top-5 priorities for Hebron Urban Area. Where appropriate, in approximately 9% of Hebron Urban Area total surface, priority may be given to upgrading of services in the existing industrial zone and/or the establishment of a new industrial zone as viable options for economic development.

The existing challenges in covering the water and energy demands of the industry sector and minimizing pollution and health risks can be partly addressed with industrial symbiosis initiatives such as the use of construction waste for the rehabilitation of abandoned quarries and the use of treated wastewater from the stone and marble industry for concrete production; treated industrial wastewater can be also used to cover water needs.

As shown in Figure 5.4.4-8 below, approximately 15% of the areas that have a high probability of becoming urban by 2035 ('Urban Growth Boundary') within Hebron Urban Area falls within the priority area for industry development. Urban expansion outside urban area boundaries to the north and south of Hebron Urban area (marked in blue) seems to be in conflict with the priority ('go-but') areas for industrial development within urban area boundaries; future urban planning would have to incorporate adequate buffer zones from proposed industrial areas to ensure minimization of nuisances and likely implications on human health.

Existing quarries to the west of the urban area (marked in red) are located mostly within exclusion areas for industry development but also within areas that have a high probability of becoming urban by 2035;guidance should be provided regarding the location of new quarries, based on the identified exclusion zones. Future urban planning of the urban area would also have to incorporate adequate buffer zones from industries and industrial areas in order to ensure minimization of any likely environmental and health impacts; these areas are marked in pink.

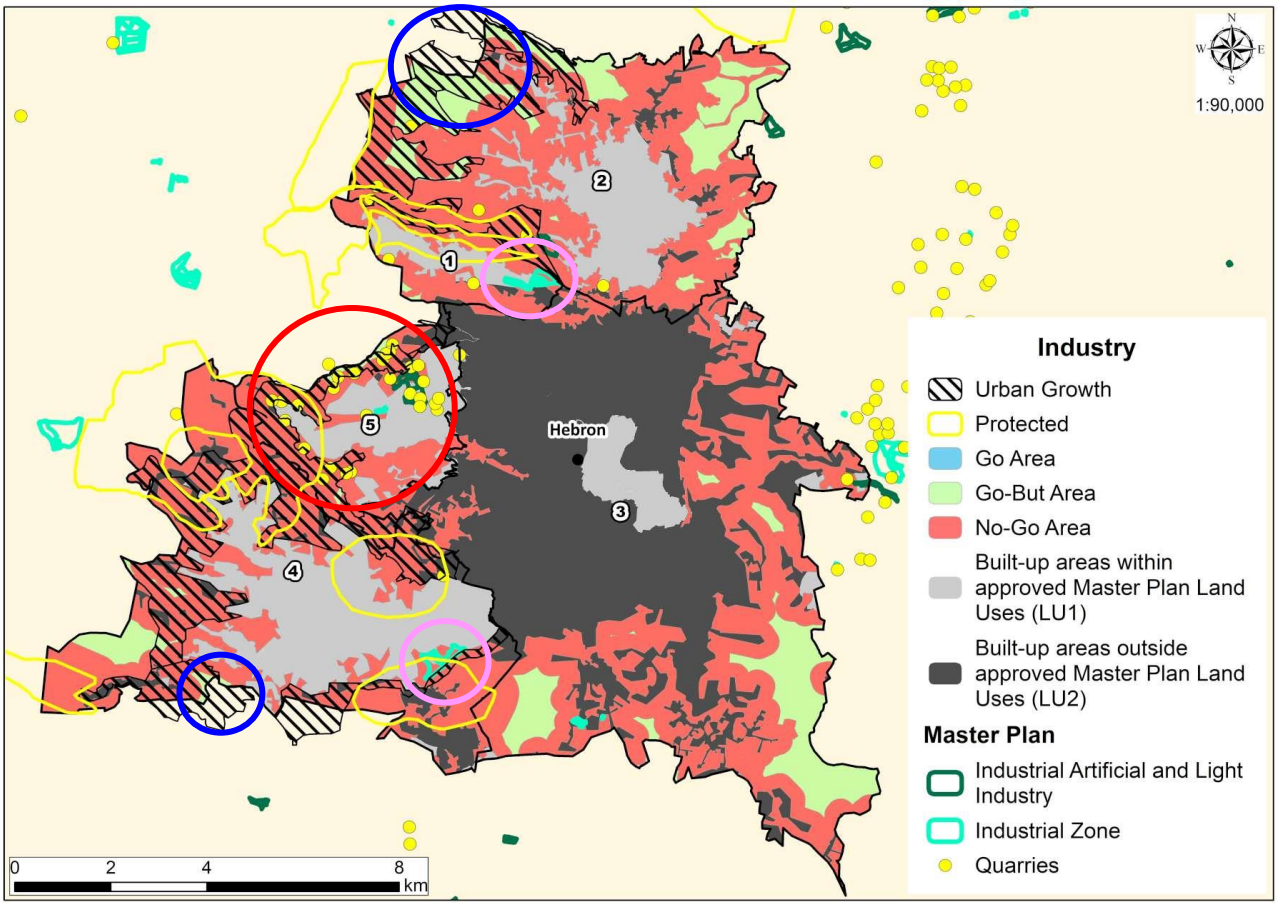


Figure 5.4.4-8: Urban Growth Boundaries & Priority and Exclusion areas for industry development – Hebron Urban Area

5.4.4.2 Supporting sectors

Energy

As a result of the final ranking process for Hebron Urban Area, top priority is given to the development of the **renewable energy sector**. As in the case of Nablus and Ramallah and Al Bireh Urban Areas, the hilly regions of Hebron that are about 1000m above sea level with an annual average wind speed in the range of 4-8m/s[333], are considered as suitable for the development of windfarms. Hebron Urban Area has high solar energy potential, therefore the implementation of rooftop PV systems on public buildings and residences is highly recommended even though solar energy harvesting for domestic use is considered expensive. Utility-scale PV production may also be promoted.

Solid waste

At present, 50% of **solid waste** from Hebron Governorate is collected and transported to Al Menya landfill directly and 50% is collected and transported to Al Menya landfill via Transfer Stations; as a result, there are no dumpsites in Hebron Urban Area. As mentioned earlier, most of the waste in Al Menya landfill is organic and recyclable therefore there is significant potential to reduce the volume of waste being disposed through recycling and to produce energy (composting, biogas generation, incineration); this is captured in the final ranking results, where the promotion of advanced,

[333] *Adel Juaidi, Francisco G. Montoya, Imad H. Ibrik, Francisco Manzano-Agugliaro, An overview of renewable energy potential in Palestine, Renewable and Sustainable Energy Reviews, 2015*

sustainable solid waste management methods (SDP 16) is included in the top-5 priorities. The high organic content in the solid waste generated implies good potential for composting (and using the compost for land rehabilitation). Reduction of waste volume (via sorting, recycling and composting), would alleviate pressure on existing infrastructure and accommodate for growing solid waste management volumes. More specifically, there is significant potential for the recycling of e-waste, with emphasis on reuse of materials rather than the conventional down-cycling process. Recycling facilities would be preferably located away from sensitive receptors such as schools, hospitals and residential areas.

Water and Wastewater

With reference to the **water and wastewater infrastructure**, there is no WWTP in Hebron Urban Area, however Hebron WWTP outside urban area limits is under construction; water scarcity is severe, with low annual aquifer balances and relatively low annual rainfall quantities. As a result of drop in recharge and increase of pumping from wells, the water table in many wells of Hebron Governorate, has dropped significantly. Domestic water is supplied intermittently to consumers, who rely on roof tanks to cover the deficit in water supply; domestic water supply is groundwater that requires disinfection only. As in all targeted urban areas, in Hebron Urban Area, sewage runs untreated through populated areas causing a substantial damage to the aquifer and the health of residents. This is captured in the final ranking exercise, as the use of unconventional water resources for covering water demands for all uses (SDP 25) has ranked 2th. As wastewater generation is expected to increase substantially due to population growth and urbanisation trends, there is a need to promote the use of unconventional water resources for covering water demands for all uses. Furthermore, the use of septic tanks can be promoted for rural communities.

Treated wastewater can be reused for agricultural production, for industry and urban applications; constructed wetlands may potentially be created for greywater treatment; rainwater harvesting may be promoted in order to address the area's extremely limited water resources. Such initiatives would preferably be situated in areas that have low or no vulnerability to groundwater pollution and where the underlying geological formations are aquitards.

Health

Hebron Governorate has the lowest rate of persons per primary **healthcare facility** in the West Bank; this has been captured in the final ranking exercise, as Hebron Urban Area is the only urban area in West Bank where the creation of new and the upgrading of existing primary health facilities (SDP 5) has not been included in the top-5 priorities. Overall, there is an uneven distribution of health facilities between LGUs, with Beit Kahil and Taffuh LGUs lagging behind; this has also been captured by the final ranking exercise, as SDP 5 has scored moderately (10th) in the final ranking exercise. Upgrading of existing infrastructure, would have to focus on the management of medical waste.

Education

Hebron Urban Area has the highest number of **education facilities** from the West Bank Urban Areas and there is an uneven distribution of education facilities between LGUs; these are mostly located within Hebron LGU. Overall, as a result of the final ranking exercise, the creation of new and the upgrading of existing education facilities is not considered as a priority; this is captured in the results of the final ranking exercise, where the respective SDP 5 was ranked 24th.

Transport

As in the case of all other targeted urban areas in West Bank, even though there is poor connectivity between LGUs in Hebron Urban Area and high traffic volumes, the **transport sector** SDP (development of public transport and enhancement of connectivity) have scored low in the final ranking exercise, thus indicating that the planned and on-going road infrastructure projects are expected to alleviate existing limitations.

5.4.5 Gaza Urban Area

5.4.5.1 Key development sectors

Agriculture, Forestry and Fishing

Table 5.4.5-1 below presents the priority areas and exclusion areas for future agriculture development in Gaza Urban Area. All percentages in Table 5.4.5-1 are calculated based on the total surface of Gaza Urban Area (55.6 km²). The priority and exclusion areas for agriculture development within restricted area (300m) are also presented.

Table 5.4.5-1: Priority and Exclusion Areas for Agriculture Development - Gaza Urban Area

		Gaza Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total Surface	km²	55.6	30.56	9.28	7.18	8.58
	%	100%	54.97%	16.7%	12.9%	15.4%
Within restricted area (300m)	km²	2.4	0	2.4	0	0
	%	4.3%	0%	4.3%	0%	0%

Legend

The sum of these areas are the priority areas for future agriculture development.

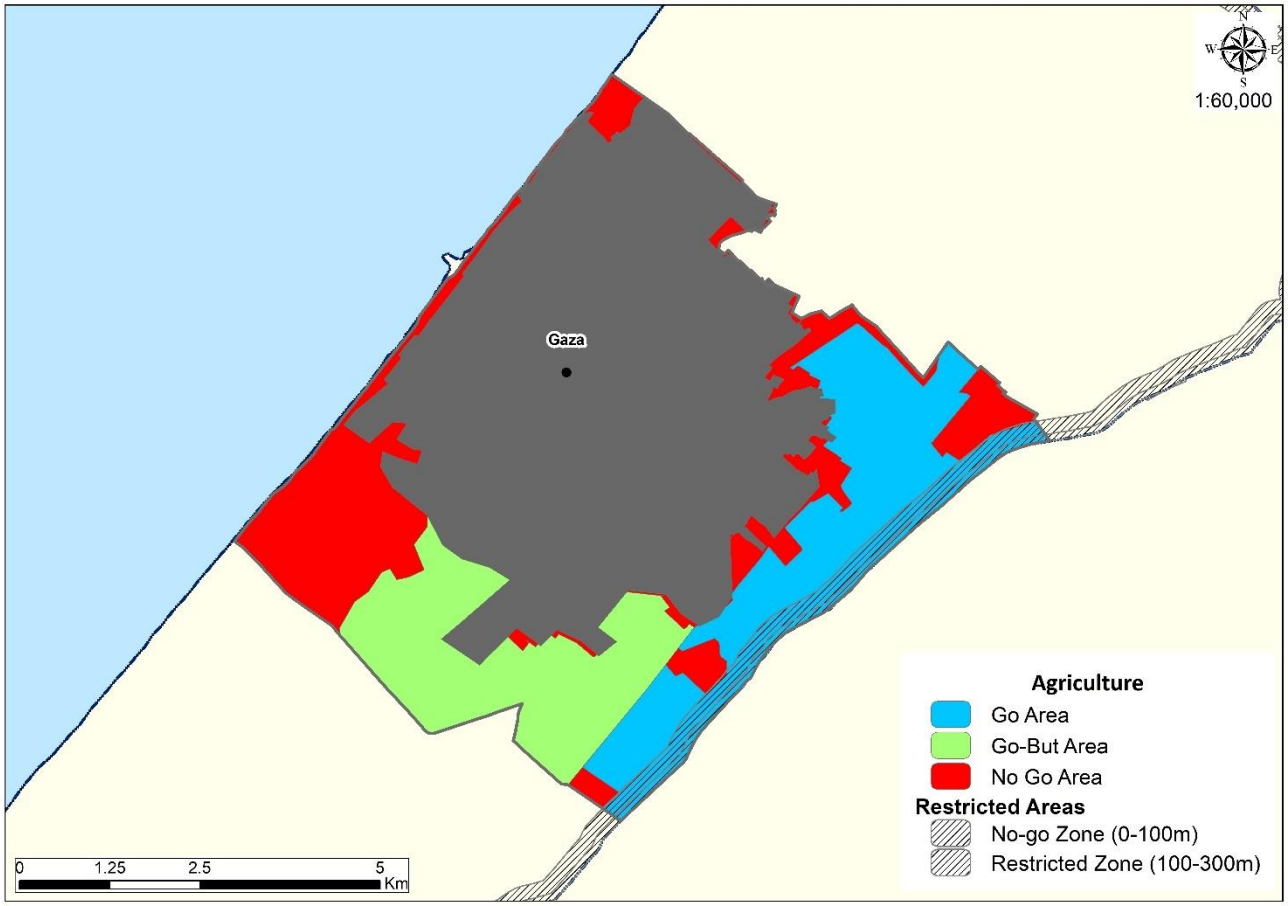


Figure 5.4.5-1: Priority and Exclusion Areas for Agriculture Development - Gaza Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 15% of Gaza Urban Area total surface is considered as an exclusion area and therefore not a priority for agricultural development; this is mostly due to the fact that these areas are of low agricultural productivity. However, within the 300m restricted zone, where only agricultural uses are permitted (4%), and given the fact that there is a shortage of available land resources, agriculture may be developed in areas of low productivity. In these areas, agricultural practices of low groundwater pollution risk such as precision agriculture and closed-loop hydroponic farming could be implemented.

Gaza Urban Area has poor soil quality, therefore leading to the intensive usage of chemical fertilizers by farmers. The expected population increase and urban expansion will be on the account of agricultural lands, which makes the identification of alternative options for agricultural development a necessity. This is captured in the selection of SDP 1 '*Develop, promote and implement sustainable agricultural practices, including residential agriculture and support small-scale food producers in Palestine*' within the top-5 priorities for Gaza Urban Area. In Gaza Urban Area, 90% of all agriculture activities can be considered urban or semi-urban and residential agriculture is widely implemented; Gaza Urban Area has the highest percentage of residential agriculture cover area out of total urban area surface among targeted urban areas. Furthermore, Gaza Urban Area has the second highest production of cattle among targeted urban areas. In the priority areas for agriculture, which cover approximately 30% of the total urban area surface, there is an opportunity for the expansion of residential agriculture, home gardens and domestic livestock; activities such as backyard and rooftop gardens, along with small rabbit, chicken and fish units (aquaponics), can boost the quality

of food consumed by poor households and also provide a modest source of additional income through sales of surplus production.

The Coastal Aquifer's annual abstraction rate exceeds the recharge rate and the sustainable use rate based on its recharge rate, leading to severe deterioration. Water shortages can be partly addressed through the use of the existing WWTP's treated wastewater for agricultural production and the introduction of water efficient and water saving irrigation techniques such as drip and sub-surface irrigation to reduce evaporation and water losses.

Gaza Urban Area relies on the fishing sector; mariculture and aquaculture are widely implemented and provide a source of income and food security to a significant number of people. However, the fisheries and aquaculture/mariculture sector face challenges, including, among others, freshwater scarcity, and unfavorable coastal sea conditions (heavy wave actions, high pollution levels which increase fish mortality). Fishing restrictions into shallow waters have serious implications for Gaza's1 coastal ecosystem, depleting fish stocks by increasing the exploitation of immature fish that have yet to reach breeding age. Despite these challenges, there is potential for the expansion of existing freshwater and marine water fishfarms.

Urban and Strategic Planning

Table 5.4.5-2 below presents the priority areas and exclusion areas for urban planning development in Gaza Urban Area. All percentages in Table 5.4.5-2 are calculated based on the total surface of Gaza Urban Area (55.6 km²). The restricted area (300m) is also presented.

Table 5.4.5-2: Priority and Exclusion Areas for Urban Planning Development - Gaza Urban Area

		Gaza Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total Surface	**km²**	55.6	30.56	14.26	1.51	9.27
	%	100%	54.97%	25.6%	2.7%	16.7%
Within restricted area (300m)	**km²**	2.4	0	0	0	2.4
	%	4.3%	0%	0%	0%	4.3%

Legend

The sum of these areas are the priority areas for urban planning development.

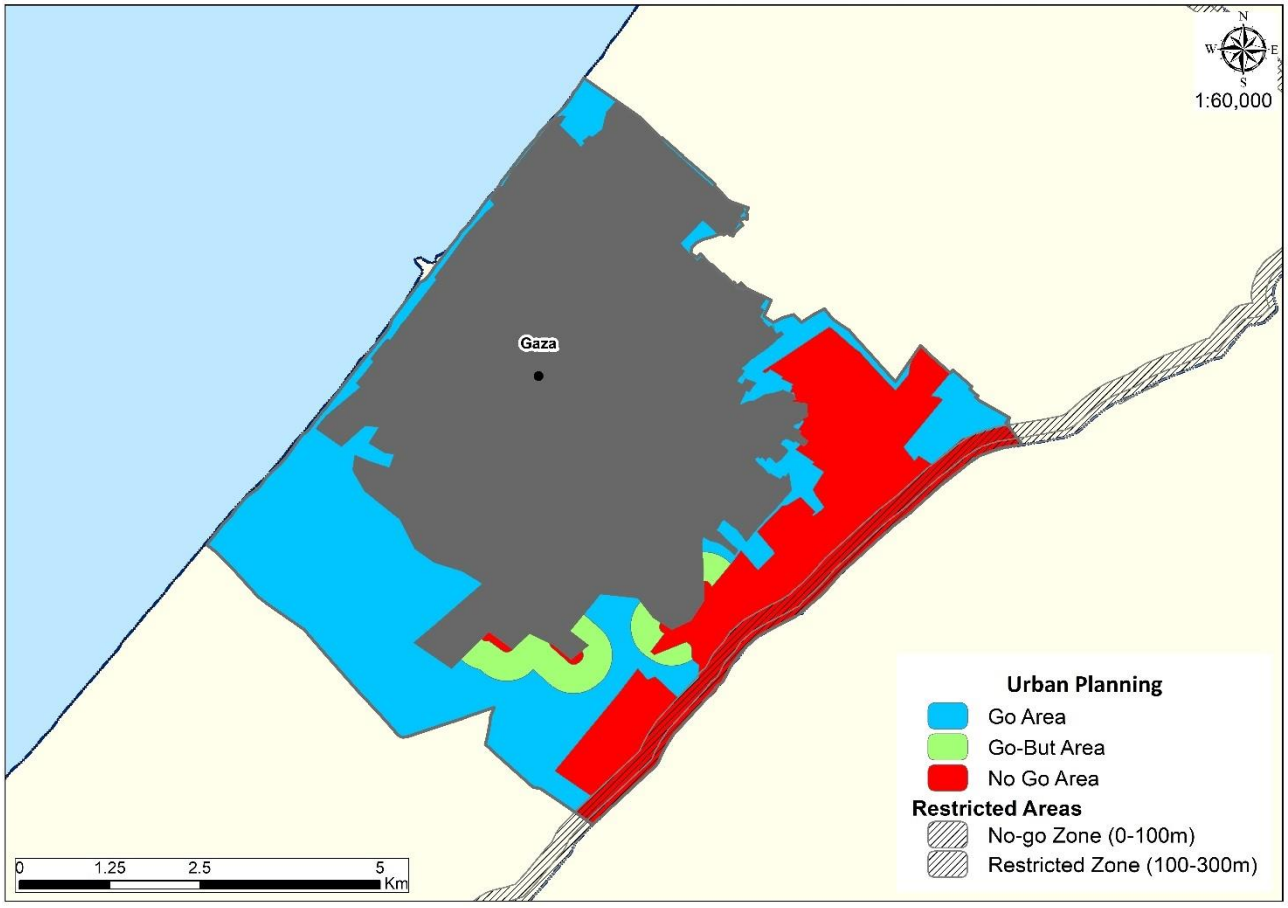


Figure 5.4.5-2: Priority and Exclusion Areas for Urban Planning Development - Gaza Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 17% of Gaza Urban Area total surface is considered as an exclusion area and therefore not a priority for urban planning development; this is mostly due to the fact that these areas are of high agricultural productivity, but also taking into consideration that within the 300m restricted zone, urban planning development is not permitted.

It must be noted that, as a result of the final ranking exercise, urban planning SDP are not within the top-5 priorities for Gaza Urban Area. However, since SDP 23 '*Urban infill: dense construction in urban centers to take advantage of available land, taking into consideration sustainable planning and construction methods (smart city model)*' has scored relatively high (7th) in the final ranking exercise, it is proposed that, where appropriate, in approximately 28% of Gaza Urban Area total surface where urban planning may be developed, priority may be given to the reuse of existing vacant and ignored buildings to cover growing housing needs and the promotion of green infrastructure. The existing available government land located in the south western part of the city has the potential in the future to be used as public services. In the eastern parts of Gaza Urban Area development for residential purposes is not recommended for safety and environmental reasons; the eastern borders, the eastern cemetery, industrial zone and dumpsite are located there. There are limited green and open spaces in Gaza Urban Area; future urban planning would have to take this into consideration, allowing for an even distribution of such recreation areas among neighborhoods.

Tourism

Table 5.4.5-3 below presents the priority areas and exclusion areas for future tourism development in Gaza Urban Area. All percentages in Table 5.4.5-3 are calculated based on the total surface of Gaza Urban Area (55.6 km²). The restricted area (300m) and the 'Risk-zone' (300-1000m) are also presented.

Table 5.4.5-3: Priority and Exclusion Areas for Tourism Development - Gaza Urban Area

		Gaza Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total Surface	km²	55.6	30.56	10.8	1.3	12.94
	%	100%	54.97%	19.42%	2.34%	23.27%
Within restricted area (0-1000m)	km²	8.1	0	0	0	8.1
	%	14.55%	0%	0%	0%	14.55%

Legend

The sum of these areas are the priority areas for tourism development.

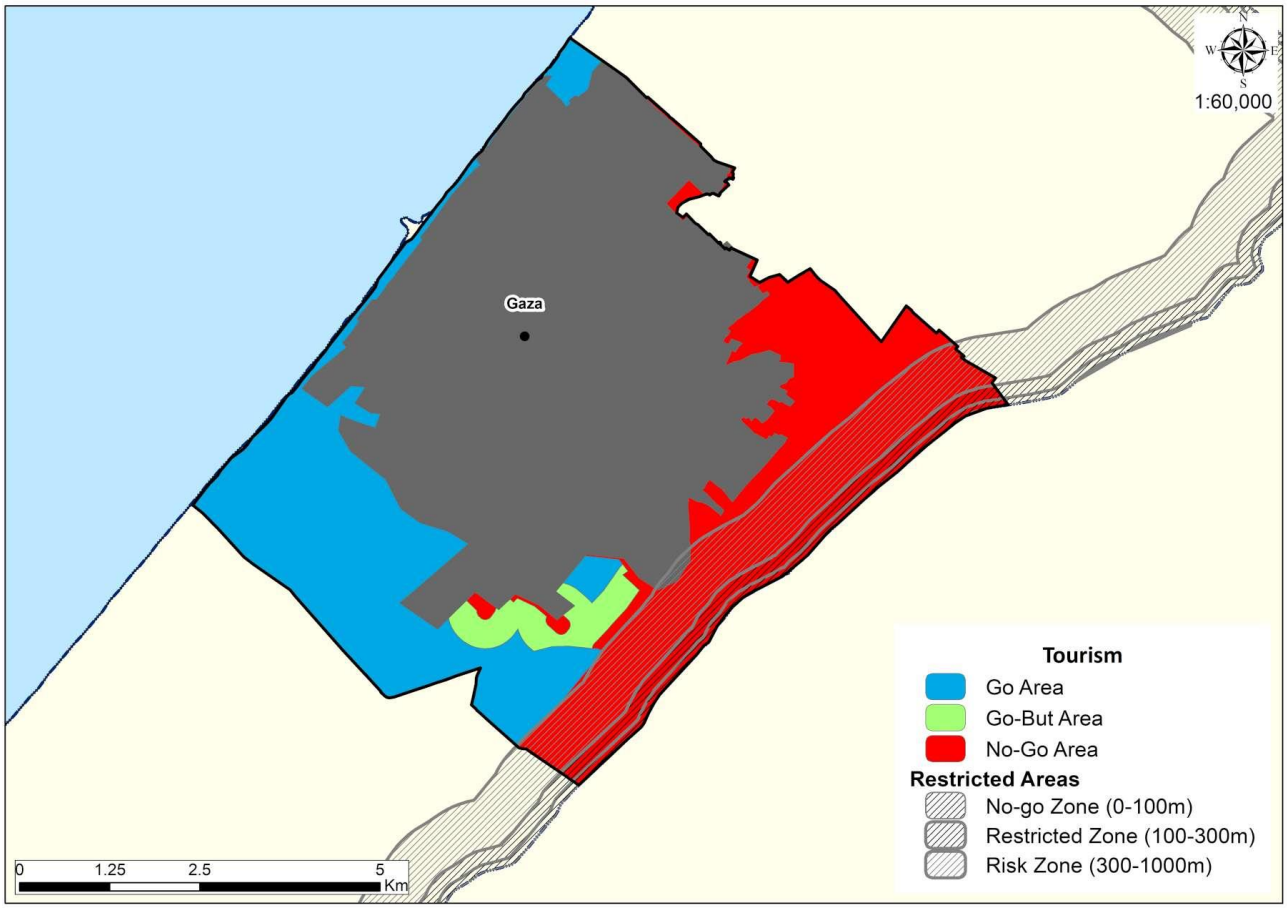


Figure 5.4.5-3: Priority and Exclusion Areas for Tourism Development - Gaza Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 23% of Gaza Urban Area total surface is considered as an exclusion area and therefore not a priority for tourism development; this is mostly due to the fact that these areas are of high agricultural productivity, but also taking into consideration the access restriction areas in Gaza Urban Area; within the 300m restricted zone, only agriculture development is permitted and within the 300-1000m 'Risk-zone' any development other than agriculture is strongly discouraged.

Gaza has been off-limits to tourists since 2007; this is captured in the final ranking exercise as SDP 19 '*Promote the diversification of the tourism to integrate alternative forms of tourism*' has scored low (20th). However, there are many tourist attractions such as historical sites as well as hotel services in the area. Obviously, Gaza Beach is considered a feature of the city and a popular destination for most of Gaza's people; however, coastal erosion due to man-made structures and seawater pollution due to wastewater discharges pose considerable limitations for future tourist development. It is proposed that, where appropriate, in approximately 22% of Gaza Urban Area total surface where tourism may be developed, priority may be given to the renovation of historical sites in order to promote cultural tourism, but also to the rehabilitation of Gaza beach.

Industry

Table 5.4.5-4 below presents the priority areas and exclusion areas for future low-nuisance industry development in Gaza Urban Area. All percentages in Table 5.4.5-4 are calculated based on the total surface of Gaza Urban Area (55.1 km²). The restricted area (300m) is also presented.

Table 5.4.5-4: Priority and Exclusion Areas for low-nuisance Industry Development - Gaza Urban Area

		Gaza Urban Area	Existing built-up areas (LU1 and LU2)	LU3 and LU4		
				Priority Areas		Exclusion Areas
				Go areas	Go-but areas	No-go areas
Total Surface	**km²**	55.6	30.56	8.4	4.8	11.84
	%	100%	54.97%	15.1%	8.6%	21.3%
Within restricted area (300m)	**km²**	2.4	0	0	0	2.4
	%	4.3%	0%	0%	0%	4.3%

Legend

The sum of these areas are the priority areas for low-nuisance industry development.

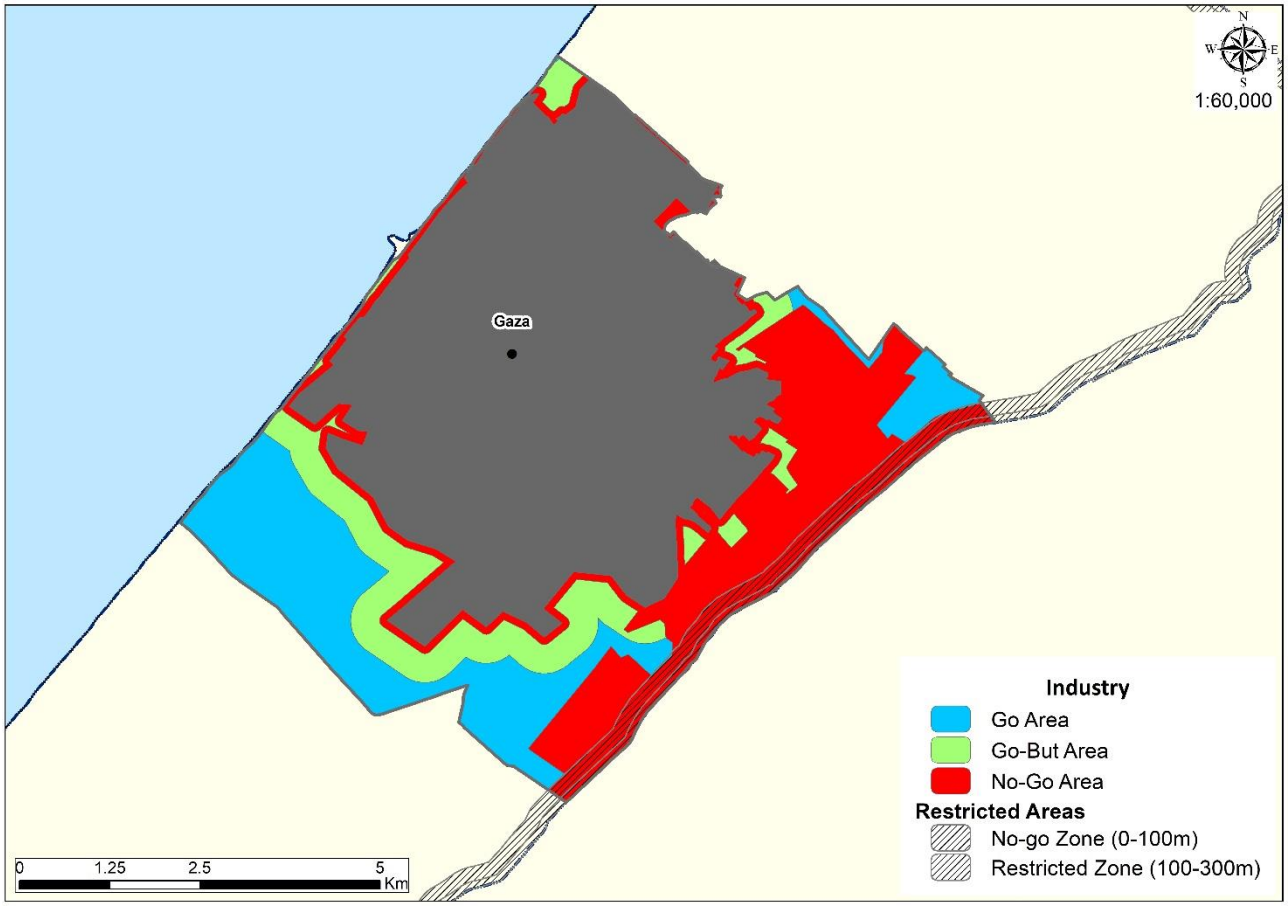


Figure 5.4.5-4: Priority and Exclusion Areas for low-nuisance Industry Development - Gaza Urban Area

As a result of the application of environmental criteria, as presented in Table 2.3.2-2, the spatial analysis shows that approximately 21% of Gaza Urban Area total surface is considered as an exclusion area and therefore not a priority for industry development; this is mostly due to the fact that these areas are either of high agricultural productivity or within a buffer area from residential areas, but also taking into consideration that within the 300m restricted zone, industry development is not permitted. As mentioned earlier, due to the limited availability of land, only environmental criteria for low-nuisance industry with minimum buffers from residential areas were applied.

It must be noted that, as a result of the final ranking exercise, industry SDP are not within the top-5 priorities for Gaza Urban Area. However, since SDP 13 '*Support, rehabilitate and increase the establishment and development of small enterprises of a productive nature (craft areas)*' and SDP 12 '*Establish industrial zones, industrial compounds and industrial incubators*' have scored moderately (10th and 15th respectively) in the final ranking exercise, it is proposed that, where appropriate, in approximately 24% of Gaza Urban Area total surface, priority may be given to the promotion of craft industries and the creation of new industrial zones.

The Gaza Industrial Park which is specialized to large scale activities is located in the eastern part of Gaza Urban Area; however, light industries such as carpenter work-shops, concrete block factories and metal work-shops are located inside the city built-up area. These activities are distributed randomly and cause noise and air pollution, therefore in order to improve environmental conditions in Gaza Urban Area, it is proposed that all light industrial activities within built-up areas move to the industrial area.

5.4.5.2 Supporting sectors

Energy

As a result of the final ranking process for Gaza Urban Area, priority is given to the development of the **renewable energy sector**. The coastal strip region (Gaza Strip) is characterised by a very low wind speed throughout the year, with an annual average of about 2.5–3.5 m/s, therefore it is insufficient for the consideration of potential wind applications as a renewable energy source. However, Gaza Urban Area has high solar energy potential, therefore the implementation of rooftop PV systems on public buildings and residences is highly recommended even though solar energy harvesting for domestic use is considered expensive. Considerable amounts of biomass which can be used for the energy production in Gaza Urban Area are municipal solid waste, agricultural residues and sewage sludge.

Solid waste

Approximately two thirds of the waste produced in Gaza Governorate is transported to Johr Al-Diek Landfill; half of this volume is transported directly and the rest via Al-Yarmouk Transfer Station. The remaining one third of waste is disposed of in random dumpsites to the north of Gaza Governorate; domestic, industrial and medical wastes are often dumped near cities and villages or burned and disposed of in unregulated disposal sites which cause soil, air and water pollution, leading to health hazards and ecological damage. Scarcity of waste disposal sites coupled with huge increase in waste generation is leading to serious environmental and human health impacts on the population. These issues are captured in the results of the final ranking exercise, where the promotion of advanced, sustainable **solid waste management** methods (SDP 16) and the improvement of waste collection and transport methods (SDP 17) are included in the top-5 priorities. Furthermore, the need for rehabilitation of existing dumpsites is also captured in SDP 18, which has scored moderately in the final ranking exercise (11th).

Approximately 82% of waste in Johr Al-Diek Landfill is organic and recyclable therefore there is significant potential to reduce the volume of waste being disposed through recycling and to produce energy (composting, biogas generation, incineration). Johr Al-Diek Landfill (JAD) is the only hazardous waste disposal site in Palestine and it is currently beyond its operational capacity.

The reduction of waste volume (via sorting, recycling and composting) would alleviate pressure on existing infrastructure and accommodate for growing solid waste management volumes as a result of population growth and urbanization trends. Recycling of construction/building debris and recycling and management/disposal of used batteries from PV systems have good potential for implementation. Given the fact that there is a shortage of available land resources to construct new landfills and limited energy sources coupled with high population growth, the development of a waste to energy facility to manage solid waste and to alleviate the electricity shortage in Gaza Urban Area is considered a viable option, which would also significantly reduce greenhouse gas emissions.

Water and Wastewater

Water scarcity and poor water quality are major concerns in Gaza Urban Area. The drop in the groundwater level of the Gaza coastal aquifer has led to seawater intrusion and an increase of groundwater salinity. With reference to the **water and wastewater infrastructure**, the existing Gaza Central WWTP in Gaza Urban area functions intermittently and little sewage is treated, thus posing a

threat to public health and pollution of freshwater and marine. The existing sewage network is ineffective, consisting of a combined system for both sewage and rainwater; this causes floods and contamination of domestic water supply in some areas during rainy days. Where there are no sewerage networks, cesspits and open channels are most commonly used, causing surface and groundwater pollution as well as serious public health concerns. As wastewater generation is expected to increase substantially due to population growth and urbanisation trends, there is a need to promote the use of unconventional water resources for covering water demands for all uses; in the final ranking process, this is captured in the selection of the relevant SDP within the top-5 priorities in Gaza Urban Area.

In Gaza Urban Area, treated wastewater can be reused for agricultural production, for industry and urban applications (such as fire-fighting etc.); in this case, proximity to each proposed use/water demand would be considered preferable. However, because the topography is flat and land is scarce, the scope for storing and using any remaining surface water is limited. Treated wastewater can also be reused as an important renewable resource for artificial groundwater recharge and aquaculture production and desalinization plants can be applied to face water scarcity.

Health

Hospitals and medical centers currently suffer from a chronic shortage of pharmaceuticals, supplies, spare parts and poor general maintenance; power outages and lack of fuel significantly affect everyday operations. In most cases, there is no provision for the management of medical solid wastes, thus increasing health concerns. This has been captured in the final ranking exercise, as the creation of new and the upgrading of existing primary health facilities has scored relatively high (9th) in the final ranking exercise for Gaza Urban Area. Creation of new **health care facilities** could be located in existing vacant and ignored buildings; public buildings and facilities may also be used for these purposes. Upgrading of existing healthcare facilities would include water and sanitation services and medical waste management.

Education

Gaza Urban Area has the highest number of primary and secondary **education facilities** among targeted urban areas. Even though the quality of school infrastructure is in need of upgrades for effective service provision, the overall score from the final ranking exercise for SDP 5 is low, indicating the upgrading of existing education facilities is not considered a priority in Gaza Urban Area when compared to the energy and water shortages.

Transport

Even though Gaza Urban Area suffers from severe traffic congestion and public transportation infrastructure is poor, the **transport sector** SDP (development of public transport and enhancement of connectivity) have scored low in the final ranking exercise; this is further verification of the critical nature that the energy and water SDP have for future development in Gaza Urban Area.

CHAPTER 6 PRELIMINARY ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN - RECOMMENDATIONS

The Preliminary Environmental and Social Management Plan in Table 6-1 below, presents recommendations on how the Strategic Development Priorities could be achieved in a manner that avoids specific environmental constraints while maximizing benefits from environmental opportunities; these recommendations consist of proposed interventions and emerging technologies to achieve implementation of SDP and are presented under the 'Interventions' column. The applicability of each intervention per targeted urban area is also presented in the respective columns. The implementation period of each intervention is characterized as:

- Short-term (1-2 years)
- Medium-term (3-5 years)
- Long-term (>5 years)

For each intervention, measurable monitoring indicators are identified. Finally, roles, responsible parties and monitoring frequency for the implementation of interventions are provided as part of the Environmental and Social Management Plan.

In this context, the Preliminary Environmental and Social Management Plan forms the basis of regular monitoring for urban development planning of the five targeted urban areas and acts as a guidance tool for decision-makers with respect to proposed interventions in order to achieve SDP in a manner that is sustainable over the long-term but also maximizes opportunities associated with the environmental characteristics.

The Final Environmental and Social Management Plan is presented in a separate deliverable.

Table 6-1: Preliminary Environmental and Social Management Plan

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
AGRICULTURE, FORESTRY AND FISHING	1. Develop, promote and implement sustainable agricultural practices, including residential agriculture and support small-scale food producers in Palestine	Precision agriculture / climate smart agriculture	X	X	X	X	X	Short term	Number of farmers who have adopted precision agriculture / climate smart agriculture	No	Annual	MoA, Specialized agricultural councils, Palestine National Agricultural Research Center (NARC)
									Total government budget spent on the development of precision agriculture / climate smart agriculture	Palestine Pound / $	Annual	MoA, MoNE, MoFP, Donors, NGOs
		Integrated agriculture (aquaponics) / closed-loop hydroponic farming	X	X	X	X	X	Medium term	Number of farmers who have adopted integrated agriculture (aquaponics) / closed-loop hydroponic farming	No	Annual	MoA, Specialized agricultural councils, Palestine National Agricultural Research Center (NARC)
									Total government budget spent on the development of precision agriculture / climate smart agriculture	Palestine Pound / $	Annual	MoA, MoNE, MoFP, Donors, NGOs, Donors
		Agroforestry / sylvo-pastoralism	X		X	X		Short term	Total surface used for agroforestry / sylvo-pastoralism	ha	Annual	MoA, MoLG, Specialized agricultural councils, Palestine National Agricultural Research Center (NARC)
		Greywater treatment for irrigation	X					Short term	Volume of greywater treated for irrigation	m^3	Annual	PWA, EQA, MoA, Specialized agricultural councils, Palestine National Agricultural Research Center (NARC)
		Rainwater harvesting	X		X	X	X	Short term	Volume of rainwater harvesting used for irrigation	m^3	Annual	PWA, EQA, MoA, Specialized agricultural councils, Palestine National Agricultural Research Center (NARC)
									Number of projects developed for rainwater harvesting used for irrigation	No	Annual	PWA, EQA, MoA, Specialized agricultural councils, Palestine National Agricultural Research Center (NARC), Academic partners, NGOs, Donors
	2. Sustainable development of the	Mariculture					X	Short term	Number of marine aquaculture facilities developed	No	Annual	MoA (General Directorate of Fisheries), EQA, PWA, MoNE, MoLG,

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
	fishing sector and restoration of fishing stocks								Number of integrated Coastal Management plan for coastal areas, including aquaculture	No	Annual	MoA (General Directorate of Fisheries), EQA, PWA, MoLG,
		Development of aquaculture and expansion of existing freshwater aquafarms / integrated agriculture (aquaponics)	X			X	X	Short term	Number of freshwater aquafarms / integrated agriculture (aquaponics) developed	No	Annual	MoA (General Directorate of Fisheries), EQA, PWA, MoLG, Fisheries cooperatives / syndicates
									Total government budget spent on the development of aquaculture	Palestine Pound / $	Annual	MoA, MoNE,MoFP, Donors, NGOs
		Creation of aquaculture strategy	X	X	X	X	X	Short term	Number of strategies developed	No	Annual	MoA (General Directorate of Fisheries), EQA, PWA, MoNE, MoLG
	3. Protect agricultural & forest lands from urban expansion and other forms of degradation	Residential Agriculture / Urban Farming		X	X	X	X	Short term	Urban area dedicated to Residential Agriculture / Urban Farming	ha	Annual	MoA, EQA, MoLG, NGOs, Ministry of Public Works and Housing, Higher Planning Council, regional (or district) planning committees, the local planning committees
		Active restoration - plant production in nurseries	X		X	X		Short term	Number of plant nurseries operating	No	Semi-annual	MoA, EQA, MoLG, MonE,
		Assisted natural regeneration	X		X	X		Long term	Area re-vegetated or re-generated	ha	Annual	MoA, MoLG, NGOs, Higher Planning Council, regional (or district) planning committees, the local planning committees
		Recreation / ecotourism / agrotourism initiatives	X		X			Medium term	Number of establishments - offering "agrotourism", "nature-based tourism", "village tourism"	No	Bi-annual	MoA, EQA, MoLG, NGOs, Ministry of Public Works and Housing, Higher Planning Council, regional (or district) planning committees, the local planning committees

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
		Development of forest management plans indicating areas-Land suitable for forestation or rangeland	X		X	X		Short term	Number of forest management plans	No	Annual	MoA, EQA, MoLG, MonE
		Land reclamation for forestation or rangeland	X		X	X		Long term	Area for land reclamation for forestation or rangeland	ha	Annual	MoA, EQA, MoLG, MonE
	4. Implement initiatives towards intensive and semi-intensive agricultural production systems and increase productivity and competitiveness in local and international markets	Introduce new crops with high export potential	X	X	X	X	X	Medium term	Area cultivated with new crops with high export potential	ha	Annual	MoA, MoLG
		Target new markets	X	X	X	X	X	Medium term	Ratio of exports for new markets compared to existing markets	%	Annual	MoA, MoNE
		Improve efficiency of existing irrigation network	X	X	X	X	X	Medium term	Lenth of improved irrigation network	km	Annual	MoA, PWA, MoLG, other water seevices related
									Total government budget spent on the improvement of existing irrigation network	Palestine Pound / $	Annual	MoA, PWA, MoLG, other water services related, MoNE, MoFP, Donors
EDUCATION	5. Build and upgrade education facilities	Development of new education facilities	X	X	X	X		Medium term	Number of new education facilities	No	Bi-annual	MoEHE, MoLG, MoNE, Donors
									Total government budget spent on the construction of new education facilities	Palestine Pound / $	Annual	MoEHE, MoLG, MoNE, Donors
		Upgrade / rehabilitation of existing education facilities (laboratories, libraries, activities arenas, etc.)	X	X	X	X	X	Short term	Number of upgraded existing education facilities (laboratories, libraries, activities arenas, etc.)	No	Annual	MoEHE, MoLG, MoNE, Donors
									Total government budget spent on upgrade / rehabilitation of existing education facilities (laboratories, libraries, activities arenas, etc.)	Palestine Pound / $	Annual	MoEHE, MoLG, MoNE, MoFP, Donors

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
		Accessibility for CWD in education facilities	X	X	X	X	x	Short term	Number of Schools with developed and adopted Disability Inclusion Policies	No	Annual	MoEHE, MoLG
									Ratio of schools with infrastructure for CWD compared to total schools	%	Annual	MoEHE, MoLG
									Total government budget spent on infrastructure imrpoving accessibility for CWD in education facilities	Palestine Pound / $	Annual	MoEHE, MoLG, MoNE, Donors
ENERGY	6. Increase reliance on renewable energy	Development of spatial plans for the installment of windfarms	X	X		X		Short term	Spatial plans for the development of windfarms	No	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA, Higher Planning Council, regional (or district) planning committees, the local planning committees, MoLG
		Establishment of windfarms (wind energy)	X	X		X		Medium term	Windfarm capacity	MWh	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA
									Ratio of energy produced by installed wind farms compared to fossil fuel produced energy	%	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA
									Reduction of greenhouse gas emissions caused by the operation of windfarms	Metric tons of CO2 equivalent	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
		Development of spatial plans for the installment of solar PV parks	X	X	X	X	X	Short term	Number of spatial plans for the installment of solar PV parks	No	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA, MoNE
		Establishment of solar PV park or rooftop solar PV (Solar energy)	X	X	X	X	X	Medium term	Solar PV parks capacity	MWh	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA
									Ratio of energy produced by installed solar parks compared to fossil fuel produced energy	%	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA
									Reduction of greenhouse gas emissions caused by the operation of solar PV parks	Metric tons of CO2 equivalent	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA
		Development of spatial plans for the installment waste-to-energy plants	X	X	X	X	X	Short term	Number of spatial plans for the installment waste-to-energy plants	No	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA, Joint Service Council for Solid Waste Management, Higher Planning Council, regional (or district) planning committees, the local planning committees
		Establishment of waste-to-energy technologies for biogas generation	X	X	X	X	X	Medium term	Bioenergy capacity	MWh	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA, Joint Service Council for Solid Waste Management

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
									Ratio of bioenergy from solid waste to fossil fuel produced energy	%	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA, Joint Service Council for Solid Waste Management
									Reduction of greenhouse gas emissions caused by the production of bioenergy	Metric tons of CO2 equivalent	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA, Joint Service Council for Solid Waste Management
	7. Develop transmission and distribution systems and rationalize energy consumption through the application of modern technologies	Increasing the efficiency of existing transmission and distribution network	X	X	X	X	X	Short term	Upgraded existing transmission and distribution network	Km	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre
									Total government budget spent on increasing the efficiency of existing transmission and distribution network	Palestine Pound / $	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, MoNE, MoFP
		New energy transmission infrastructure	X	X	X	X	X	Medium term	Total government budget spent on new energy transmission infrastructure	Palestine Pound / $	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, MoNE
	8. Exchange of energy with neighboring countries through electrical linkage	Electric interconnection line with Jordan	X					Medium term	Electricity imports from electric interconnection line with Jordan	GW	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA, MoNE

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
	projects	Electric interconnection line with Egypt					X	Medium term	Electricity imports from electric interconnection line with Egypt	GW	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA, MoNE
	9. Diversify energy sources; increase the storage capacity and reserves of oil and gas	Strategic reserve storage system for gas and oil (development of depots)	x			x		Long term	Reserve storage system for gas and oil (development of depots)	No	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA
									Capacity of reserve storage system for gas and oil (development of depots)	Million barrels / tn	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA
		Develop a system of transportation of gas and oil derivatives from their sources to storage and consumption centers	x			x		Medium term	Capacity of the system to transport gas and oil derivatives from their sources to storage and consumption centers	Million barrels / tn	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA
		Adequate inventory of oil and gas products	x			x		Medium term	Inventory of oil and gas products	Million barrels / tn	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA
	10. Develop new and enhance existing Power Plants	Development of new electricity power plant in West Bank	X	X	X	X		Long term	Construction of new electricity power plant in West Bank	1	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA, MoNE

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
		Increase the capacity of existing power plant in Gaza - converting existing Power Plant from running on diesel to run on natural gas with high economic returns.					X	Medium term	Increase the capacity of existing power plant in Gaza	kW	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA, MoNE
HEALTH	11. Build and upgrade essential health-care facilities	Development of new health-care facilities	X	X	X	X	X	Medium term	Number of new health-care facilities	No	Semi-annual	MoH, MoLG, Municipalities, Regional authorities, MoNE, NGOs
		Investment in new health-care facilities	X	X	X	X	X	Medium term	Total government budget spent on development of new health-care facilities	Palestine Pound / $	Annual	MoH, MoLG, Municipalities, Regional authorities, MoNE, MoFP, NGOs, Donors
		Upgrading of existing health-care facilities	X	X	X	X	X	Short term	Number of upgraded existing health-care facilities	No	Semi-annual	MoH, MoLG, Municipalities, Regional authorities, MoNE, NGOs, Donors
		Investment in ugrading of existing health-care facilities	X	X	X	X	X	Short term	Total government budget spent on upgrading of existing health-care facilities	Palestine Pound / $	Annual	MoH, MoLG, Municipalities, Regional authorities, MoNE, MoFP, NGOs, Donors
		National Master Plan for hazardous waste management, including medical solid waste	X	X	X	X	X	Short term	National Master Plan for hazardous Waste approval	yes / no	Annual	EQA

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
		Creation of an electronic platform (e-registry) for monitoring types, quantities, modes of transportation and final delivery and management of medical waste and its management	x	x	x	x	x	Medium term	Medical waste quantities	m³	Annual	MoH, EQA
		Accessibility for CWD in health facilities	X	X	X	X	X	Short term	Number of health facilities with developed and adopted Disability Inclusion Policies	No	Annual	MoH, MoLG
									Ratio of health facilities with infrastructure for CWD compared to total schools	%	Annual	MoH, MoLG
									Total government budget spent on infrastructure imrpoving accessibility for CWD in health facilities	Palestine Pound / $	Annual	MoH, MoLG, MoNE, Donors
INDUSTRY	12. Establish industrial zones, industrial compounds and industrial incubators	Plans for the expansion of existing industrial zones	X	X	X	X	X	Short term	Number of integrated plans for the expansion of existing industrial zones	No	Annual	MoFP, MoNE, Higher Planning Council, MoLG, private developers, NGOs, Donors
		Secure financial support for the expansion of existing industrial zones	X	X	X	X	X	Medium term	Total government budget for the expansion of existing industrial zones	Palestine Pound / $	Annual	MoFP, MoNE, MoLG, NGOs, Donors,private developers
									Value added from expansion of existing industrial zones as a proportion of GDP and per capita	Palestine Pound / $ - %GVA / GDP, GVA per capita	Annual	MoFP, MoNE, MoLG, NGOs, Donors
		Plans for the Creation of new industrial zones	X		X	X	X	Short term	Number of integrated plans for the creation of new industrial zones	No	Annual	MoFP, MoNE, Higher Planning Council, MoLG, private developers, NGOs, Donors

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
		Secure financial support for the creation of new industrial zones	X		X	X	X	Medium term	Total government budget for the creation of new industrial zones	Palestine Pound / $	Annual	MoFP, MoNE, MoLG, NGOs, Donors,private developers
								Long term	Value added from new industrial zones as a proportion of GDP and per capita	Palestine Pound / $ - %GVA / GDP, GVA per capita	Annual	MoFP, MoNE, MoLG, NGOs, Donors
		Studies for the Installment of RES in existing industrial parks	X	X	X	X	X	Short term	Number of studies for the Installment of RES in existing industrial parks	No	Annual	MoFP, MoNE, Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA,
		Integration of RES in existing industrial parks	X	X	X	X	X	Medium term	Energy from RES	kW	Annual	MoFP, MoNE, Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA,
	13. Support, rehabilitate and increase the establishment and development of small enterprises of a productive nature (craft areas)	Promotion of craft industries	X	X	X		X	Short term	Number of integrated plans-studies for the promotion of craft industries	No	Annual	MoFP, MoNE, MoLG, craft associations, NGOs, Local investors
									Training courses on crafts design and production for the young and unemployed	No	Annual	MoFP, MoNE, MoLG, NGOs, Donors, local incestors
		Promotion of less water and energy-demanding industries	X	X	X			Medium term	Investment in sustainable (less water and energy-demanding) industries	Palestine Pound / $	Annual	MoFP, MoNE, MoLG, NGOs, Donors, local incestors

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
	14. Ensure optimal organization of the process of industrial exploitation of natural resources promoting the comparative advantages in each region	Implementation of verticalization strategy	X	X	X	X	X	Long term	Revenue increase	Palestine pound / $	Annual	MoFP, MoNE, MoLG, EQA,NGOs, Donors, local investors
	15. Rehabilitation of industrial facilities and industrial equipment	Upgrading existing industrial infrastructure	X			X		Medium term	Investment in upgrading existing industrial infrastructure	Palestine Pound / $	Annual	MoFP, MoNE, MoLG, EQA,NGOs, Donors, local investors
		Promotion of less polluting industries	X	X	X	X		Medium term	Investment in clean industrial technologies	Palestine Pound / $	Annual	MoFP, MoNE, MoLG, EQA,NGOs, Donors, local investors
		Set up laws and regulations for controlling industrial pollution (industrial wastewater, hazardous waste management and air emissions)	X	X	X	X	X	Short term	Number of specific laws, by-laws, regulations and technical guidelines for controlling industrial pollution	No	Annual	MoFP, MoNE, MoLG, EQA,NGOs, Donors, local investors
		- Use of construction waste for the	X	X	X	X	X	Medium term	Number of rehabilitated abandoned quarries	No	Annual	MoNE, MoLG, EQA,

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
		rehabilitation of abandoned quarries - Use of treated wastewater from the stone and marble industry for concrete production - Use treated industrial wastewater to cover water needs.							Volume of treated wastewater reused	m³	Annual	MoNE, MoLG, EQA,
SOLID WASTE	16. Safe and efficient disposal of SW using advanced technological methods	Implementation of recycling projects	X			X		Medium term	Ratio of recycled / total waste per wastestream	%	Annual	MoLG, LGUs, EQA, Joint Service Councils, private sector, NGOs, donors, Civic initiatives (including start-ups)
		Creation of an electronic platform (e-registry) for monitoring types, quantities, modes of transportation and final delivery and management of recycled waste and its management	x			x		Medium term	Quantities of recycled waste per wastestream	m³	Annual	EQA, MoLG, LGUs, Joint Service Councils
		Capacity-building / raising awareness projects on recycling	x			x		Medium term	Number of projects	No	Semi-annual	MoLG, LGUs, EQA, Joint Service Councils, private sector, NGOs, donors, Civic initiatives (including start-ups)
		Composting for land rehabilitation	X		X		X	Medium term	Volume of compost produced from treatment of solid waste	m³	Annual	MoLG, LGUs, EQA, Joint Service Councils, private sector, NGOs, donors

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
		Development of spatial plans for the installment waste-to-energy plants	X	X	X	X	X	Short term	Number of spatial plans for the installment waste-to-energy plants	No	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA, Joint Service Council for Solid Waste Management, Higher Planning Council, regional (or district) planning committees, the local planning committees
		Establishment of waste-to-energy technologies for biogas generation	X	X	X	X	X	Medium term	Bioenergy capacity	MWh	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA, Joint Service Council for Solid Waste Management
									Ratio of bioenergy from solid waste to fossil fuel produced energy	%	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA, Joint Service Council for Solid Waste Management
									Reduction of greenhouse gas emissions caused by the production of bioenergy	Metric tons of CO2 equivalent	Annual	Palestinian Energy Authority, Palestine Energy and Natural Resource Authority Palestinian Energy and Environment Research Centre, EQA, Joint Service Council for Solid Waste Management
		Integrated plans-studies for the development of incineration facilities	X	X	X	X	X	Short term	Number of plans	No	Annual	EQA, MoNE, Palestinian Energy Authority, MoLG, NGOs, donors
		Development of incineration facilities	X	X	X	X	X	Long term	Number of facilities	No	Annual	EQA, MoNE, Palestinian Energy Authority, MoLG, NGOs, donors
									Ratio of incinerated / total waste produced	%	Annual	EQA, MoNE, Palestinian Energy Authority, MoLG

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
		Secure financial support for the development of incineration facilities	X	X	X	X	X	Long term	Total government budget for the creation of incineration facilities	Palestine Pound / $	Annual	MoFP, MoNE, EQA, MoLG, NGOs, Donors,private developers
		Set up Palestinian standards / regulations for handling special and hazardous waste	X	X	X	X	X	Short term	Seting new standards, regulations and technical guidelines for handling special and hazardous waste	No	Annual	MoLG, EQA, MoH, Palestinian Standards Institute, Palestinian Central Bureau of Statistics
	17. Supporting and promoting the current management systems for SW collection and transport, in order to improve the quality and effectiveness of services and provide them to all citizens	Increase waste container bins	X	X	X	X	X	Medium term	Number of bins	No	Annual	MoLG, EQA, MoH
		Creation of an integrated solid waste registry that will record solid wastes throughout the entire chain, from production to transportation to disposal	X	X	X	X	X	Medium term	Quantities of solid waste (production, transportation, disposal)	m^3	Annual	MoLG, EQA, MoH, JSC
		Set up a regulatory framework for the transportation of solid waste	X	X	X	X	X	Short term	Standards, regulations and technical guidelines for vehicles transporting solid waste	No of regulations / standards	Annual	MoLG, EQA, MoH, JSC
	18. Safe and efficient disposal of SW in regional sanitary landfills enough for servicing all communities while prohibiting random dumpsites which must be closed and rehabilitated	Creation of sanitary landfills	X	X				Medium term	Number of sanitary landfills	No	Annual	MoLG, EQA, MoH, JSC
		Set up Palestinian standards for the siting, design, or operation of sanitary landfills	X	X	X	X	X	Short term	Number of integrated plans-studies for spatial planning as well as the siting, design, or operation of sanitary landfills	No	Annual	EQA, MoNE, Palestinian Energy Authority, MoLG, NGOs, donors
		Rehabilitation of dumpsites	X	X	X		X	Short term	Number of dumpsites rehabilitated	No	Annual	MoLG, EQA, MoH, JSC

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
TOURISM	19. Promote the diversification of the tourism to integrate alternative forms of tourism	Conservation tourism / ecotourism	X	X	X	X		Medium term	Number of tourists visiting for conservation tourism / ecotourism	No	Semi-Annual	MoTA, MoNE, MoFP, MoLG, tourism providers in city (e.g. hotels)
									Total expenditure of tourists for conservation tourism / ecotourism	Palestinian Pound / $	Semi-Annual	MoTA, MoNE, MoFP, MoLG, tourism providers in city (e.g. hotels)
		Rural tourism / agrotourism			X	X		Medium term	Number of tourists visiting for rural tourism / agrotourism	No	Semi-Annual	MoTA, MoNE, MoFP, MoLG, tourism providers in city (e.g. hotels)
									Total expenditure of tourists for rural tourism / agrotourism	Palestinian Pound / $	Semi-Annual	MoTA, MoNE, MoFP, MoLG, tourism providers in city (e.g. hotels)
		Cultural tourism / promoting archaeological sites and cultural landscapes as tourism attractions	X	X	X	X	X	Short term	Number of tourists visiting for cultural tourism	No	Semi-Annual	MoC, MoTA, MoNE, MoFP, MoLG, tourism providers in city (e.g. hotels)
									Total expenditure of tourists for cultural tourism	Palestinian Pound / $	Semi-Annual	MoC, MoTA, MoNE, MoFP, MoLG, tourism providers in city (e.g. hotels)
	20. Upgrade and develop existing tourism product (seasonal, pilgrimage tourism)	Promote pilgrimage tourism			X			Short term	Number of tourists visiting for pilgrimage tourism	No	Semi-Annual	MoC, MoTA, MoNE, MoFP, MoLG, tourism providers in city (e.g. hotels)
									Total expenditure of tourists for pilgrimage tourism	Palestinian Pound / $	Semi-Annual	MoC, MoTA, MoNE, MoFP, MoLG, tourism providers in city (e.g. hotels)
		Development of plans-studies for Tourism Strategy (including Municipal, Regional-Governorate and National level)	X	X	X	X	X	Short term	Number of integrated plans-studies for Tourism Strategy (including Municipal, Regional-Governorate and National level)	No	Annual	MoC, MoTA, MoNE, MoFP, MoLG
		Capacity building-awareness raising programs for empowering people working in the tourism sector	X	X	X	X	X	Short term	Number of capacity building-awareness raising programs for empowering people working in the tourism sector	No	Annual	MoC, MoTA, MoNE, MoFP, MoLG, tourism providers in city (e.g. hotels)

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
		Integrate management of protected areas in existing legislation	X	X	X	X	X	Short term	Number of integrated "management plans" for protected areas	No	Annual	MoTA, MoNE, MoFP, MoLG, tourism providers in city (e.g. hotels)
									Number of monitoring programs for protected areas	No	Annual	MoTA, MoNE, MoFP, MoLG, tourism providers in city (e.g. hotels)
									Number of capacity building-awareness raising programs for protected areas	No	Annual	MoTA, MoNE, MoFP, MoLG, tourism providers in city (e.g. hotels)
		Upgrade existing and develop new tourism facilities	X	X	X	X	X	medium term	Number of touristm facilities developed	No	Annual	MoTA, MoNE, MoFP, MoLG, tourism providers in city (e.g. hotels)
TRANSPORT	21. Establish a public transport network including non-road dependent modes of transportation	Upgrading of public transportation mobility services	X	X	X	X	X	long term	Length of network for urban mobility (including public transport, bicycle lanes etc)	km	Annual	MoT, District Traffic Councils, MoLG, MoF, MoNE, EQA
									Reduction of greenhouse gas emissions	Metric tons of CO2 equivalent	Annual	MoT, District Traffic Councils, MoLG, MoF, MoNE, EQA, Academia, Private sector, NGOs
		Set up sustainable urban mobility guidelines	X	X	X	X	X	Short term	Number of integrated sustainable urban mobility plans (traffic and transportation plans)	No	Annual	MoFP, MoNE, MoT, District Traffic Councils, MoLG, Hiigher Planning Council
		Investment in sustainable mobility infrastructure	X	X	X	X	X	medium term	Total government budget for public transport	Palestinian Pound / $	Annual	MoFP, MoNE, MoT, District Traffic Councils, MoLG
		Development of plans for integration of accessibility provisions for PWD in transportation planning	X	X	X	X	X	Short term	Number of plans for integration of accessibility provisions for PWD in transportation planning	No	Semi-annual	MoT, District Traffic Councils, MoLG, civic groups for PWD
		Integration of accessibility provisions for PWD in transportation	X	X	X	X	X	Medium term	Projects for improvement of accessibility especially for PWD in public roads and infrastructure	No	Semi-annual	MoT, District Traffic Councils, MoLG, civic groups for PWD

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
		planning						Medium term	Investment in infrastructure appropriate for PWD	Palestinian Pound / $	Annual	MoFP, MoNE, MoT, District Traffic Councils, MoLG, NGOs, Donors
		Investment in infrastructure appropriate for PWD	X	X	X	X	X	short term	Total government budget for public transportation appropriate for PWD	Palestinian Pound / $	Annual	MoFP, MoNE, MoT, District Traffic Councils, MoLG, NGOs, Donors
	22. Develop multimodal transportation and link the road network, railways and airports with the seaport.	New ring road segments	X	X	X			Medium term	Number of new ring road segments	No	Annual	MoT, District Traffic Councils, MoLG, Hiigher Planning Council
		Investment in infrastructure for the development of new ring road segments	X	X	X			Medium term	Total government budget for road transportation infrastructure	Palestinian Pound / $	Annual	MoFP, MoNE, MoT, District Traffic Councils, MoLG, NGOs, Donors
		Upgrading existing seaport (including coastal infrastructure, logistics and road network leading to the seaport, IT support etc)					X	Long term	Volume of ocean freight transportation	m^3	Annual	MoT, MoLG, port authorities,
		Investment in upgrading existing seaport					X	Long term	Total government budget for upgrading existing seaport	Palestinian Pound / $	Annual	MoFP, MoNE, MoT, port authorities, MoLG, NGOs, Donors
		Upgrading existing railway network	X				X	Long term	Length of railway network rehabilitated	km	Annual	MoT, MoLG, railway authorities,
		Investment in rehabilitating existing railway network	X				X	Long term	Total government budget for railway transportation infrastructure	Palestinian Pound / $	Annual	MoFP, MoNE, MoT, railway authorities, MoLG, NGOs, Donors
		Use Renewable energy sources in transport (liquid biofuels, hydrogen, and biomethane)	X	X	X	X	X	Short term	Number of integrated plans-studies for the development of RES projects in transport	No	Annual	MoFP, MoNE, MoT, railway authorities,

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
URBAN & STRATEGIC PLANNING	23. Urban infill: dense construction in urban centers to take advantage of available land, taking into consideration sustainable planning and construction methods (smart city model)	Reuse of existing vacant and ignored buildings to cover growing housing needs.	X	X	X	X	X	Short term	Identification of Vacant-underused spaces in Urban Centers in order to cover growing housing needs.	No	Semi-annual	MoPWH, MoFP, MoNE, MoLG, Municipalities, Regional authorities, MoNE, NGOs, Donors, other institutions that own such spaces
		Set up a legal framework for the reuse of vacant and ignored buildings	X	X	X	X	X	Short term	Specific laws, by-laws, regulations and technical guidelines for reuse of vacant and ignored buildings	No	Annual	MoH, MoLG, Municipalities, Regional authorities, MoNE, MoFP, NGOs, Donors
	24. Urban periphery: construction around existing urban centers to increase city size, and development of decentralized areas taking into consideration sustainable planning and construction methods (smart city model)	Development of plans-studies for the development of green infrastructure for existing public buildings	X	X	X	X		Short term	Number of integrated plans-studies for the development of green infrastructure for existing public buildings	No	Annual	MoPWH, MoFP, MoNE, Palestinian Energy Authority, EQA, NGOs (e.g. Palestine Green Building Council)
		Capacity-building / raising awareness on green buildings	X	X	X	X		Short term	Number of capacity-building / raising awareness projects on green buildings	No	Annual	MoPWH, MoFP, MoNE, Palestinian Energy Authority, EQA, NGOs (e.g. Palestine Green Building Council)
		Investment in existing buildings through energy-efficient initiatives	X	X	X	X		Medium term	Total government budget for green building infrastructure	Palestinian Pound / $	Annual	MoPWH, MoFP, MoNE, Palestinian Energy Authority, EQA, NGOs (e.g. Palestine Green Building Council), Donors
		Improving road, water and electricity networks	X	X	X	X	X	medium term	Population connected to urban infrastructure networks / total population	%	annual	MoPWH, MoFP, MoNE, Palestinian Energy Authority, EQA, NGOs (e.g. Palestine Green Building Council), Donors
		Investment in urban infrastructure (road, water and electricity networks)	X	X	X	X	X	medium term	Total government budget for urban infrastructure	Palestinian Pound / $	Annual	MoPWH, MoFP, MoNE, Palestinian Energy Authority, EQA, NGOs (e.g. Palestine Green Building Council), Donors

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
		Establish public or green space strategy integrated into urban planning	X	X	X	X	X	Short term	Public or green space strategy approved	yes / no	Annual	MoPWH, MoFP, MoNE, Palestinian Energy Authority, EQA, NGOs (e.g. Palestine Green Building Council)
		Creation of public urban spaces / green areas	X	X	X	X	X	Medium term	Urban green space per capita	m^2	Annual	MoPWH, MoFP, MoNE, EQA, Higher Planning Council, NGOs, Donors
		Investment in public urban spaces / green areas	X	X	X	X	X	Medium term	Total government budget for public green spaces / urban areas	Palestinian Pound / $	Annual	MoPWH, MoFP, MoNE, EQA, Higher Planning Council, NGOs, Donors
		Investment in PWD infrastructure in urban planning	X	X	X	X	X	Short term	Total government budget for incorporation of PWD accessibility in urban planning	Palestinian Pound / $	Annual	MoH, MoLG, Municipalities, Regional authorities, MoNE, MoFP, NGOs, Donors
		Integration plans for incorporation of accessibility for PWD in urban planning	X	X	X	X	X	Short term	Number of plans for the incorporation of PWD accessibility in urban planning	No	Annual	MoH, MoLG, Municipalities, Regional authorities, MoNE, MoFP, NGOs, Donors
WATER & WASTEWATER	25. Use of unconventional water resources for covering water demands for all uses (e.g., wastewater treatment for agriculture, desalination for drinking water) and unconventional wastewater treatment practices	Use treated wastewater for agricultural production, for industry and urban applications	X	X	X	X	X	Short term	Volume of greywater treated for irrigation, industry and urban applications	m^3	Annual	PWA, WSRC, Water Service Providers, NWC, EQA, MoA, Specialized agricultural councils, Palestine National Agricultural Research Center (NARC), MoLG, NGOs
		Investment in unconventional water resources and wastewater treatment practices	X	X	X	X	X	Short term	Total government budget for unconventional water resources and wastewater treatment practices	Palestinian Pound / $	Annual	PWA, WSRC, Water Service Providers, NWC, EQA, MoA, MoNE
		Agricultural rainwater harvesting in order to address the area's limited water resources	X	X	X	X	X	Short term	Volume of rainwater harvesting used for irrigation	m^3	Annual	PWA, WSRC, Water Service Providers, NWC, EQA, MoA, Specialized agricultural councils, Palestine National Agricultural Research Center (NARC), MoLG, NGOs

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
									Number of projects developed for rainwater harvesting used for irrigation	No	Annual	PWA, WSRC, Water Service Providers, NWC, EQA, MoA, Specialized agricultural councils, Palestine National Agricultural Research Center (NARC), MoLG, NGOs
		Studies for the creation of new desalination plants - including spatial plans					X	Short term	Number of studies prepared	No	Annual	PWA, WSRC, Water Service Providers, NWC, EQA, MoLG, MoNE, MoPF, MoA,
		Development of desalination plants					X	Short term	Volume of desalinated water (including privately owned desalination plants with small capacities)	m^3	Annual	PWA, WSRC, Water Service Providers, NWC, EQA, MoLG, MoNE, MoPF, MoA,
									Ratio of desalinated water compared to other types of water production	%	Annual	PWA, WSRC, Water Service Providers, NWC, EQA, MoLG, MoNE, MoPF, MoA,
		Investment in desalination plants					X	Medium term	Total government budget for desalination plants	Palestinian Pound / $	Annual	PWA, WSRC, Water Service Providers, NWC, EQA, MoLG, MoNE, MoPF, MoA, NGOs, Donors
		Constructed wetlands for greywater treatment	X				X	long term	Number of wetlands for greywater treatment	No	Annual	PWA, WSRC, NWC, EQA, MoLG, MoNE, MoPF, MoA, NGOs, Donors
	26. Develop decentralized wastewater collection, transportation and treatment systems	Development of new sewage network	X	X	X	X	X	medium term	Length of improved sewage network	Km	Annual	PWA, WSRC, NWC, EQA, MoLG, MoNE, MoPF, MoA, NGOs, Donors
		Development of rainwater collection systems separate from sewage systems	X	X	X	X	X	medium term	Length of rainwater collection systems	Km	Annual	PWA, WSRC, NWC, EQA, MoLG, MoNE, MoPF, MoA, NGOs, Donors

Sector	SDP	Interventions	Urban Area					Implementation period	Measurable monitoring indicators	Unit	Frequency of monitoring	Responsible authority / stakeholders
			Nablus	Ramallah & Al Bireh	Bethlehem	Hebron	Gaza					
		Investment in developing decentralized wastewater infrastructure systems						Medium term	Total government budget for decentralized wastewater infrastructure systems	Palestinian Pound / $	Annual	PWA, WSRC, NWC, EQA, MoLG, MoNE, MoPF, MoA, NGOs, Donors
	27. Develop centralized infrastructure, increasing the efficiency of wastewater systems (collection, transportation and treatment)	Upgrading of existing sewage network	X	X	X	X	X	Short term	Percentage of households connected to central wastewater system	%	Annual	PWA, WSRC, NWC, EQA, MoLG, MoNE, MoPF, MoA, NGOs, Donors
		Investment in developing central wastewater infrastructure systems	X	X	X	X	X	Medium term	Total government budget for central wastewater infrastructure systems	Palestinian Pound / $	Annual	PWA, WSRC, NWC, EQA, MoLG, MoNE, MoPF, MoA, NGOs, Donors
	28. Improve the efficiency of water distribution systems in order to minimize losses and implement water consumption optimization methodologies	Reduction of Non-revenue Water	X	X	X	X	X	Medium term	Percentage of unaccounted-for water	%	Annual	PWA, WSRC, Water Service Providers, NWC, EQA, MoLG, MoNE, MoPF
		Improving of existing water network	X	X	X	X	X	Short term	Disturbance period / year in supplying water	Days	Annual	PWA, WSRC, Water Service Providers, NWC, EQA, MoLG, MoNE, MoPF, NGOs
									Number of un-served communities	No	Annual	PWA, WSRC, Water Service Providers, NWC, EQA, MoLG, MoNE, MoPF, NGOs
		Investment in improving of existing water network	X	X	X	X	X	Long term	Total government budget for improvement of existing water network	Palestinian Pound / $	Annual	PWA, WSRC, Water Service Providers, NWC, EQA, MoLG, MoNE, MoPF, NGOs, Donors
		Set up a regulatory framework for the monitoring of drinking water	X	X	X	X	X	Short term	Number of specific laws, by-laws, regulations and technical guidelines for monitoring of drinking water	No	Annual	PWA, WSRC, Water Service Providers, NWC, EQA, MoLG, MoNE, MoPF

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Introduction

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Baseline Assessment

The documents used for the baseline assessment are presented in the following Baseline Data List; references are organized per baseline assessment sector, as will be included in the SESA report. Overarching documents, which have been used as a data source for several sectors have been categorized as multi-sectoral; these are identified by item number under each relevant sector, in addition to sectoral references.

The MoLG-ICUD GIS database has been used as an additional source of information in order to provide an overview of the baseline condition in the five targeted urban areas.

Multi-Sector

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Air quality - Noise

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In addition to above references, multi-sectoral documents (10), (11), (14), (16), (35) were used.

Soil - Desertification

- MoLG- ICUD GIS database

Multi-sectoral document (11) was used.

Biodiversity

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