



Shadow Report

"Review of the National Report on the State of the Environment in Palestine,"

Published by the Environment Quality Authority (Palestine) for the year 2023.

Prepared by
Palestinian Agricultural Institutions Coalition (PAIC) and the Palestinian Environmental NGOs Network (PENGON)

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The content of this report does not necessarily represent the views or opinions of the Organization or the Consulate

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the Swedish "We Effect" Organization for their financial support under the Environmental and Climate Justice Program in Palestine (ECJP).

Furthermore, we would like to acknowledge all stakeholders who played an active role and contributed constructively to the preparation of this report, including representatives from relevant ministries and official bodies, Palestinian environmental institutions under the umbrella of the Palestinian Environmental NGOs Network (PENGON), universities, research centers, and all experts and stakeholders who provided valuable contributions that enriched this report and helped present it in the best possible manner.

We especially thank A2Z Consulting and their team of experts for their valuable efforts in providing rich and scientific content, and for their outstanding work in preparing this report, which responds to the need for improving and developing national environmental reports in Palestine. This report aims to offer a comprehensive and complementary vision of the state of the environment, including critical observations and practical suggestions that can be implemented in the future.

The report highlights the importance of effective representation of all relevant parties, including civil society and academic institutions, to ensure the comprehensiveness and accuracy of the information provided. It is hoped that the recommendations in this report will serve as a foundation for decision-makers to enhance Palestine's ability to address ongoing environmental challenges and safeguard its environmental rights in accordance with international standards.

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Executive Summary

The Environment Quality Authority recently issued the first national report by the Palestinian government documenting the state of the environment in Palestine for the year 2023. According to its summary, the national report aims to highlight the current state of the environmental sector, collect and present available data and information related to various environmental issues—including drivers, pressures, and responses—to stakeholders, provide the latest data on environmental concerns, outline the status of key environmental components, and ultimately propose recommendations to address the pressures and driving forces impacting the Palestinian environment.

Despite the significant efforts invested in preparing the national report, civil society organizations recognized the need for a complementary and parallel report that provides a more comprehensive picture

of the environmental situation in Palestine. The Shadow Report seeks to incorporate studies and efforts undertaken by this sector that were not sufficiently represented or to highlight gaps that were not addressed in the national report.

The Shadow Report was prepared by The Palestinian Agricultural Institutions Coalition (PAIC) and the Palestinian Environmental NGOs Network (PENGON) in collaboration with A2Z Consulting, as part of the Environmental and Climate Justice Program, in partnership with the Agricultural Civil Society Coalition and the Swedish organization We Effect. This effort followed a series of extensive consultations, interviews, and workshops with civil society organizations and relevant experts. The report aims to review the State of the Environment in Palestine Report, reflecting the perspectives of civil society organizations by analyzing strengths, identifying gaps and potential challenges, and providing recommendations to improve the process of issuing future reports on the state of the environment in Palestine. This approach ensures comprehensive coverage of environmental issues and extends across the different sections and components addressed in the national report. This report aspires to enrich discussions, complement ongoing efforts to enhance awareness and responsiveness to critical environmental challenges, and contribute to enabling decision-makers to develop a more holistic and integrated understanding of Palestine's environmental landscape.

The Shadow Report includes in-depth reviews of the official report, along with general recommendations that align with the broader environmental context. It provides a detailed analysis of each section of the national State of the Environment Report, focusing on key strengths and gaps. Additionally, it presents crucial recommendations that were not included in the national report, as well as additional references recommended for future reports to improve the accuracy and comprehensiveness of environmental assessments.

Key Findings:

The National Report on the State of the Environment in Palestine is notable for its comprehensiveness and its coverage of most pressing environmental issues. It provides an extensive overview of the various environmental challenges facing Palestine, including those related to the occupation and its widespread impact on different environmental sectors. This reflects significant efforts to present an accurate picture of the environmental situation in Palestine. However, based on a thorough analysis of the different environmental sectors covered in the national report, several key findings emerge that highlight challenges and gaps related to improving environmental conditions, as outlined below:

- ★ **Report Length:** The report is exceptionally long due to the repetition of text, ideas, and outcomes across multiple sections. This excessive length affects the clarity of the report's objectives and findings, sometimes inflating the content without adding real value. Similar ideas are repeated across different sections instead of being structured in a more focused and efficient manner. As a result, readers may struggle to follow the main themes, which can divert attention from key points and reduce the overall impact of the report.
- ★ **Narrative Analysis:** Some environmental topics in the report lack in-depth and comprehensive analysis, particularly in identifying key gaps across various environmental sectors. Many issues are presented in a descriptive manner, making them less effective in providing an accurate picture of the overall environmental situation. A more detailed analytical approach is required to offer a precise and holistic understanding of the different environmental sectors in Palestine.
- ★ **Data and Sources:** While the national report relies extensively on multiple sources, primarily government references, there remains a clear gap in updated data and in-depth analysis in several sections. Some sections depend on a limited range of sources, such as government publications or outdated data, which affects the comprehensiveness of the content. This lack of diverse sources makes it difficult to capture the full dimensions of environmental issues or effectively identify gaps and priorities for action (refer to Annex 3 for additional recommended references).
- ★ **Report Connectivity:** The national report lacks cross-referencing between different sections. When information is mentioned in an earlier section, it is not referenced or linked to related sections, making it difficult for readers to track environmental impacts across various sectors. This issue is particularly evident in sections like Environmental Governance and Occupation Policies, whose effects extend across multiple environmental sectors. The absence of such references weakens the report's coherence and reduces its ability to present a unified and comprehensive view of the environmental situation.
- ★ **Geographical and Regional Challenges:** The report does not adequately distinguish between the environmental challenges faced by different regions within Palestine. Some sectors require a more detailed analysis to highlight geographical disparities, particularly in Area C, urban and rural areas, or the Gaza Strip. For example, sections on air pollution, energy, water resources, and biodiversity

would benefit from a regional breakdown. Addressing these geographical variations and tailoring recommendations to the specific environmental needs of each area would enhance the report's effectiveness.

- ★ **Role of Non-Profit Institutions:** The report provides limited coverage of the role and activities of civil society organizations, academic institutions, research centers, and international organizations. These contributions are rarely mentioned, except in the Environmental Governance section, which briefly references the role of civil society, academic, and educational institutions, and in a few other sections in a very limited manner. This omission reduces the report's comprehensiveness and fails to acknowledge the significant role of these entities in addressing environmental challenges, implementing various programs, and providing valuable research data and findings. Including these contributions more explicitly would enhance the report's depth and inclusivity.
- ★ **Stakeholders and Key Actors:** The analysis in the national report is limited to outlining stakeholder roles and responsibilities without conducting a comprehensive stakeholder analysis that examines their importance, influence, and interactions. For example, in the Governance and Israeli Policies section, there is no analysis of how different stakeholders interact, influence decision-making, or face role overlaps and conflicts. This omission limits the report's ability to assess stakeholder effectiveness and provide strategic insights into role distribution and coordination. A deeper stakeholder analysis would help identify major challenges, gaps, and conflicting responsibilities more effectively.
- ★ **Proposed Recommendations:** Many of the recommendations in the report lack clarity and specificity. Most are generalized and not linked to concrete strategies, interventions, or well-defined implementation mechanisms. Additionally, the report does not classify recommendations based on the responsible entities for their execution. This lack of specificity makes it difficult to translate the recommendations into actionable and effective measures. Future reports should ensure that recommendations are more targeted, clearly assigned to relevant stakeholders, and supported by detailed implementation steps based on scientific analysis of the local environmental situation to drive meaningful and sustainable improvements in various environmental sectors.
- ★ **Absence of a Forward-Looking Vision:** The report lacks future-oriented scenarios that project potential developments across key environmental sectors such as air quality, water resources, waste

management, marine environment, and biodiversity. Without these foresight analyses, the report is missing a crucial tool for understanding long-term environmental trends and formulating proactive policy recommendations. Future reports should integrate environmental forecasting to enhance strategic planning.

- ★ **Limited Inclusion of the Private Sector and Related Projections:** The report does not adequately reflect the current or potential future role of the private sector in addressing environmental challenges. Integrating the private sector into environmental strategies and policies is essential for developing sustainable solutions. Future reports should include a detailed analysis of the private sector's contributions and expectations, as this sector plays a vital role in advancing sustainable policies and cross-sectoral collaborations.

Recommendations:

The efforts invested in this report demonstrate a very high level of research and data collection. However, this section aims to highlight areas requiring further attention and improvement in future reports. Addressing these gaps will allow upcoming reports to provide a more comprehensive perspective on Palestine's environmental sector and propose more precise solutions. The key areas for improvement include:

- ★ Enhancing the structure and methodology of future environmental reports to ensure a more analytical and concise presentation of key environmental sectors and indicators rather than a purely narrative approach. Essential data should be included in annexes, while the main report should feature clear analysis of gaps and challenges. The report should also highlight areas that require further research or additional data, allowing stakeholders and decision-makers to gain a

comprehensive and integrated understanding of the environmental context, facilitating priority setting and resource allocation toward the most pressing issues.

- ★ Bridging data gaps caused by outdated or limited information by ensuring a diversified range of sources. The report should enhance cooperation with governmental, civil society, academic, and research institutions that hold relevant environmental data, ensuring a comprehensive and accurate analysis.
- ★ Identifying missing data and developing an integrated data system to facilitate access to updated and reliable information, particularly regarding air quality, water resources, waste management, biodiversity, and other key areas. A well-structured data system would enhance the report's ability to provide multi-dimensional insights into the environmental situation, supporting policy planning and decision-making.
- ★ Ensuring consistency and alignment between national plans and cross-sectoral environmental strategies, which would help define national priorities, ensure comprehensive sectoral coverage, and foster collaboration between various stakeholders to achieve shared environmental objectives.
- ★ Expanding the role of civil society organizations in participating in the preparation of the national State of the Environment Report by giving greater visibility to the contributions of Palestinian environmental organizations. The report should also utilize findings from civil society research and publications more extensively to enhance credibility and deepen the analysis of Palestine's environmental landscape.
- ★ Encouraging research collaboration with civil society and academic institutions by fostering research partnerships that facilitate studies on under-documented environmental issues. Such collaborations would enrich discussions on environmental challenges and prioritize research-based solutions for the sector.
- ★ Conducting a comprehensive stakeholder analysis, focusing on importance, influence, and interrelations among different actors. This analysis should highlight key challenges, role overlaps, and gaps in responsibilities (e.g., governance and occupation-related policies). A clearer understanding of stakeholder dynamics would enhance role coordination and cooperation across relevant entities.

- ★ Developing more precise and actionable recommendations, ensuring they are clearly defined, linked to strategies and interventions, and backed by practical implementation mechanisms. Recommendations should also be categorized according to responsible entities, ensuring accountability and feasibility. Additionally, future reports should incorporate forward-looking perspectives and scenario-based analyses across key sectors such as air quality, water resources, waste management, marine environment, and biodiversity, enabling better long-term environmental planning and ensuring effective policy guidance.
- ★ Strengthening the role of the private sector in environmental improvements by integrating it more effectively into national policies and strategies. A clearer vision should be established regarding the private sector's future contributions in addressing environmental and developmental challenges.

Section One: Methodology and Objectives of the Report

This section includes several key components: **Introduction, Report Preparation Methodology, Role of Civil Society Organizations and Academic Institutions, Objectives of the Shadow Report, and Content of the Shadow Report.**

1.1 Introduction

The Environment Quality Authority recently issued the first-of-its-kind report on the State of the Environment in Palestine for the year 2023. This report holds significant importance as it provides a comprehensive and updated documentation of environmental conditions in Palestine before the current conflicts, as of November 7, 2023. The report reflects the extensive efforts and collaborations undertaken with various official entities and relevant stakeholders.

The 2023 State of the Environment Report aims to provide a comprehensive overview of Palestine's environmental situation, focusing on key issues such as water, air, land, marine and coastal environments, biodiversity, and climate change at the national level. Each environmental component is addressed

individually in separate chapters, making the report a reference document for understanding Palestine's environmental status.

Additionally, the report explores environmental governance, along with the challenges posed by Israeli policies and actions, highlighting the environmental violations faced by the Palestinian people, which pose a serious threat to the Palestinian ecosystem.

Beyond these core environmental elements, the report also examines three major environmental issues separately due to their direct and significant impact on various aspects of the environment: Solid Waste Management, Hazardous Waste and Chemical Substances, and Energy.

The report is based on an analytical methodology that considers environmental pressures, driving forces, the overall environmental status, and associated impacts while reviewing the response mechanisms adopted in each environmental sector. The analysis outlines the key threats affecting each environmental component and presents a description of the current situation, drawing from multi-source data and studies.

Additionally, the report examines the economic, social, and environmental implications of the prevailing environmental conditions in Palestine and proposes effective response mechanisms to mitigate these threats or minimize their negative impacts.

At the end of each chapter, the report provides recommendations targeted at decision-makers, aiming to reduce environmental risks and protect Palestinian environmental resources. Furthermore, the report evaluates Palestine's progress in achieving the global Sustainable Development Goals (SDGs) relevant to each environmental sector.

1.2 The Methodology

The Shadow Report was developed using a comprehensive and integrated methodology, which included an extensive literature review. This review encompassed an analysis of the 2023 National Report on the State of the Environment in Palestine, issued by the Environment Quality Authority, along with a broad range of other relevant documents and reports related to the environmental situation in Palestine. This literature review served as the foundation for analyzing the content of the national report and identifying key areas of focus for the Shadow Report.

The methodology also involved consultative meetings and workshops with various stakeholders. The process began with an initial meeting with the Board of Directors of the Palestinian Environmental NGOs Network (PENGON). Additionally, a central workshop was conducted, bringing together representatives from environmental civil society organizations, alongside governmental institutions, including: Environment Quality Authority, Ministry of Health, Ministry of Agriculture, Natural Resources Authority, Ministry of Local Government, and Ministry of National Economy. The meeting also included representatives from academic and research institutions, such as Birzeit University, An-Najah University, and the Arab American University.

Moreover, a series of in-depth individual interviews were conducted with various stakeholders, particularly Palestinian environmental organizations, totaling 20 meetings. These interviews aimed to gather insights, identify gaps, and collect recommendations relevant to the areas covered in the National State of the Environment Report. Stakeholders were also requested to provide available data and publications to support and document the Shadow Report.

The second phase of the work process built upon the findings from the literature review and consultative meetings. These insights were used to validate the data presented in the national report, particularly through interviews and recommendations generated from the central workshop with various stakeholders and experts.

It is important to note that concerning Gaza, the upcoming national environmental report is expected to provide updated data on various environmental sectors, particularly after the devastating war on the Gaza Strip, which has caused widespread destruction and severe environmental impacts that are currently difficult to fully assess or quantify.

Finally, all findings from previous phases were analyzed to identify gaps, verify additional data, and incorporate missing perspectives and recommendations. This analysis included additional meetings and further reviews to ensure comprehensive coverage of the environmental issues. Once the analysis was completed, a draft of the Shadow Report was prepared and presented to PENGON for review and feedback before the final version of the Shadow Report was approved.

1.3 The Role of Civil Society Organizations

The contribution of Palestinian environmental organizations and academic institutions to the preparation of the State of the Environment Report is vital in the Palestinian context, as it enhances the credibility and comprehensiveness of the report. The engagement of environmental organizations and coalitions, such as the Palestinian Environmental NGOs Network (PENGON) and civil society institutions, plays a crucial role in highlighting the environmental challenges directly affecting Palestinian communities, including water and air pollution and the degradation of natural resources.

These organizations have a strong presence and extensive experience in environmental work and direct access to field-based data, allowing them to document environmental damage in affected areas, especially in regions that may not be fully covered in official reports. This is particularly relevant given the political challenges and geographical divisions imposed by the Israeli occupation, which often limit the ability to assess environmental conditions comprehensively.

On the other hand, academic institutions contribute their scientific expertise and research capabilities, enriching the report's content by providing research-based data and scientific analyses that support its

findings and recommendations. These institutions also foster partnerships with international organizations, which helps to bring Palestinian environmental issues onto the global agenda.

Incorporating the perspectives and contributions of civil society organizations and academic institutions more effectively enhances the transparency and inclusivity of environmental reporting. By integrating diverse viewpoints, the report gains a more comprehensive and multidimensional understanding of Palestine's environmental landscape.

Recognizing this importance, civil society organizations in Palestine took the initiative to prepare the Shadow Report to address gaps in the official report and offer additional recommendations. This effort aims to present a more accurate and holistic depiction of Palestine's environmental conditions. Furthermore, the Shadow Report contributes to the adoption of effective environmental policies capable of driving change, meeting the needs of Palestinian communities, and addressing existing environmental challenges.

1.4 Objectives of the Shadow Report

The Shadow Report aims to review the 2023 National Report on the State of the Environment in Palestine from a comprehensive and critical perspective. This report serves as a complementary effort to the government-issued report, which represents a significant step forward in improving the environmental sector in Palestine across its various dimensions.

While recognizing the importance of the national report and the considerable efforts made to collect available data and present a comprehensive overview of Palestine's environmental sectors, it is crucial to address challenges such as limited resources, data availability, technical and human capacity constraints, and the lack of peer-reviewed scientific research. Additionally, the tight implementation timeline posed further difficulties in ensuring the depth and accuracy of the report's findings.

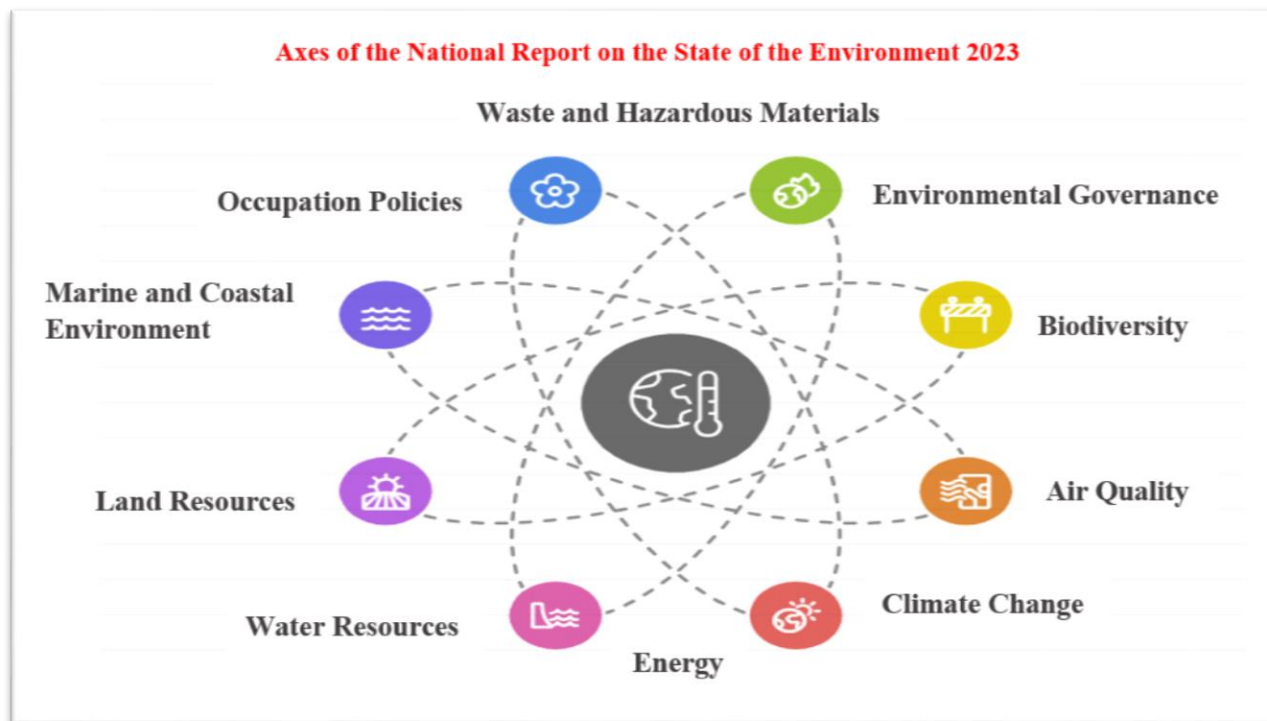
Objectives of the Shadow Report:

- ★ Reviewing the findings and outcomes of the 2023 National Report on the State of the Environment from a holistic analytical perspective.
- ★ Assessing the key challenges, gaps, and strengths identified in the first national environmental report.
- ★ Incorporating the views and perspectives of civil society organizations to enhance the comprehensiveness of the report in reflecting the environmental reality.
- ★ Evaluating the accuracy of the data and information presented in the national report to improve the quality of future environmental reports.
- ★ Providing relevant recommendations and proposals to enhance the process of preparing future environmental reports, ensuring their inclusivity and effectiveness.

1.5 Content of the Shadow Report

The Shadow Report consists of several sections covering various environmental aspects, with a focus on providing detailed observations and recommendations that enhance the effectiveness and objectivity of the 2023 State of the Environment in Palestine Report. The main components of the Shadow Report are as follows:

1. **Executive Summary:** Outlines the scope and objectives of the report, along with key findings and relevant recommendations.
2. **Introduction:** Highlights the importance of the Shadow Report as a complementary effort, emphasizing the role of civil society and academic institutions in supporting and improving national environmental reports. It also underscores the need for greater transparency and inclusivity in covering Palestine's environmental issues.
3. **Objectives of the Report:** This section clarifies the goals of the Shadow Report, which include constructive critique of the official report, recommendations for improving its content, and the incorporation of stakeholder perspectives on environmental issues that were not adequately covered in the national report.
4. **Methodology:** Describes the approach used in preparing the Shadow Report, including a comprehensive review of relevant literature and reports, in-depth interviews, consultations, and workshops involving key stakeholders, including environmental NGOs, government institutions, and academic organizations.
5. **Role of Civil Society and Academic Institutions:** This section highlights how civil society organizations and academic institutions contribute to enhancing and improving the national environmental report, ensuring a more comprehensive and representative account of Palestine's environmental realities.
6. **Content of the Shadow Report:** Provides an overview of the key themes covered in the report.
7. **Findings of the Analysis and Detailed Review of the National Report:** This section presents an in-depth analysis of each section of the national report, highlighting gaps that were not adequately addressed. It also includes recommendations and a list of additional references and sources that were not included in the national report. The analysis covers key environmental sectors, such as:
- 8.



Annexes and Appendices: These include (a list of interviews and workshops with stakeholders, a summary of the expertise of the advisory team, a list of references and sources recommended for future reports).

Section Two: Findings of the Detailed Review of the Palestinian State of Environment Report

This section presents the findings from the detailed analysis and review of various environmental sectors covered in the national report, across the following areas: (Environmental Governance, Occupation Policies and Measures, Air Quality, Climate Change, Water Resources, Land Resources, Marine and Coastal Environment, Biodiversity, Solid Waste, Waste and Hazardous Materials, and Energy).

2.1 Findings of the Analysis and Review of the National Report

This section of the Shadow Report presents a detailed analysis of the chapters covered in the National Report on the State of the Environment. The national report successfully addressed various dimensions of complex environmental issues and the challenges associated with them. Its structured framework and comprehensive approach make it a valuable resource for assessing the environmental situation in Palestine. However, based on feedback gathered from representatives of civil society organizations and experts who contributed to the Shadow Report, several key considerations emerge. These include: recognizing the strengths highlighted in the national report, identifying gaps that need to be addressed, providing key recommendations for improvement, and suggesting additional references that enhance the credibility and comprehensiveness of future reports.

This section of the Shadow Report serves as an extension of the main chapters covered in the official report, maintaining the same structure to ensure consistency and coherence with the national report's framework. Additionally, the analysis is based on the comprehensive and detailed methodology outlined in Section

Three, which involved rigorous reviews and extensive consultations with stakeholders from civil society, experts, and other key actors.

2.1.1 Environmental Governance

Environmental governance encompasses legislation, practices, policies, and the roles of various stakeholders. It focuses on enhancing cooperation between official institutions and local communities to ensure environmental protection. Governance is based on laws and policies that regulate how individuals and institutions interact with the environment.

Chapter Two of the report examines the roles and responsibilities in environmental protection, covering: legislative frameworks, tools such as Environmental Impact Assessments (EIA), environmental planning, and law enforcement, and roles of different authorities to ensure the right to a clean and sustainable environment

Summary of Subsections (as Presented in the National Report)

The National Report addresses various aspects of environmental governance in Palestine, focusing on three main themes. The first theme discusses roles and responsibilities in ensuring the right to a clean and sustainable environment, presenting the roles of legislative, executive, and judicial authorities, as well as local government bodies, civil society organizations, and academic institutions. It also highlights the responsibilities of the occupying power in preserving the Palestinian environment in accordance with international law.

The report then shifts to environmental legislation and legal frameworks, explaining the legal foundations that regulate environmental protection, including the Palestinian Basic Law, multilateral environmental agreements, and various environmental laws, regulations, and instructions. It also addresses the Environmental Impact Assessment (EIA) policy and the importance of mandatory technical guidelines in environmental governance.

The third theme explores environmental protection tools, covering mechanisms such as Environmental Impact Assessments (EIA), environmental inspection and monitoring, management of environmental complaints, law enforcement, and the collection and dissemination of environmental data. It also emphasizes the importance of environmental awareness and monitoring, highlighting the need for strategic planning and financial support to ensure the sustainability of environmental efforts in Palestine.

The report concludes with recommendations aimed at enhancing these governance aspects, stressing the importance of strengthening environmental policies to achieve sustainable environmental management.

Strengths (as Presented in the National Report)

This section provides a comprehensive and integrated review of the roles and responsibilities in ensuring the right to a clean and sustainable environment by outlining the duties of the three branches of government and various stakeholders, including official entities, civil society organizations, and academic and educational institutions involved in the environmental sector.

The section on environmental legislation and legal frameworks presents a detailed analysis of environmental laws, including the Palestinian Basic Law, multilateral environmental agreements, and mandatory technical regulations related to environmental protection. It also highlights conflicting legal provisions and key regulatory gaps that impact the overall environmental sector in Palestine.

The section on environmental protection tools provides a well-structured and comprehensive overview of mechanisms such as Environmental Impact Assessment (EIA), environmental approvals, inspection and monitoring, environmental complaints management, law enforcement, environmental data collection and dissemination, awareness campaigns, environmental monitoring, planning, and financing. In addition to defining the roles and functions of each tool, the report includes an assessment of the current situation, referencing statistics on environmental violations, types of complaints submitted to the Environment Quality Authority (EQA), and an analysis of complaint trends over the years. The report also effectively highlights the roles of the Environment Quality Authority and Palestinian civil society organizations in promoting environmental awareness.

Key Gaps in the National Report

This section highlights the main challenges and gaps that were not fully addressed in the National State of the Environment Report under this chapter, as follows:

- ★ The report provides a detailed review of stakeholders and their respective roles; however, it includes an unnecessary level of detail regarding the specific responsibilities of each entity. Instead, it would have been more effective to provide key summaries of stakeholders' roles, placing detailed information in annexes. Additionally, summarizing stakeholders' responsibilities in tables or infographics would have made comparisons between roles clearer without excessive elaboration.
- ★ While the report outlines stakeholder roles and responsibilities, it lacks a comprehensive stakeholder analysis that assesses the level of importance, influence, and interrelations among different actors. Such an analysis is critical for understanding interaction dynamics, role overlaps, and governance challenges. The absence of this component limits the report's ability to evaluate the effectiveness of governance structures and how responsibilities intersect. Furthermore, it does not sufficiently highlight the weaknesses and gaps in the roles of official bodies and key stakeholders, particularly concerning the judiciary's role in environmental governance. The report also fails to address potential conflicts between different stakeholders regarding law enforcement and policy implementation, which significantly impacts environmental governance effectiveness.
- ★ The report does not adequately examine how Israeli occupation policies affect the roles and responsibilities of Palestinian stakeholders in environmental management. It does not assess which sectors are most impacted, particularly regarding restricted access to natural resources, obstacles to environmental policy implementation, and challenges in enforcing environmental regulations in areas under Israeli control. These barriers undermine sustainable development efforts and effective environmental governance in Palestine.
- ★ The section on environmental governance does not sufficiently explore cross-sectoral environmental strategies or national plans. While it briefly mentions the Cross-Sectoral Environmental Strategy (2020-2023) and the Environmental Awareness and Media Strategy (2021-2030) developed by the Environment Quality Authority (2021), the integration of these strategies

into the governance pillar is limited. Although cross-sectoral strategies were discussed in the energy and water sections, they were not incorporated into the governance section. The report does not explain how environmental issues are integrated into national strategies or the interlinkages between cross-sectoral strategies, which is crucial for coordinating efforts between government, civil society, and academia. Additionally, no reference links were provided for accessing the strategies mentioned in the report.

- ★ Although the legal and regulatory framework was covered in detail, the report includes unnecessary expansion on legislative details. Instead, only key legal issues should have been summarized, with detailed legal provisions placed in annexes.
- ★ While the governance section identifies gaps in environmental law enforcement, it does not assess the extent of their impact on different environmental sectors. The enforcement challenges vary significantly across sectors, and failing to analyze these variations limits the report's ability to address sector-specific governance issues.
- ★ The report references studies conducted by environmental NGOs and the Environment Quality Authority on environmental awareness and legislative development; however, these studies were not incorporated into the recommendations despite their importance in strengthening environmental governance and legal frameworks.
- ★ The recommendations mention the need to update the organizational structure of the Environment Quality Authority, but they do not highlight the need to implement the 2021 approved structure, as the 2005 structure is still in effect. While this issue was noted in the section discussing the role of the Environment Quality Authority, it was not reflected in the recommendations, despite its importance, given that the authority is the primary institution responsible for environmental governance.
- ★ Although the governance section covers its topics comprehensively, the narrative approach used in presenting information reduces its effectiveness in clearly identifying key governance gaps. While the report includes some charts and tables, it does not present detailed analyses of governance gaps within each of the three governance components. It would have been more effective to structure each section with a dedicated gap analysis, explicitly outlining governance weaknesses and challenges. This approach would have simplified comparisons between governance elements and facilitated the development of targeted recommendations, ultimately improving environmental governance effectiveness.
- ★ Throughout the various environmental sectors covered in the report, the implications of governance factors were not systematically analyzed. Addressing how governance challenges affect each environmental sector would have highlighted key gaps and policy obstacles, helping stakeholders understand the governance barriers affecting sustainable environmental management in Palestine.

Recommendations and Improvement Strategies

Despite the recommendations included in the National Report, several additional recommendations can be proposed to further enhance the effectiveness of the report:

- The report should provide a summarized overview of stakeholders and environmental laws, regulations, and instructions, while detailed explanations should be placed in the annexes for reference.
- A thorough analysis of stakeholder roles and responsibilities in the environmental sector should be conducted, assessing their importance, influence, and interrelations. The analysis should address gaps and conflicts in responsibilities, including the impact of the occupation on roles and enforcement

mechanisms, as well as identifying weaknesses and challenges that hinder the achievement of environmental governance goals.

- The environmental laws and regulations section should be enhanced by clarifying how the implementation and enforcement of laws impact different environmental sectors. The report should include an analysis of the varying effects of environmental laws and regulations across sectors, allowing for a better understanding of legal gaps and enabling targeted improvements for more effective environmental law enforcement.
- Existing studies on environmental legislation conducted by civil society organizations and the Environment Quality Authority should be incorporated into the report. The recommendations from these studies should be used to develop and improve Palestine's environmental legal framework, ensuring alignment with international environmental agreements.
- The report should be aligned with national and cross-sectoral environmental strategies, ensuring that strategic outcomes are referenced within the environmental governance section. Strengthening integration and coordination across sectors will enhance the comprehensiveness of the report, avoiding duplication and ensuring that environmental governance is effectively implemented.
- The organizational structure of the Environment Quality Authority should be updated and implemented, ensuring that the 2021 approved structure is activated instead of the 2005 structure that remains in effect. Strengthening the institutional capacity of the authority by allocating necessary resources will improve its effectiveness in environmental management.
- The environmental governance section should be more effectively integrated with each sub-sector, allowing for a clearer identification of gaps and challenges within each environmental domain. A sector-specific analysis should be included to illustrate how governance issues impact different environmental challenges. This approach will enable the development of targeted recommendations based on a deeper understanding of the governance-environment relationship, ultimately enhancing the effectiveness of environmental management strategies.

2.1.2 Policies and Procedures of the Occupation

This section examines the impact of Israeli occupation policies and procedures on the Palestinian environment, highlighting the environmental challenges resulting from the ongoing occupation practices. The report presents the various effects of the Annexation and Expansion Wall and the military orders imposed by the occupying state. Additionally, it reviews the obstacles created by occupation policies and the recurring violations, including military aggression and the ongoing blockade, which hinder the implementation of Palestinian environmental interventions.

This review aims to highlight the weaknesses related to this section, particularly those associated with the broad environmental policies imposed by the occupation. It also seeks to provide recommendations to mitigate these impacts and strengthen mechanisms for protecting the Palestinian environment while enhancing the presentation of this section within the report.

Summary of Subsections (as Presented in the National Report)

The report addresses the occupation's policies and procedures affecting the environment in Palestine from pages (100-131) within the first chapter. It covers several key areas, including settlement expansion in the territories occupied in 1967, the Annexation and Expansion Wall, and military orders imposed by the occupying state. Additionally, this section discusses illegal waste trade (waste smuggling) and policies that hinder Palestinian environmental projects, as well as the ongoing violations committed by the occupying state, including aggression, blockade, and military checkpoints. The report concludes with recommendations aimed at mitigating the impact of these policies and strengthening mechanisms for protecting the Palestinian environment.

Strengths (as Presented in the National Report)

This section reviews the occupation's policies and procedures affecting the Palestinian environment, emphasizing various aspects that illustrate the negative impact of these policies on environmental resources in general. It also presents the effects of the restrictions and measures imposed by the occupation on the protection and development of environmental resources, as well as those that obstruct Palestinian environmental projects.

Additionally, this section provides a relatively well-structured and comprehensive presentation of the Annexation and Expansion Wall, addressing the current status of the wall constructed on Palestinian lands and its various impacts on related environmental sectors. Recent sources were used in this section, along with various presentation and visualization tools, such as maps and other illustrative materials.

The report also highlights the ongoing violations by the occupying state, including aggression, blockade, and military checkpoints, clarifying their impact on the Palestinian environment. It includes references to numerous statistical data, maps, and infographics that underscore the negative effects of Israeli policies on the environment. The report concludes with comprehensive recommendations aimed at enhancing mechanisms for protecting the Palestinian environment and mitigating the impact of occupation policies, contributing to efforts toward a cleaner and more sustainable environment in Palestine.

Key Gaps in the National Report

This section highlights the main challenges and gaps that were not adequately addressed in the National State of the Environment Report under this chapter, as follows:

- ★ The section on occupation policies and procedures did not effectively present the elements listed in its contents, which include settlement expansion in the territories occupied in 1967, the Annexation and Expansion Wall, and military orders imposed by the occupying state. The report lacks a comprehensive and integrated assessment of the environmental impacts, and the referenced environmental sectors were not clearly defined. The absence of subheadings categorizing the effects of Israeli policies on each relevant environmental sector makes it difficult to track their impact. For example, the report references air quality, climate change, water resources, land resources, marine and coastal environment, and biodiversity, but does not structure them as distinct subtopics. As a result, many of the impacts were mentioned in different sections in an unstructured, incomplete, and non-comprehensive manner.
- ★ The presentation of information was primarily narrative, making it less effective in clearly outlining the key gaps. While the report includes maps, illustrative tables, and statistics, the narrative approach reduces its effectiveness in demonstrating the impact of Israeli policies on different environmental sectors. The lack of subheadings and clear links between sections makes it difficult to trace the transition from occupation-related impacts to their effects on environmental sectors.
- ★ Despite focusing on the environmental consequences of the occupation, the report lacks an assessment of the impact of colonial policies on biodiversity and broader ecosystems. It does not address how these policies affect Palestine's ability to enforce laws, develop and implement strategies and interventions, or protect natural habitats and biodiversity, nor does it discuss measures to prevent habitat loss and ecosystem destruction.
- ★ The report also lacks clear cross-references between sections, failing to guide readers to related topics. Since this section on occupation policies intersects with all environmental sectors, cross-referencing is crucial. For example, in the environmental governance section, when discussing the environmental legislative framework or the responsibilities of the occupying power in protecting the Palestinian environment, there is no mention of military orders imposed by the occupying state, which were discussed in this section. Similarly, connections to other environmental sectors and themes are missing.
- ★ Additionally, the report relies heavily on outdated sources, frequently citing data that is over ten years old when discussing various environmental impacts of the occupation. Furthermore, it does not clarify whether recent data is unavailable, nor does it acknowledge gaps in current information. Some notable examples include:

- It was indicated in the "Introduction" that the occupying state controls more than 85% of Palestinian water resources (Palestinian Water Authority, 2013). This indicator is considered old and there is a gap of (11) years.
- It was indicated in the "Colonization in the Palestinian Territories Occupied in 1967" axis, "B'Tselem" organization explained, through examining the data of the so-called Civil Administration and aerial photographs of the settlements taken in 2009, that 21% of the area of the settlements is lands that the occupying state defines as private property owned by Palestinians that were seized by the settlements (B'Tselem, 2010).
- It was also indicated in the "Colonization in the Palestinian Territories Occupied in 1967" axis, and with the expansion of the settlements and the doubling of the number of settlers in the West Bank, the quantities of

water used by them increased, as the settlers' consumption of water was estimated at about 75 million cubic meters per year (World Bank, 2009).

- Some old explanatory tables were also mentioned, for example Figure No. 1 Number of colonial quarries belonging to the occupying state in the West Bank, (Source: Architectural and Artistic Planning Association, 2015).
- It was mentioned within the axis "The Racist Annexation and Expansion Wall", the Palestinian Hydrology Group reported that the Annexation and Expansion Wall imposed a new reality regarding the allocation and division of 2 of the basin area located. The area of the Western Groundwater Basin, where the Annexation and Expansion Wall will isolate about 1,096 km within the borders of the West Bank, preparing it for its subsequent annexation to the occupying state (2005, PHG).

Recommendations and Improvement Strategies

Despite the recommendations included in this section of the national report, several additional recommendations can be proposed to enhance its effectiveness:

- The report should provide a more comprehensive assessment of the environmental impacts of colonial policies, focusing on key environmental sectors such as air quality, climate change, water resources, land resources, marine and coastal environment, and biodiversity. These sectors should be presented as independent subheadings, making it easier to track the effects of Israeli policies on each one.
- It is essential to adopt a more structured and effective approach to presenting information instead of the current narrative format. The use of clear subheadings to directly link impacts to environmental sectors would improve clarity. Additionally, integrating maps, illustrative tables, and statistics in a well-organized manner would enhance both the presentation and contextual understanding.
- Inclusion of biodiversity and ecosystems: A comprehensive assessment of the impact of colonial policies on biodiversity and broader ecosystems should be included. The report should also discuss how these policies affect Palestine's ability to enforce laws, develop strategies, and implement interventions. Additionally, it is crucial to identify threatened local species and propose solutions for biodiversity protection.
- Updating data and sources: The report should replace outdated sources with current data that accurately reflects the present situation. When older data is used, the timeframe should be explicitly stated, particularly if no recent data is available. Any gaps in available information should be clearly highlighted.
- Restructuring the "Policies and Procedures of the Occupation" section in future reports to ensure a clear analysis of impacts and gaps, rather than relying solely on a narrative approach. Strengthening

cross-referencing between different sections is crucial, ensuring that the occupation policies section is clearly linked to other key themes in the report.

2.1.3 Air Quality in Palestine

Air quality in Palestine is a significant environmental concern, as air pollution poses a major threat to public health and the environment. Air quality is primarily affected by human activities such as transportation, industry, agricultural practices, and waste management. However, air pollution is not solely caused by human-related emissions; natural sources, such as dust/sandstorms and weather conditions, also contribute to increased pollutant concentrations in the atmosphere.

Additionally, noise pollution is another environmental issue that negatively impacts quality of life and human health, causing stress and psychological disorders. It is noteworthy that the report successfully presents the available data, despite the scarcity of information in this field due to a lack of monitoring stations and political restrictions. However, some critical issues were overlooked in this section, which should be addressed in the shadow report.

Summary of Subsections (as Presented in the National Report)

The report covers various aspects related to air quality and noise pollution in Palestine, beginning with a discussion of pressure factors affecting air quality, which are closely linked to human activities and natural factors. It emphasizes the impact of the occupation and its industrial, military, and settlement-related activities on the deterioration of air quality in Palestine.

The report attributes human-induced air and noise pollution to population growth as a primary pressure factor. It highlights the impact of transportation on air quality and briefly mentions the effect of energy production, given Palestine's heavy reliance on imported energy.

It further explores the impact of manufacturing and extractive industries on air quality, particularly quarries and the stone and marble industry, identifying them as major contributors to pollution. The report also discusses the negative effects of solid and liquid waste management, particularly waste burning, decomposition, and wastewater treatment plants. It briefly mentions the agricultural sector's contribution to air pollution through greenhouse gas emissions and agricultural waste burning. Additionally, it highlights the use of ozone-depleting substances (ODS) and notes the lack of accurate data on their usage in Palestine.

The report extensively examines the impact of the occupation and its activities as a major pressure factor on air quality, emphasizing settler movement on roads, construction activities, land clearing for settlement expansion, the Annexation and Expansion Wall, and the establishment of more than 25 industrial sites, including highly polluting industrial facilities deep inside the West Bank. The report also covers natural sources of air pollution, such as sandstorms and forest fires.

It then describes the state of air quality and noise levels in Palestine, stressing the lack of proper monitoring systems. It compares national air quality and noise standards to international benchmarks and highlights the scarcity of available data. The report mentions that new air quality monitoring devices installed at

Palestinian universities by the Environment Quality Authority represent a step in the right direction, but they do not qualify as recognized air quality monitoring stations capable of measuring key air pollutants.

The report attempts to summarize available government data, primarily from environmental inspections conducted by the Environment Quality Authority, alongside limited and scattered studies. It also discusses Sustainable Development Goals (SDGs) related to air quality, emphasizing the lack of sufficient national data to assess key indicators. Additionally, the report outlines laws and regulations stipulated in Palestinian environmental law and relevant regulations governing this field.

Later, the report examines the economic and social impact of air quality, relying on health sector statistics and data on diseases linked to air pollution. It also addresses the environmental consequences of poor air quality, including its effects on biodiversity, water resources, land degradation, and climate change.

The chapter concludes with a discussion of national efforts to combat air pollution, particularly responses to the pressures and driving forces previously discussed. It also presents a set of recommendations, reaffirming the need for significant efforts and attention to improve air quality in Palestine.

Strengths (as Presented in the National Report)

The report successfully provides a realistic representation of this sector, despite significant challenges, including data collection on air quality in Palestine, the limited number of monitoring stations, and the scarcity of studies and available information. Presenting these findings despite such obstacles is a notable strength of the report. Additionally, the report clearly identifies human activities and occupation-related practices as the primary sources of air and noise pollution in Palestine, offering an accurate diagnosis of the current situation.

Furthermore, the report effectively highlights national gaps in this sector, helping to prioritize future actions. It also presents a comprehensive analysis of air and noise pollution caused by quarries and the stone industry, utilizing available data to provide a detailed insight into the impact of these industries on air quality.

One of the report's key strengths is its comparison between Palestinian and international pollutant concentration standards, an essential step for future planning and balancing environmental protection with economic growth. While the report details the newly installed air quality monitoring sensors by the Environment Quality Authority, it explicitly states that these efforts remain insufficient to ensure effective air quality monitoring in Palestine.

Additionally, the report adequately presents the institutional and legislative framework governing air quality management, providing a clear overview of the current regulatory system and its challenges. Finally, many of the recommendations included in the report align with key priorities that Palestinian policymakers should carefully consider to ensure improved air quality.

Key Gaps in the National Report

This section outlines the major challenges and gaps that were not adequately addressed in the National State of the Environment Report under this chapter, as follows:

- ★ **Drivers and Pressures on Air Quality:** The report does not address the impact of inadequate infrastructure on air and noise pollution in various areas of the West Bank and Gaza Strip. For example, the lack of a stable electricity supply in Gaza forces Palestinians to rely on fuel-powered generators, which are a major source of pollution and noise. Similarly, water shortages in the West Bank compel residents to install water pumps, increasing noise pollution. The report also fails to mention the impact of Israeli civil and military aviation on air and noise pollution, even though this could be a significant driver if relevant data were available.
- ★ **Human Sources of Air and Noise Pollution:** The report presents Palestinian Central Bureau of Statistics (PCBS) data in Figure 1, comparing the percentage of households exposed to noise, odors, dust, or smoke between 2018 and 2020. However, this comparison is misleading, as 2020 was the year of the global COVID-19 pandemic, which led to a sharp decline in industrial and commercial activities, as well as transportation due to lockdowns. This temporary reduction in activities artificially lowered pollution levels, meaning that any improvements in air quality during that period were not sustainable or representative of long-term trends. Given Palestine's growing population and urban expansion, air quality challenges are likely worsening rather than improving.
- ★ **Transport and Mobility:** The report presents the number of licensed vehicles in the West Bank, but ignores the issue of illegal vehicles. According to the Palestinian Ministry of Transport and Communications, there were approximately 180,000 unregistered vehicles in 2021, meaning that the actual number of cars on the road is closer to 480,000 rather than the official count. Additionally, many decommissioned vehicles continue to operate illegally, raising the total number to around 630,000 vehicles, which is double the figure mentioned in the report. These vehicles, often in poor mechanical condition, contribute significantly to air and noise pollution. In Gaza, the Israeli blockade and restrictions on spare parts and clean fuel have severely degraded vehicle conditions, making them a major source of pollution. Furthermore, the report overlooks Israeli settler vehicles (estimated at 700,000) and the extensive settler transportation network connecting settlements across the West Bank.
- ★ **Carbon Dioxide Emissions:** Figure 5 presents CO₂ emissions from the transport sector between 2009 and 2022, based on fuel sales data. However, the report does not account for smuggled fuel, which significantly impacts emissions calculations. A 2020 study by the Palestine Economic Policy Research Institute (MAS) estimated that 25% of the annual fuel consumption in the West Bank (approximately 60 million liters) is smuggled, valued at \$120 million. Since smuggled fuel is not included in official records, actual CO₂ emissions from the transport sector are significantly higher than reported. Additionally, low-quality smuggled fuel produces higher emissions of CO₂ and other pollutants, worsening air pollution.
- ★ **Manufacturing, Extractive, and Construction Industries:** The report focuses heavily on the stone and marble industry, ignoring other significant industrial polluters, such as: cement production, including the Rujeib Cement Factory in Nablus, metal industries, such as iron and aluminum workshops in industrial zones, textile and leather tanning factories in Hebron and Nablus, which use hazardous chemicals that contribute to air pollution, plastic manufacturing plants in Hebron and Nablus, which release harmful emissions, chemical and fertilizer industries, which operate on a limited scale but contribute to environmental pollution, and many of these industries operate without proper environmental oversight, increasing air and noise pollution, a critical gap in the report.

- ★ **Solid and Liquid Waste Management:** While the report discusses waste management, it completely omits the issue of electronic waste burning, a major air pollutant. This is particularly widespread in southern West Bank towns like Yatta, where electronic devices (phones, computers, and batteries) are burned to extract valuable metals like copper and aluminum. This process releases hazardous pollutants such as dioxins, furans, and lead, all of which have severe health and environmental impacts. The report fails to mention this issue, despite its prevalence and toxicity.
- ★ **Agriculture:** The report discusses agriculture's role in reducing air pollution and its negative environmental impacts, but it does not mention methane emissions from livestock farming. Studies estimate that each cow produces 100-120 kg of methane per year, meaning that Palestine's 80,000 cattle emit approximately 8,000-9,600 tons of methane annually. Since methane is a potent greenhouse gas, this omission is significant, as livestock emissions contribute to climate change and air quality degradation.
- ★ **Occupation Policies and Restrictions:** While the report extensively discusses the occupation's impact on air quality, it fails to highlight key issues, such as: restrictions on access to environmental resources, which prevent Palestinian authorities from effectively monitoring and managing air quality, movement restrictions, which hinder environmental inspections and infrastructure maintenance, worsening pollution problems.
- ★ **Environmental Costs of the Occupation:** The report mentions the environmental costs imposed by Israeli policies but does not thoroughly explore them. A 2019 study by the Applied Research Institute – Jerusalem (ARIJ) titled “Assessing the Impact of Israeli Movement Restrictions on Palestinians” estimated that Israeli checkpoints and roadblocks cost the Palestinian economy \$247 million annually in lost productivity. Additionally, inefficient transportation routes consume an extra 81 million liters of fuel annually, costing \$135 million and producing 196,000 tons of CO₂ emissions. These factors significantly impact air quality, yet the report does not fully address them.
- ★ **Climate Change and Air Quality:** The section on natural sources of air pollution briefly mentions climate change, but it lacks a detailed explanation of how climate shifts will exacerbate air pollution. Given that Palestine is classified as a climate hotspot, factors like sandstorms, pollen levels, and sea salt particles will intensify, worsening respiratory and environmental conditions.
- ★ **Natural Sources of Pollution:** While the report discusses sandstorms and wildfires, it ignores pollen pollution, which significantly affects air quality during spring. Additionally, sea salt particles from ocean spray contribute to coastal air pollution, affecting respiratory health and environmental conditions.
- ★ **Sustainable Development Goals (SDGs) on Air Quality:** The report addresses three SDGs related to air quality but fails to mention three other relevant goals that should be considered:

- Goal 11: Sustainable cities and communities - (11.6) which focuses on reducing the negative environmental impacts of cities, including air quality and waste management.
- Goal 12: Responsible consumption and production - (12.4) which refers to the sound management of chemicals and all waste throughout their life cycle to reduce their negative impacts on health and the environment, including air.
- Goal 13: Climate action - which is directly linked to air quality by reducing greenhouse gas emissions that contribute to air pollution and climate change.

- ★ **Economic and Social Impacts:** Although the title refers to the social and economic impacts of air pollution, the content was only referring to the health impacts of this pollution. In order for this section to fully reflect the title, it should also address other aspects such as:

- **Environmental degradation impact:** Air pollution degrades environmental resources such as soil and water, negatively impacting agricultural and economic activities associated with them.
- **Social justice:** Low-income individuals and communities are disproportionately affected by air pollution, as they have fewer resources to adapt or protect themselves from these effects.
- **Economic cost of mitigation and adaptation:** The costs of mitigating air pollution include investments in clean energy technologies and environmental policies, which burden the national economy.
- **Investment in pollution reduction:** Allocating resources to control pollutant emissions, including investments in pollution reduction technologies and clean infrastructure.
- **Impact of pollution on tourism:** Poor air quality can negatively impact tourism, as tourists may avoid polluted areas.
- **Impact of clean technology on economic development:** Clean technology in the field of pollution reduction can be an opportunity to improve the economy by creating new jobs and promoting innovation.

Recommendations and Improvement Strategies

Despite the recommendations included in the national report, the following additional recommendations can enhance its effectiveness:

- **Environmental Advocacy:** Strengthening advocacy efforts in future air quality reports, with a strong focus on the environmental impacts of the occupation. Advocacy should aim to influence environmental policies, raise public awareness about environmental risks, and urge international bodies to support Palestinians' rights to a clean and sustainable environment.
- **Focus on Legislation and Monitoring of Fine Particulate Matter (PM2.5):** Recent studies indicate that PM2.5 particles (smaller than 2.5 micrometers) are the most harmful to health and the environment, as they can penetrate the respiratory system, reaching the lungs and bloodstream, increasing the risk of chronic diseases such as heart and lung diseases.
- **Monitoring and Advocacy Against Regional Pollution:** Palestine is negatively affected by pollution from neighboring countries, especially from the occupying state. Strengthening monitoring mechanisms, data collection, and regional advocacy campaigns is necessary to address transboundary pollution.
- **Enhancing Cooperation Between the Environment Quality Authority and the Palestinian Meteorological Department:** Installing pollution detection sensors at existing meteorological stations would help reduce costs and improve continuous environmental monitoring.
- **Developing Action Plans and Seeking Donor Support for Implementing Transport-Related NDC Goals:** Palestine has committed to having 20% of trucks and buses run on natural gas by 2020 and achieving a 25% shift from private vehicle use to public transportation. Financial and technical support is needed to achieve these targets.
- **Expanding and Improving Public Transportation Networks:** Enhancing and expanding public transport infrastructure will help reduce reliance on private vehicles, thereby decreasing air pollution emissions.
- **Increasing Green Spaces, Including in Urban Areas:** Expanding urban green spaces helps improve air quality, lower temperatures, and promote public health.
- **Developing and Maintaining Infrastructure to Reduce Air Pollution:** Investing in road improvements, waste management systems, and air filtration technologies for industrial and urban areas.

- **Adopting Green Technologies to Reduce Air Pollution:** Investing in environmentally friendly technologies, such as renewable energy systems and emission reduction technologies for factories and vehicles.
- **Regular Inspection of Vehicle, Truck, and Bus Emissions, as well as Industrial Pollution:** Implementing strict and routine inspection procedures to ensure compliance with environmental standards and reduce pollutant emissions.
- **Mobilizing Climate Finance:** Palestine should apply for funding from the Green Climate Fund (GCF) to develop environmental projects focusing on air quality monitoring and pollution reduction, particularly in the face of growing climate change challenges.

2.1.4 Climate Change

Climate change is one of the most pressing environmental challenges facing Palestine today. Although Palestine does not contribute significantly to global greenhouse gas emissions, it is classified as a climate hotspot, experiencing negative impacts at more than twice the global average rate. This phenomenon has severe consequences for biodiversity, health, the environment, and the socio-economic sector.

Under occupation, the challenges of climate adaptation are further exacerbated, making it more difficult to adopt effective strategies to mitigate its negative effects. Despite the efforts made in preparing this section as part of the National State of the Environment Report issued by the Environment Quality Authority, it fails to provide a comprehensive and sufficient analysis of the impacts of climate change on Palestine.

Summary of Subsections (as Presented in the National Report)

Chapter Five of the report addresses climate change and its diverse impacts on Palestine, divided into several main sections. The first section provides a comprehensive overview of global climate change impacts, with a particular focus on Palestine, highlighting the extreme vulnerability of its environment under ongoing political and economic constraints. The report explains how climate change affects Palestine's environment, especially given the challenges in adaptation due to restrictions imposed by political and economic conditions.

The report also examines the drivers contributing to greenhouse gas emissions, primarily stemming from global human activities. It further discusses the impact of political crises and the occupation, which complicate Palestine's ability to respond effectively to climate changes. It explores the effects of climate change, including rising temperatures, water scarcity, and increased frequency and intensity of extreme weather events, such as sandstorms and floods. Additionally, the report highlights long-term environmental, economic, and social consequences for Palestine.

The proposed adaptation strategies focus on measures Palestine can adopt to cope with climate change, including transitioning to renewable energy, strengthening water security, and improving infrastructure. It emphasizes the need to activate national adaptation plans to ensure sustainable development in the face of ongoing climate shifts. The report also discusses mitigation efforts, stressing the importance of reducing emissions, particularly in key sectors like agriculture and water. However, it acknowledges the financial and political constraints that limit Palestine's ability to implement climate mitigation actions.

Finally, the report highlights the importance of international cooperation in supporting Palestine's climate resilience efforts, including financial aid and technical assistance to build capacity and enhance climate

adaptation measures. It concludes with comprehensive recommendations to improve Palestine's ability to address climate change impacts, focusing on water, agriculture, and energy programs to promote environmental sustainability.

Strengths (as Presented in the National Report)

The report effectively outlines efforts to identify and categorize greenhouse gas emissions across different sectors, aiming to target these emissions with appropriate mitigation measures. It recommends the implementation of emission reduction policies in the energy, agriculture, and transport sectors, emphasizing national strategies focused on improving energy efficiency and adopting renewable energy sources.

Additionally, the report highlights environmental vulnerabilities that increase Palestine's susceptibility to climate change, such as water scarcity and the impacts of settlement activities. It stresses the importance of strengthening water infrastructure and addressing water shortages through sustainable projects and pollution control measures.

The report also examines the climate-related effects on public health and biodiversity, emphasizing the need for adaptation strategies that support ecosystems and protect biodiversity, especially given the increasing pressure on agricultural lands and natural resources. Furthermore, the report recommends strengthening institutional and community roles in climate adaptation through environmental education and community engagement.

Finally, the report underscores the importance of establishing financial and investment partnerships with international and local entities to support climate projects, enhancing the success and sustainability of crucial environmental initiatives in addressing future climate challenges.

Key Gaps in the National Report

This section outlines the major challenges and gaps that were not adequately addressed in the National State of the Environment Report under this chapter, as follows:

- ★ **Impact of the Israeli Occupation on the Environment:** The report does not sufficiently emphasize the negative environmental impacts of the Israeli occupation, including water and air pollution, desertification, and land confiscation. The destruction of agricultural and water infrastructure by the occupation exacerbates environmental vulnerability in Palestine.
- ★ **Overemphasis on Palestinian Emissions Instead of Global Trends:** The report spends significant space detailing global greenhouse gas emissions, rather than focusing on the direct climate change impacts on Palestine, including economic, social, and environmental consequences. A localized approach would better reflect Palestine's reality.
- ★ **Comparison Between Palestine's and Israel's Emissions:** The report fails to compare emissions between Palestine and Israel over different years, especially 2020, when emissions decreased globally due to the pandemic. A comparison would provide a clearer picture of the occupation's environmental impact.
- ★ **Comparisons with Arab Countries:** The report overextends its comparison of Palestine's emissions with other Arab countries, which may not accurately represent the unique environmental challenges Palestine faces. A stronger focus on local environmental stressors would be more relevant.
- ★ **Expanding the Social Impacts Beyond Health:** The report mainly discusses health impacts, overlooking other key social effects, such as food security, economic opportunities, and livelihoods of vulnerable communities affected by climate change.

- ★ **Diverse Environmental Impacts:** The report focuses mainly on marine ecosystems and biodiversity but overlooks the impacts on terrestrial ecosystems, water resources, and soil, which are directly affected by climate change and require greater attention.
- ★ **Tracking Progress on Government Commitments (2021 Update):** The report does not specify the level of achievement based on Palestine's 2021 government updates, which would provide a clearer assessment of progress in climate change mitigation and adaptation efforts.
- ★ **Lack of a Detailed Review of Nationally Determined Contributions (NDC) Implementation Plans:** The report does not clarify Palestine's progress in implementing NDCs, leaving a gap in assessing national environmental commitments.
- ★ **Lack of Recent Climate Indicators:** The report lacks up-to-date data on temperature changes, precipitation patterns, droughts, and floods, making it difficult to assess long-term climate trends.
- ★ **Weak Emphasis on the Role of Local Communities:** The report does not highlight the role of local communities and NGOs in climate adaptation, despite the presence of community-led initiatives improving environmental conditions.
- ★ **Economic and Agricultural Impacts:** The report ignores the economic consequences of climate change, particularly on the agricultural sector, where farmers struggle with weather fluctuations, droughts, and rising production costs.
- ★ **Lack of a Comprehensive Climate Adaptation Vision:** The report does not propose a holistic climate adaptation strategy, failing to address how the occupation restricts access to resources and hinders essential projects like water management and infrastructure development.

Recommendations and Improvement Strategies

Despite the recommendations included in the national report, the following additional recommendations can enhance its effectiveness:

- **Comprehensive Analysis of the Occupation's Impact:** The report should include a thorough analysis and accurate documentation of how the Israeli occupation affects the Palestinian environment, with data and statistics demonstrating resource depletion and pollution caused by settlement activities.
- **Focus on the Direct Impacts of Climate Change:** Greater emphasis should be placed on the direct and immediate effects of climate change on Palestine, including economic, social, and environmental consequences. A localized analysis will provide a realistic and comprehensive understanding of the environmental situation.
- **Comparative Analysis of Emissions:** A comparative study should be included to contrast Palestine's emissions with those of Israel and Arab countries, highlighting differences in environmental impact while maintaining a focus on Palestine's unique challenges.
- **Assessing Climate Change Impacts on Ecosystems:** A more in-depth examination of climate change's effects on terrestrial ecosystems, water resources, soil, and marine ecosystems is necessary to provide a comprehensive environmental outlook.
- **Evaluation of Government Achievements:** The report should include an assessment of progress based on 2021 government updates, reflecting the degree of commitment to climate-related obligations.
- **Analysis of Progress in National Plans Implementation:** The report should provide a comprehensive review of Palestine's progress in executing its Nationally Determined Contributions (NDCs) and offer clear steps for accelerating implementation.

- **Enhancing Climate Monitoring and Evaluation Systems:** Improving climate data collection and analysis by utilizing long-term data (at least 30 years) on temperature and precipitation trends. Graphs and visual trends should be used to illustrate climate changes over time.
- **Strengthening the Role of Local Communities:** The report should highlight the role of local communities in climate adaptation, emphasizing initiatives such as rainwater harvesting projects and sustainable agricultural practices, and explore ways to expand these efforts within a national strategy.
- **Building Local Capacities:** Developing comprehensive training programs to help communities mitigate and adapt to climate change, ensuring efficient resource use and enhanced climate resilience.
- **Economic Analysis of Climate Change Impacts:** The report should include an economic assessment of climate change effects, covering costs related to environmental degradation and adaptation efforts. A detailed analysis of climate change's impact on agriculture and the economy should be provided, including data on agricultural losses and production costs, along with recommendations to support farmers and enhance their adaptive capacity.
- **Enhancing Climate Policies and Institutional Frameworks:** The report should advocate for policy updates aligned with emerging climate challenges and propose clear directions for implementing sustainable environmental measures. The legal and institutional framework should also be updated to better address climate-related risks.
- **Strengthening International Support:** The report should emphasize cooperation with neighboring countries and international organizations to secure funding and technical assistance, particularly in agriculture and renewable energy sectors. Additionally, it should explore strategies for attracting international climate financing to enhance sustainability efforts.

2.1.5 Water Resources

Water resources in Palestine represent one of the most critical environmental, social, and political issues, given their vital role in sustaining daily life, economic development, agriculture, and industry. Water scarcity or mismanagement negatively impacts public health and the environment.

Under Israeli occupation, water resource management becomes increasingly complex due to Israeli control over water sources and the restrictions imposed on Palestinians, preventing them from managing their water resources in accordance with international agreements.

Additionally, climate change and growing water demand further exacerbate these challenges, making access to clean and safe water an urgent issue that is directly linked to social and political stability in the region.

Summary of Subsections (as Presented in the National Report)

The water resources chapter in the State of the Environment Report addresses key issues related to the water sector in Palestine, beginning with the increasing challenges caused by water scarcity, primarily due to Israeli control over water sources, which limits Palestinians' ability to achieve water security.

The chapter explores driving factors such as population and economic growth, climate change-induced rainfall shortages, and Israeli policies that restrict Palestinian access to water resources. It examines the status of traditional water sources (such as the Jordan River and groundwater) and non-traditional sources (treated wastewater, desalination, and purchased water). Additionally, it discusses water quality deterioration in certain areas due to pollution. The report highlights the growing gap between available water resources and projected population needs, while reviewing water sector laws and regulations and the role of Palestinian institutions in achieving Sustainable Development Goals (SDGs).

It also emphasizes the economic and health consequences of water scarcity and pollution, as well as the Palestinian government's efforts to implement policies and projects to improve water resource management despite ongoing challenges. The chapter concludes with recommendations to enhance water resource efficiency and calls for international intervention to support Palestinians in reclaiming sovereignty over their water sources.

Strengths (as Presented in the National Report)

The report provides a comprehensive and accurate depiction of the water situation in Palestine, despite data limitations and difficulties in obtaining precise information due to Israeli control over most water sources. The collection and analysis of available information, including data on traditional and non-traditional water sources, is a notable strength, reflecting efforts to present an evidence-based assessment of the current reality.

The report effectively highlights the impact of Israeli policies in preventing Palestinians from utilizing their water resources, clearly outlining the barriers imposed by the occupation on water infrastructure development. This presents a precise diagnosis of the structural challenges facing the water sector.

Additionally, the report successfully identifies institutional and regulatory gaps within Palestine's water sector, which helps in prioritizing future actions and formulating effective strategies to address these challenges. A comprehensive analysis of various water sources—including groundwater, surface water, and desalinated water—is presented, with quantitative and qualitative comparisons that aid in future planning.

The report's focus on water quality and pollution challenges is another notable strength, as it clearly highlights the need to enhance water treatment and monitoring systems. Furthermore, the report emphasizes the role of national institutions and reviews the existing legislative framework, contributing to a clearer understanding of Palestine's water governance system and reflecting government efforts to improve water management.

Key Gaps in the National Report

This section highlights the major challenges and gaps that were not adequately addressed in the National State of the Environment Report under this chapter, as follows:

- ★ **Lack of data indicators and analysis:** This section suffers from a lack of data and analysis related to water resources in Palestine, limiting its ability to provide sustainable solutions. There is a noticeable shortage of detailed data on groundwater quality, particularly in affected areas such as Gaza, which suffers from water contamination due to salinity and nitrates. The report also lacks comprehensive documentation of pollution sources in the West Bank and does not provide an in-depth analysis of the impact of agricultural and industrial activities on groundwater basins. Furthermore, there is a lack of data on shared regional water scarcity, especially regarding the challenges faced with neighboring countries like Jordan, Syria, and Lebanon. Additionally, the report does not provide an in-depth analysis of climate change impacts on water resources, such as the effects of temperature changes and rainfall patterns on agriculture and groundwater, and possible adaptation strategies. There is also a lack of integration among different analyses, such as linking water pollution to health impacts and its effects on vulnerable groups such as children and pregnant women, as well as the absence of a clear link between water consumption in agriculture and the deterioration of water quality. Finally, the report does not offer a comprehensive assessment of non-conventional water management projects, such as wastewater reuse, which reduces the effectiveness of water resource management strategies in the region.
- ★ **Geographical gaps and uneven coverage of the water situation in Palestine:** The report defines geographical boundaries based on the 1967 borders, excluding the impact of the occupation on water sources within the 1948 territories. It primarily focuses on certain areas such as Ramallah and Gaza, at the expense of rural and southern areas, which limits the comprehensiveness of the analysis and affects the development of inclusive water strategies. The report does not adequately address water-related challenges in areas such as the southern Jordan Valley, which suffers from severe drought due to Israeli policies, nor does it sufficiently cover water pollution issues in Gaza, which have escalated due to historical occupation-related factors that have led to high levels of salinity and nitrates. Additionally, the report overlooks the impact of Israeli policies on fragile ecosystems in the Jordan Valley, as well as surface water resources such as the Jordan River, which suffers from severe reductions in water flow. Furthermore, it does not highlight water issues in areas such as southern Hebron and northern West Bank (Jenin and Tubas), which experience significant groundwater depletion. These gaps in geographical coverage limit the report's ability to provide a comprehensive analysis and propose sustainable solutions that align with national challenges and the specific needs of each region.
- ★ **Gaps in stakeholder participation:** This section lacks a comprehensive representation of key stakeholders, leading to an incomplete analysis and less effective recommendations. The report does not include insights from local communities affected by water shortages and pollution, nor does it reflect the challenges of marginalized groups such as Bedouin communities in the Jordan Valley and Naqab, who struggle with severe restrictions on water access due to Israeli policies. The report also fails to represent the Palestinian industrial sector, as well as the efforts of local and international environmental organizations, which could contribute to developing sustainable solutions.

Additionally, the report does not address the impact of water scarcity on vulnerable groups such as women, children, and the elderly.

- ★ **Gaps related to policies and governance:** The report does not provide a comprehensive review of national, regional, and international policies that affect water management in Palestine, including water-sharing agreements with neighboring countries and the impact of Israeli occupation policies on Palestinian water rights. Furthermore, it lacks a deep analysis of the effectiveness of current policies, particularly in areas related to water pollution, resource depletion, and climate change adaptation. There is no evaluation of policy implementation, which prevents the report from identifying the barriers to applying these policies in practice, such as weak enforcement mechanisms and resource shortages. Additionally, the report does not adequately address the legislative and regulatory framework, such as the Palestinian Water Law, or the need for policy reforms to meet growing environmental challenges. It also fails to analyze the impact of Israeli policies on Palestinian water rights and does not suggest alternatives or improvements to these policies. This lack of policy assessment results in unbalanced and impractical recommendations, limiting the report's ability to propose effective solutions for Palestine's water crisis. A comprehensive evaluation of existing water policies and regulations should be included, with a focus on reviewing implementation and strengthening international cooperation for fair water resource distribution.
- ★ **Insufficiency of proposed recommendations:** This section exhibits clear gaps in providing actionable recommendations, particularly concerning climate change adaptation, sustainable water use, and pollution control. Many of the recommendations remain general and lack detailed implementation plans to make them practical. For instance, the report does not propose concrete interventions for securing funding for major water projects or address the political and administrative challenges that might hinder their implementation. Regarding climate change impacts, while the report acknowledges potential consequences for water resources, it does not present specific strategies to strengthen local communities' capacity to adapt to extreme climate events, such as droughts or shifts in rainfall patterns. Similarly, recommendations on sustainable water use—particularly in the agricultural sector, which is the largest water consumer—do not suggest practical solutions for enhancing efficiency, reducing water losses, or reviving traditional climate-resilient farming methods. Although the report highlights water pollution issues, particularly in Gaza, it does not propose effective strategies to combat wastewater pollution or industrial waste contamination. Furthermore, it lacks recommendations on integrating modern water treatment technologies and enhancing environmental monitoring systems. In terms of financing, the report does not outline mechanisms to secure funding for water projects, whether through government support, international aid, or private sector investments. Additionally, the report does not emphasize the need for Palestinian coordination with regional actors, such as Jordan, to ensure sustainable management of shared water resources and reclaim Palestinian water rights in accordance with international agreements.
- ★ **Future projections and planning gaps:** This section also lacks future-oriented projections and scenarios related to water availability and quality in Palestine, creating a significant gap in planning for long-term water sustainability. The report does not analyze how climate change might impact water resources, particularly in terms of rising temperatures, declining rainfall, and sudden flooding events. Additionally, it does not examine the impact of urban population growth on increasing water demand. The report does not present projections for future water pollution trends and does not propose innovative solutions to address these challenges. Moreover, the report does not discuss political obstacles, such as Israeli control over Palestinian water resources, nor does it propose regional cooperation strategies or funding solutions for future water projects. These gaps significantly reduce the report's effectiveness, limiting its ability to support sustainable water resource planning in Palestine.

Recommendations and Improvement Strategies

Despite the recommendations included in this section of the national report, several additional recommendations can be proposed to enhance its effectiveness:

- **Enhancing Climate Change Adaptation:** It is essential to develop detailed plans aimed at improving infrastructure to address drought and sudden flood challenges, with a focus on water harvesting technologies. Improving water use efficiency in the agriculture and industrial sectors is necessary to achieve a sustainable balance between development and resource conservation.
- **Managing Increasing Water Demand:** A comprehensive strategy should be established to manage the growing water demand resulting from rapid population growth, especially in the agricultural and industrial sectors. This includes developing sustainable infrastructure to provide clean water access for all, raising community awareness about water rights, and ensuring community involvement in decision-making and solution development.
- **Combating Water Pollution:** Strategies for pollution control should be enhanced by improving wastewater treatment systems and adopting modern water purification technologies. This includes utilizing renewable energy-based techniques to recycle wastewater for agricultural use, along with strengthening environmental monitoring to limit pollution sources.
- **Strengthening Regional and International Cooperation:** Advocacy campaigns should be launched to support Palestinian water rights and develop mechanisms for cooperation with neighboring countries, such as Jordan, to manage shared water resources. This requires enhancing international support to develop water infrastructure and improve Palestine's ability to utilize available resources.
- **Incorporating Future Projections and Scenarios:** The report should include future predictions regarding water availability and quality, considering factors such as climate change, population growth, and regional policies. Scientific models can be used to present multiple scenarios that highlight the impact of these factors and assist in future planning.
- **Engaging Stakeholders:** The perspectives of local communities, women, farmers, and environmental organizations should be incorporated into water policy development to ensure that recommendations align with the needs of the most affected groups. Additionally, the agricultural and industrial sectors should be involved to reduce pollution and promote sustainability.
- **Developing Sustainable Financing Strategies:** Improving water sector management requires innovative financing strategies, including public-private partnerships and collaboration with international donors to support desalination and wastewater treatment projects.
- **Enhancing Legislation and Policies:** Water management laws should be updated to improve regulatory oversight, prevent overexploitation, and reduce pollution. This includes enhancing coordination between governmental authorities and local agencies to ensure effective policy implementation.
- **Monitoring and Improving Water Data:** A continuous monitoring system should be developed to improve data collection on water resources, including updating information on water availability and quality and identifying major pollution sources.
- **Encouraging Scientific Research:** Innovation in the water sector should be promoted by supporting scientific research and initiatives that offer sustainable solutions to improve water resource management.

2.1.6 Land Resources

Land resource management in Palestine is one of the most complex issues discussed in the report due to its direct and interconnected relationship with other natural resources such as water, air quality, and biodiversity. Land is not merely a resource on its own but is linked to various aspects, including soil composition, the rocky crust, and natural elements. For instance, land use directly affects water flow and quality, while land resources both influence and are influenced by air quality, as factors such as urban expansion and agricultural practices contribute to pollution.

Similarly, biodiversity depends on land resources, and any damage to land can lead to habitat loss, ecosystem degradation, and a decline in plant and animal diversity, ultimately disrupting ecological balance.

Palestinians face major challenges in land resource management, particularly due to Israeli occupation policies, which restrict access and planning for more than 60% of the West Bank's land area, especially in Area C. These territorial divisions limit the ability to implement comprehensive land management and sustainable development strategies.

In Gaza, one of the most densely populated areas in the world, the buffer zone imposed by the occupation further restricts land use and accessibility, exacerbating pressure on already scarce land resources. The preservation of agricultural land and sustainable management of natural resources remains a key challenge.

Land resources in Palestine are limited due to rapid urban expansion, Israeli settlement activities, and unsustainable land use. In addition to these challenges, environmental factors such as climate change, soil degradation, and pollution further increase pressure on land resources.

With climate change worsening and the rise in extreme weather events and desertification, the preservation of agricultural land and the sustainable management of natural resources has become a major challenge. Thus, land in Palestine is not only under geopolitical pressures but also facing broader environmental challenges that significantly impact the region.

Summary of Subsections (as Presented in the National Report)

The land resources chapter of the State of the Environment Report begins by defining land as a fundamental natural resource that is directly linked to other resources such as water and biodiversity. It emphasizes the importance of this resource, both in terms of economic activities (such as agriculture and construction) and non-economic activities (such as ecosystem conservation), as it is a crucial foundation for human life. The report discusses the pressures facing this sector, with a particular focus on Palestinian land, which is of high value due to its limited availability, resulting from Palestine's small geographic area and high population density. These pressures are further compounded by demographic conditions and the natural limitations of these resources. The report does not overlook the role of the Israeli occupation, which has a significant impact on Palestinians' ability to utilize their land, including settlement activities, land confiscation, restrictions on Palestinian access to resources, and the inability to fully exercise sovereign rights over their land.

The report focuses on the challenges facing land resources in Palestine, highlighting several key driving forces affecting this resource. It starts by illustrating the pressure caused by population growth and urban expansion, pointing out that this growth leads to an increasing need for land for housing and construction, which creates significant pressure on Palestinian land. This urban expansion is tied to urbanization and changes in land use patterns, which directly affect agricultural land and open spaces. Additionally, the report covers industrial activities, particularly stone quarries and crushers, which are among the main activities causing severe damage to the land. The industrial sector not only contributes to land depletion but

also causes widespread environmental degradation through the destruction of soil, vegetation, natural habitats, biodiversity, and water sources.

In the agricultural sector, the report examines agricultural activities as another driving force that has a clear impact on the land. While agriculture is essential, it sometimes leads to land depletion and soil impoverishment if not managed sustainably. The report does not ignore the role of the Israeli occupation in this context, dedicating a section to discuss Israeli measures to control Palestinian land, including land confiscation, settlement activities, and strict restrictions on Palestinian use of their land, which exacerbates the land crisis and hinders sustainable development in Palestinian territories.

In conclusion, the report briefly addresses additional pressures on land resources, such as climate change, which increases forest fire incidents, alongside pollution that contributes to the deterioration of land quality. Together, these factors complicate the land resource crisis in Palestine, posing further challenges to sustainable land management.

The report proceeds to provide a detailed description of land cover and land distribution in Palestine, focusing on the status of forests and rangelands. It also discusses certain indicators related to land use, such as land classified for natural resource protection and historical sites, and land protected under the 2014 spatial planning plan. Additionally, the report allocates space to discuss degraded land and desertification, despite the limited data available in this area, which reflects the major challenges in managing such lands. As with all sections, the report highlights the Sustainable Development Goals related to land resources and emphasizes the importance of the institutional and legal framework to ensure effective and sustainable management of this important resource.

The report continues by describing the impacts caused by pressing forces on land resources, such as population growth and various human activities, and outlining the Palestinian response to these challenges. The report mentions land protection and rehabilitation projects as part of Palestinian efforts to conserve natural resources, focusing on the importance of promoting sustainable agriculture and reducing land degradation.

It also references Palestine's accession to international agreements aimed at land protection, such as the UN Convention to Combat Desertification, and the development of national strategies to combat desertification and reduce its negative impacts. In this context, the report highlights national urban policies and the development of spatial plans, as well as efforts to combat forest fires and encroachments, which have become a significant environmental threat. One of the new elements in addressing these challenges is the integration of climate change considerations into land planning processes, a strategic step aimed at improving the sustainability of urban and rural areas.

In conclusion, the report provides a series of recommendations aimed at improving the management and protection of land resources, focusing on the development of institutional and legal frameworks, enhancing regional and international cooperation to protect this vital resource, and ensuring its sustainability for future generations.

Strengths (as Presented in the National Report)

The land resources section of the report demonstrates several key strengths. It provides a comprehensive overview of land resources in Palestine, illustrating their strong interconnection with other natural resources, such as water and biodiversity, which enhances a deeper understanding of their critical importance.

The report also focuses on driving and pressing forces that impact land, highlighting the challenges arising from Palestine's limited geographical space and increasing population density. Additionally, it clearly addresses the impact of Israeli occupation policies on Palestinian land, outlining the restrictions imposed on Palestinians' ability to fully utilize their resources.

Another notable strength of this section is its emphasis on sustainability, presenting land protection strategies, including Palestine's accession to international agreements and the development of local policies to combat desertification and protect agricultural land.

Key Gaps in the National Report

This section highlights the major challenges and key gaps that were not adequately addressed in the National State of the Environment Report under this chapter, as follows:

- ★ **Driving Forces and Pressures:** While the report provides a comprehensive overview of the pressures affecting land resources, it overlooks the impact of climate change on this vital resource. Key climate-related effects, such as desertification, soil erosion, drought, and extreme weather events (floods and rising temperatures), are not thoroughly discussed. These climatic factors directly influence soil health and agricultural land suitability, leading to land degradation and worsening desertification.
- ★ **Urban Expansion and Urbanization:** The report discusses urban expansion and urbanization in Palestine, relying on clear evidence and statistics regarding urban planning efficiency. However, it fails to address a critical issue—land degradation within cities caused by unplanned and unsustainable urban expansion. This degradation includes soil contamination, erosion of open lands, and reduction of green spaces due to increased construction and infrastructure expansion. Such degradation has a significant impact on urban environmental quality, exacerbating challenges related to natural resource management, declining soil quality, increased flooding due to loss of agricultural land, and reduced biodiversity within urban areas.
- ★ **Human Settlements:** The report does not mention the demographic congestion or the unregulated residential clusters that have been imposed on Palestinians due to population growth and Israeli occupation practices, particularly in Gaza, the West Bank refugee camps, and East Jerusalem. Areas such as Kafr Aqab, Bir Ona, and other regions surrounding Jerusalem suffer from overcrowded living conditions and weak infrastructure, leading to negative impacts on land resources and the surrounding environment due to population density and the lack of proper urban planning.
- ★ **Industrial Activities and Stone Quarries:** The report primarily focuses on stone quarries and the stone industry as the main industrial activities affecting land resources. However, it overlooks other industries that have a major environmental impact, such as the chemical, plastic, and metal industries, which contribute to soil and water pollution and land degradation in industrial areas. For instance, industrial waste and chemical byproducts significantly reduce land quality, leading to environmental pollution that extends to agricultural areas, nature reserves, and biodiversity hotspots. Additionally, the report does not address the rehabilitation of abandoned quarries and degraded sites, which is an essential part of natural resource management strategies. Transforming abandoned quarries into green spaces or other environmentally beneficial land uses could help mitigate soil erosion, reduce airborne dust pollution, and promote long-term sustainable development.

- ★ **Agricultural Practices:** While the report touches on the excessive use of pesticides and fertilizers in Palestinian agriculture, it fails to reference key reports published in recent years on this issue. Among these reports are those issued by the Land Research Center in Hebron, highlighting the environmental and health risks associated with the overuse of chemicals in farming. These studies show that unregulated pesticide and fertilizer use leads to soil and groundwater contamination, adversely affecting farmers' health and nearby communities. Furthermore, reports from FAO (Food and Agriculture Organization), the World Bank, and USAID discuss sustainable agricultural practices in Palestine, which could have provided additional insights. The report also neglects the environmental impact of olive oil production waste, specifically wastewater from olive mills ("Zibar"), which contains organic pollutants and toxic compounds that severely impact soil and groundwater quality when disposed of improperly. The mismanagement of olive mill wastewater can degrade soil fertility, reduce crop quality, harm vegetation cover, and disrupt ecological balance.
- ★ **Israeli Occupation Policies and Practices:** The report does not mention the hazardous pesticides produced in Israel and illegally smuggled into Palestinian markets. These banned or highly restricted pesticides, often regulated internationally due to their severe health and environmental risks, are illegally brought into Palestine. Their uncontrolled use contributes to soil degradation, biodiversity loss, and contamination of agricultural products, posing direct threats to human and animal health. The smuggling of these chemicals presents a major challenge to sustainable land management, underscoring the need for strict monitoring and regulatory enforcement to prevent their entry into Palestinian markets.
- ★ **Pollution:** The report does not address the impact of unregulated vehicle scrapyards that are widespread across the West Bank. This is a critical issue that needs attention due to its harmful effects on land and soil. These scrapyards contribute to soil contamination through the leakage of used oils, grease, and chemical residues containing heavy metals such as lead, mercury, and cadmium. These toxic substances are often dumped directly onto the ground without proper treatment, severely degrading soil quality and agricultural productivity. Additionally, car batteries and electronic components contain hazardous chemicals that leach into the soil over time, not only damaging farmland but also threatening groundwater sources relied upon by many Palestinian communities.
- ★ **Forests and Rangelands:** The report estimates the total forested area in Palestine at approximately 320 km². However, after reviewing data from the Palestinian Ministry of Agriculture, the actual forested area is closer to 247 km². The discrepancy arises from the fact that 320 km² represents the designated area for afforestation, while the actual planted and available forest area is significantly smaller.
- ★ **Sustainable Development Goals (SDGs):** The report does not address SDG 13, which is closely linked to climate change and its impact on land resources. This goal emphasizes urgent action to combat climate change and its effects, including desertification, drought, soil erosion, and extreme weather events affecting Palestinian land. It also includes measurable indicators that help monitor climate change's impact on land, such as tracking the percentage of degraded land and evaluating national adaptation strategies.
- ★ **Impact on Biodiversity:** When discussing the impacts of land degradation, the report does not sufficiently highlight biodiversity loss and ecosystem disruption. Land degradation affects not only soil health but also leads to ecosystem collapse, species extinction, forest and rangeland deterioration, and the spread of invasive species, pests, and rodents in Palestinian urban and rural areas. These factors significantly impact environmental sustainability and public health. The negative effects of unsustainable agricultural practices, industrial activities, and urban expansion all contribute to biodiversity loss, a crucial aspect that remains underrepresented in the report.

Recommendations and Improvement Strategies

Despite the recommendations included in this section of the National State of the Environment Report, several additional recommendations can be proposed to enhance the report's effectiveness, as follows:

- Developing a national strategy and action plan to combat desertification in alignment with the international agreements signed by Palestine.
- Formulating comprehensive national strategies and plans for the agriculture sector, agricultural land management, crop rotation, and land reclamation for agricultural purposes.
- Establishing a binding national strategy that involves all relevant stakeholders in the rehabilitation and monitoring of quarries and stone crushers, ensuring that owners and operators bear the financial costs associated with land rehabilitation.
- Enhancing the use of modern technologies, such as smart agriculture, to improve the sector's resilience against water and land scarcity and enhance its adaptation to climate change.
- Encouraging universities and research centers to localize advanced technologies in ways that align with Palestine's environmental conditions to support land resource conservation.
- Expanding projects focused on water harvesting and land reclamation to increase land sustainability.
- Developing a specialized grazing law, including regulated grazing schedules and rotational grazing systems, tailored to national needs.
- Implementing large-scale afforestation programs using native Palestinian tree species suitable for different environmental conditions to reduce soil erosion.
- Strengthening advocacy efforts, particularly in Area C of the West Bank, to protect land rights and prevent further land confiscation.
- Promoting urban afforestation by planting native Palestinian trees in cities and residential areas to enhance green infrastructure.
- Activating municipal courts and providing better support for environmental police to curb environmental violations related to land resources.
- Updating and strengthening environmental and agricultural laws, with a focus on improving their enforcement mechanisms.
- Enforcing a complete ban on the import and smuggling of illegal pesticides that enter Palestine through Israeli sources, given their harmful effects on soil, biodiversity, and public health.
- Strictly regulating factory licensing, requiring scientific, internationally recognized environmental impact assessments conducted by specialized institutions before granting permits. Additionally, adopting modern technologies to minimize industrial impacts on land resources.

2.1.7 Marine and Coastal Environment

The Palestinian environment is characterized by exceptional biological and geographical diversity, where several distinct ecosystems converge within a relatively small area. This includes the Mediterranean Sea coastline, with its moderate salinity and rich biodiversity, as well as the Dead Sea, the lowest and saltiest body of water on Earth, which possesses unique chemical properties that distinguish it as a completely distinct ecosystem. This natural diversity presents immense opportunities for biodiversity conservation and scientific research. However, Israeli-imposed restrictions severely limit Palestinian access to these resources and hinder sustainable management efforts.

In this context, the report is divided into two main sections: one addressing the Mediterranean Sea, its environmental diversity, and its economic and ecological value, while the other focuses on the Dead Sea, highlighting its unique characteristics and valuable resources.

Both marine environments face significant environmental challenges, including marine pollution, overexploitation of resources, developmental and urban pressures, and restricted access and management due to Israeli policies. These factors contribute to ecosystem degradation and threaten their long-term sustainability.

Summary of Subsections (as Presented in the National Report)

The report begins with a general introduction to the Mediterranean Sea and the Dead Sea, highlighting the major environmental challenges facing both ecosystems. It provides an in-depth analysis of the Mediterranean Sea, focusing particularly on the dire state of the Palestinian coastline in Gaza, which has been severely impacted by the ongoing blockade, high population density, and repeated attacks on farmers and fishermen. In the driving forces and pressures section, the report describes these challenges and examines the impact of human activities and coastal development, including increasing pollution, wastewater discharge, and solid waste accumulation.

It also discusses the negative impact of desalination plants, fishing harbors, fish farming, livestock and plant agriculture, and small-scale industries in Gaza. Furthermore, the report highlights marine waste, maritime accidents, and the impact of passing ships on the coastal environment, and finally addresses the challenges of gas exploration in the Gaza Marine gas field, presenting these issues in a structured manner that reflects the cumulative environmental pressures on Gaza's coastal and marine ecosystem.

The report highlights the impacts of climate change and rising sea levels on Palestinian marine and coastal ecosystems, emphasizing the environmental risks posed by these changes. It pays particular attention to Israeli-imposed policies and restrictions, which limit the use and development of marine resources, representing a major challenge in this sector.

In the section dedicated to the Mediterranean Sea and the Palestinian coastline, the report presents data and maps illustrating coastal erosion and degradation caused by climatic, environmental, and human factors, detailing the effects on shoreline stability. It also examines key marine water characteristics, such as temperature, conductivity, and important chemical indicators, and provides an analysis of marine biodiversity, despite limited available data. Additionally, it includes fish production statistics based on a 2021 study by the Palestinian Central Bureau of Statistics.

Regarding marine water uses, the report identifies four main applications: desalination, cooling power plants, fish farming, and supplying swimming pools in coastal resorts and villas. It also highlights environmentally sensitive sites, such as marine reserves and coastal wetlands. The report further discusses the legal framework and institutional roles in marine and coastal protection and concludes with sustainable development indicators related to marine conservation, following the format of other sections in the report.

The report underscores the severe environmental damage resulting from the degradation of marine and coastal ecosystems, particularly when compared to significant habitat and wildlife loss within Gaza. It examines the social and economic dimensions of this environmental decline, outlining its impact on local populations and communities, emphasizing the urgent need for intervention to safeguard livelihoods and enhance environmental security. A dedicated section details national effort to address coastal and marine challenges, such as local conservation initiatives and preventive measures to reduce pollution and coastal erosion, with a focus on protecting ecosystems and improving marine quality.

The second part of the report shifts to the Dead Sea environment, analyzing driving forces and pressures affecting it, including climate change, reduced water inflows, and environmental challenges posed by mineral extraction activities conducted by the Dead Sea Works Company. In assessing the current state of the Dead Sea, the report highlights the significant decline in its water level, surface area, and volume, alongside rising salinity levels.

The report does not overlook major environmental challenges, such as the emergence of destructive sinkholes, which cause infrastructure damage and loss of wetland areas, leading to changes in the Dead Sea's properties, increased groundwater flow, and escalating drought and salt storm occurrences. In the response section, the report emphasizes Palestinians' right to sovereignty over their share of the Dead Sea's water resources. Finally, the report concludes with a comprehensive set of recommendations addressing both the Mediterranean and Dead Sea ecosystems.

Strengths (as Presented in the National Report)

This section of the report demonstrates several key strengths, particularly in its comprehensive presentation of Palestine's marine and coastal environment. It provides a detailed overview of both the Mediterranean Sea and the Dead Sea, clearly outlining their geographical and climatic characteristics, which enhances the reader's understanding of the unique challenges facing each ecosystem.

The report offers an in-depth analysis of environmental challenges, such as water pollution, resource depletion, and rising salinity levels, explaining the main causes of environmental degradation in these areas and their impact on surrounding ecosystems. It also highlights the effects of climate change, particularly on the Dead Sea, emphasizing issues such as water level decline and increasing salt storms, demonstrating the report's awareness of both global and local climate challenges.

Furthermore, the report underscores Palestinians' rights to sovereignty over their resources in the Dead Sea, reflecting national and political awareness regarding the importance of preserving natural resources as part of sovereignty efforts. The section concludes with recommendations to improve environmental conditions and safeguard marine and coastal ecosystems.

Key Gaps in the National Report

This section highlights the major challenges and gaps that were not adequately addressed in the National State of the Environment Report under this chapter, as follows:

- ★ **Introduction:** The introduction is excessively long and delves too deeply into geographical descriptions, with an overly detailed discussion of the region's geography. It would be more effective to streamline this section and instead focus more deeply on the local environmental conditions, given that the report is specifically dedicated to assessing the state of the environment in Palestine.

Section One: The Mediterranean Sea

- ★ **Driving Forces and Pressures:** While the report highlights several key driving forces and pressures on Gaza's marine environment, it overlooks the deteriorating infrastructure as a major contributor to these pressures. Severe shortages in resources and essential equipment for infrastructure development have led to the accumulation of solid waste, industrial waste discharge, and untreated rainwater runoff directly into the sea. Additionally, chronic electricity shortages affect the operation of wastewater treatment plants, forcing some facilities to discharge untreated wastewater into the sea. The lack of proper infrastructure in Gaza is a major factor exacerbating pollution in the Mediterranean Sea, necessitating a comprehensive approach to address this issue and protect this vital environmental resource.
- ★ **Industry:** The report focuses on the boat maintenance and repair industry and its negative impact on the marine environment, mentioning pollution issues but failing to detail the highly toxic chemicals used in the industry. These include large quantities of oils, greases, paints, insulation materials, paint removers, and industrial cleaning agents, many of which contain volatile organic compounds (VOCs) and other hazardous substances. The leakage of these chemicals into marine waters leads to severe contamination, affecting water quality and marine biodiversity. These substances bioaccumulate in the food chain, posing long-term health risks to marine life.
- ★ **Maritime Accidents:** The report references historical maritime incidents, some dating back over 100 years, including events from 1973, but presents them in a narrative style without addressing their environmental consequences. It fails to discuss chemical pollution, destruction of marine ecosystems, or coastal habitat degradation caused by such accidents. It would be more effective to omit this section unless it contributes directly to understanding current environmental challenges in the Mediterranean Sea.
- ★ **Climate Change:** The report discusses the effects of climate change and rising sea levels on Palestine's marine and coastal ecosystems, highlighting the risks posed by these changes. However, it neglects a crucial aspect—the impact of climate change on saltwater intrusion and rainfall variability, which pose significant threats to coastal agriculture. While the report covers several aspects of climate change, this key issue remains underexplored.

Saltwater intrusion is a severe problem caused by rising sea levels, where seawater infiltrates freshwater aquifers, altering their chemical composition and making them unsuitable for agriculture and human consumption. This phenomenon reduces agricultural productivity in coastal areas dependent on groundwater for irrigation, ultimately threatening food security in Gaza.

Additionally, climate change contributes to irregular rainfall patterns, with extended droughts followed by intense rainfall, making adaptation difficult for farmers. Prolonged droughts increase demand for already scarce water resources, while heavy rains elevate flood risks, accelerate soil erosion, and damage agricultural infrastructure, ultimately reducing crop yields.

- ★ **Israeli Policies and Their Impact on the Marine and Coastal Environment:** The report extensively describes Israeli restrictions on Palestinian fishermen, detailing the imposed fishing zone limitations. However, it does not analyze the environmental impact of these policies. Fishing restrictions force fishermen into overcrowded areas, leading to overfishing in confined zones, which harms marine biodiversity. This section would benefit from a more concise description of Israeli-imposed restrictions, with greater focus on their environmental consequences.
- ★ **Marine Biological Balance:** This section should be relocated to the biodiversity chapter, as it is part of Palestine's broader biodiversity framework. The report also lacks specificity when mentioning marine life and seabirds, referring to general taxonomic families such as gulls (Laridae), terns (Sternidae), and plovers (Charadriidae) instead of identifying individual species. To improve clarity, species names should be provided in both Arabic and Latin, making it easier for readers to follow. Moreover, the report does not mention invasive species, despite studies indicating that around 400 invasive species have been recorded in the Eastern Mediterranean.
- ★ **Bird Migration Routes:** The report fails to acknowledge that Gaza is situated along a major migration route for many marine and waterbird species. This region serves as a critical stopover site for migratory birds, including the Common Quail (*Coturnix coturnix*) and various raptors, as they cross the Mediterranean Sea.

Hunting activities in Gaza also impact these migratory species, with songbirds, raptors, and especially quails being extensively hunted. Overhunting not only threatens bird populations and risks species decline but also disrupts the ecological balance in the area. This section should discuss the potential consequences of unregulated hunting on migratory bird populations and its broader environmental impact.
- ★ **Socioeconomic Impacts:** The report primarily focuses on health risks to Palestinians but does not adequately address the economic costs of Mediterranean coastal degradation. Environmental deterioration directly affects livelihoods in fishing and coastal tourism, and it impacts marine resource quality, which is essential for many Palestinian families. A more comprehensive analysis

of how environmental degradation affects employment and local economies would strengthen this section.

- ★ **Response Strategies:** The report fails to mention the major challenges faced by the Environment Quality Authority (EQA) in implementing marine and coastal conservation efforts due to political divisions. The political split between Palestinian authorities significantly hampers environmental initiatives, including programs aimed at marine resource management and protection. This political fragmentation weakens institutional capacity, limiting the ability to effectively address marine pollution, coastal degradation, and necessary infrastructure improvements.

Section Two: The Dead Sea

- ★ **Climate Change:** This section of the report presents general climate projections for Palestine, but fails to consider the unique climatic characteristics of the Dead Sea region. As the lowest point on Earth with highly saline waters, the Dead Sea relies heavily on low rainfall levels and surface runoff from surrounding valleys. Climate projections indicate that rainfall is expected to decrease by up to 50% by the year 2100, significantly reducing the natural replenishment of Dead Sea water. Additionally, average temperatures are expected to rise by 5-6°C, leading to accelerated evaporation and further decline in water levels.
- ★ **References:** This section of the report almost exclusively relies on a single source—the 2012 feasibility study for the Red Sea-Dead Sea Water Conveyance Project—as the basis for its information and analysis. This limited reliance restricts the comprehensiveness of the assessment regarding the current state of the Dead Sea and its surrounding environment. Since the feasibility study primarily focuses on the economic and technical aspects of the water conveyance project, environmental and biodiversity-related issues are inadequately covered, affecting the accuracy of the report’s environmental review of Dead Sea degradation.
- ★ **Unique Ecosystem of the Dead Sea:** Given the lack of studies and Palestinian restrictions on access to the Dead Sea, the report provides a broad overview of its deteriorating state but fails to highlight the region’s unique environmental features and biodiversity. The Dead Sea and its surroundings host numerous rare and endemic species, such as the Dead Sea Sparrow (*Passer moabiticus*), the Sinai Rosefinch (*Carpodacus synoicus*), and the Fan-tailed Raven (*Corvus rhipidurus*). The region is also home to Dorcas Gazelles (*Gazella dorcas*), Nubian Ibex (*Capra nubiana*), Desert Caracals (*Caracal caracal*), the Arabian Wolf (*Canis lupus arabs*), Tristram’s Starling (*Onychognathus tristramii*), and the Arabian Babbler (*Turdoides squamiceps*). The report should have dedicated a section to highlighting this unique biodiversity, either within this chapter or in the biodiversity section, as neglecting this aspect omits a crucial feature of Palestine’s ecological uniqueness.
- ★ **Natural Reserves:** The report fails to mention the key nature reserves surrounding the Dead Sea, which harbor rare and diverse ecosystems. Among these, Ein Feshkha Nature Reserve stands out as a critical habitat for endangered species and unique vegetation. These reserves provide essential habitats for numerous plant and animal species and play a vital role in preserving biodiversity in

the region. Given their ecological importance, the report should have included references to these protected areas when discussing the environmental status of the Dead Sea.

Recommendations and Improvement Strategies

Despite the recommendations included in this section of the National State of the Environment Report, several additional recommendations can be proposed to enhance the report's effectiveness, as follows:

- **Emphasizing Palestinian Sovereignty:** The report should highlight that marine environmental management faces significant challenges due to the lack of full Palestinian sovereignty over marine resources, which limits Palestine's ability to protect and sustain these vital ecosystems.
- **Strengthening Internal Coordination:** The report should address the issue of internal political division and recommend the need for effective coordination between various Palestinian entities to improve marine environmental management and overcome internal obstacles.
- **Launching International Advocacy Campaigns:** The report should include recommendations to initiate international advocacy efforts aimed at supporting Palestinians' rights to protect their marine environment. These campaigns should be based on international treaties and agreements that guarantee the right of peoples to sustain and manage their natural environments.
- **Role of Civil and International Organizations:** The report could have included a recommendation urging civil society and international organizations to play a neutral and active role in implementing environmental strategies, ensuring additional support for Palestinians' rights to their marine environment.
- **International Pressure and Cooperation:** The report should emphasize the importance of securing international and local support to establish protection and sustainability mechanisms for Palestine's marine environment, especially given the complex political and environmental challenges in the region.

2.1.8 Biodiversity

Palestine is one of the world's unique biodiversity hotspots, owing to its geographic location at the intersection of three continents—Europe, Asia, and Africa. This positioning brings together several distinct ecological zones, making it exceptionally rich in biological and environmental diversity. Palestine lies at the convergence of three major biogeographical regions: the Mediterranean region, semi-arid zones, and

deserts. This diversity allows it to host a wide range of plant and animal species, as well as varied and rich habitats. The significance of Palestine's biodiversity extends beyond national borders, playing a crucial role in both regional and global ecosystems.

Palestine is home to numerous endemic and near-endemic plant and animal species, alongside many locally and globally threatened species. Examples include the Palestinian mountain gazelle (*Gazella gazella*) and the striped hyena (*Hyaena hyaena*) among mammals, as well as rare endemic plant species such as *Iris haynei* (Fuqoua Iris), *Iris atrofusca* (Nablus Iris), and *Iris vartanii* (Shafa Al-Ghor Iris). Among birds, the Egyptian vulture (*Neophron percnopterus*) is a notable endangered species found in the region. Furthermore, Palestine lies on the world's second most important migratory bird route, making it a critical stopover site for soaring birds that occupy the top of the natural food chain.

While biodiversity loss is a global phenomenon, driven by factors such as climate change, pollution, and habitat destruction, Palestine faces unique and intensified challenges due to the Israeli occupation. These challenges include land confiscation, settlement expansion, and severe restrictions on enforcing Palestinian environmental laws in Area C, preventing the development and implementation of national conservation strategies. Consequently, this has led to the destruction of habitats, loss of natural ecosystems, and an overall decline in biodiversity.

Additionally, Palestine is classified as a climate change hotspot, experiencing rising temperatures, erratic rainfall, and extreme weather events. These environmental shifts severely impact local ecosystems, pushing many native plant and animal species toward extinction or drastic population decline.

Aside from external threats, human-induced pressures from within Palestinian communities also contribute to biodiversity degradation. Harmful practices include overhunting, illegal logging, overharvesting of wild plants, encroachment on nature reserves and biodiversity-rich areas, and the misuse of natural water resources such as springs and valleys.

Summary of Subsections (As Presented in the National Report)

The biodiversity section of the report begins with an analysis of the driving forces and pressures affecting biodiversity in Palestine. It highlights key factors such as habitat fragmentation, desertification, urban expansion, and population growth. The report also addresses human activities contributing to biodiversity loss, including quarrying, overexploitation of natural resources, and pollution. Additionally, it examines Israeli policies that exacerbate environmental degradation.

The report provides a simplified overview of how natural habitat destruction—primarily due to population growth and urban expansion—has increased pressure on resources such as water, food, energy, and land, significantly impacting biodiversity. It also discusses the negative effects of unsustainable economic growth, particularly focusing on the stone and quarry industry's role in habitat reduction and fragmentation.

Moreover, the report highlights agricultural expansion and its adverse effects on wildlife in recent years. It dedicates a section to discussing the impact of air pollution from quarries, pesticides, and wastewater, emphasizing that pollution is one of the greatest threats to Palestinian biodiversity.

In addressing harmful human practices, the report examines overharvesting, unregulated grazing, illegal hunting, and the increasing demand for plant-based biodiversity products. Additionally, it discusses the

impact of invasive alien species on native biodiversity. The section concludes by emphasizing that Israeli occupation practices remain a major challenge, significantly intensifying biodiversity pressures in Palestine.

The report then shifts to describing the current status of Palestinian biodiversity, including species diversity and population estimates. It identifies the main challenges facing these species, particularly those threatened with extinction due to environmental changes and human-induced pressures, in addition to policies and practices that further aggravate these issues.

A comprehensive overview of Palestine's climatic regions is provided, showcasing how ecological diversity influences habitat distribution and biodiversity hotspots. This is supported by detailed discussions of key biodiversity areas for plants, birds, and wetland ecosystems.

The report emphasizes the role of agricultural biodiversity in ensuring food security, highlighting the critical services provided by ecosystems. It discusses forests and rangelands, underlining their ecological significance and role in maintaining environmental balance. It further examines protected areas and national conservation plans for safeguarding natural resources and heritage sites, along with the IUCN Red List classifications of threatened species. Additionally, the report identifies Palestine's most significant natural heritage sites, presenting maps and data tables to provide a comprehensive understanding of biodiversity distribution.

As in other sections, the report integrates Sustainable Development Goals (SDGs) related to biodiversity, the Aichi Biodiversity Targets, and the Kunming-Montreal Global Biodiversity Framework. It outlines Palestine's progress toward achieving these objectives and discusses national policies aimed at biodiversity conservation, particularly the 1999 Environmental Law and the 2003 Agriculture Law and their amendments.

The legal and institutional framework governing biodiversity is analyzed, with a focus on the roles and responsibilities assigned to the Environment Quality Authority and the Ministry of Agriculture. The report also highlights the legal and institutional challenges that need strengthening to ensure effective biodiversity conservation.

The report underscores the consequences of biodiversity loss, including public health risks, food security concerns, economic challenges, and disruptions in ecological balance. It reviews national responses to these challenges, such as: adopting a national flower and bird for Palestine, establishing a national herbarium and plant nurseries, implementing in situ and ex situ conservation programs, creating a seed bank, and joining international biodiversity agreements. Other national efforts highlighted in the report include: developing biodiversity protection legislation, enhancing management plans for nature reserves, expanding afforestation programs under the "Green Palestine" initiative, promoting wetland and protected area conservation programs, funding small environmental projects through the Global Environment Facility (GEF) to support civil society biodiversity initiatives, developing a National Biodiversity Strategy, implementing a National Strategy for Managing Invasive Alien Species, and encouraging eco-tourism and increasing public environmental awareness.

This section concludes with a series of recommendations aimed at addressing biodiversity challenges, which, according to the report, seek to promote the sustainable use of natural resources—including biodiversity—to support food security and ecosystem conservation.

Strengths (As Presented in the National Report)

This section of the report underscores the critical importance of biodiversity, nature, and the environment in Palestine, highlighting their role in safeguarding public health, supporting the national economy, ensuring food security, and strengthening national resilience. It emphasizes the intrinsic value of Palestinian biodiversity as an essential component of the country's environmental identity.

The report also presents national responses to biodiversity challenges, covering more than 15 key topics, including environmental legislation, biodiversity conservation projects, international agreements and treaties, and other essential conservation efforts. While some of these initiatives may appear modest, the report justifies these limitations by citing Israeli occupation policies and financial constraints. Nonetheless, these initiatives reflect Palestine's national and international commitment to biodiversity conservation, environmental sustainability, and adherence to global agreements. They also demonstrate the ongoing efforts to protect Palestinian natural resources and ensure their long-term sustainability as part of a broader strategy for securing national presence and environmental sovereignty.

Additionally, the report highlights the negative impacts of biodiversity degradation on food security and public health, emphasizing the socio-economic significance of biodiversity conservation. By detailing national initiatives, legislation, policies, and strategies aimed at protecting biodiversity, the report demonstrates the seriousness of Palestinian efforts in this field. It also showcases ongoing efforts to develop an effective regulatory framework for safeguarding natural resources and biodiversity, despite the challenges imposed by the occupation and financial constraints.

Key Gaps in the National Report

This section highlights the major challenges and gaps that were not adequately addressed in the National State of the Environment Report under this chapter, as follows:

- ★ **Driving Forces and Pressures:** This section comprehensively addresses the pressures on biodiversity, but its presentation is largely narrative, relying on a general compilation of information rather than an investigative or analytical approach. As a result, it only provides a broad overview of the current state of biodiversity in Palestine. The report does not highlight any driving forces or pressures at the national level with precise quantitative and qualitative data, nor does it provide scientifically documented examples supported by numbers, data, or verified statistics. Such an approach would have better demonstrated the tangible impact of these pressures on biodiversity and the environment in Palestine. For example, the report does not specify the percentage of biodiversity areas and nature reserves that have been encroached upon, nor does it quantify the resulting damage in terms of habitat destruction, biodiversity degradation, or the particular biodiversity elements that have been affected. The absence of analytical data leaves the report lacking a comprehensive understanding of the environmental reality and the extent of deterioration caused by these pressures, reducing it to a general and narrative format.
- ★ **Economic Growth (Industry):** This section primarily focuses on quarries while overlooking other industries that also have significant negative impacts on biodiversity, such as the leather industry, cement manufacturing, agricultural facilities, olive oil mills and their waste, dairy and cheese production facilities, solar energy projects that encroach on biodiversity areas, and various Israeli industrial establishments. Numerous studies are available on these topics, which the report could have referenced. Additionally, the report does not assess the impact of quarries and stone extraction on wildlife such as mammals, birds, reptiles, and insects; instead, it focuses solely on olive trees and vegetation cover.
- ★ **Unsustainable Practices:** The report discusses overgrazing and its causes while emphasizing pastoral plants, but it does not address endemic, semi-endemic, or locally and globally endangered plants. It also fails to provide examples of such species and assess the impact of overgrazing on

them or identify the regions where overgrazing has the most severe effects on different types of vegetation. Furthermore, the report does not specify which plants are harvested—whether for food, medicinal use, or commercial purposes—especially rare and endangered plants that require special attention. Regarding poaching, the report focuses on migratory birds while omitting the most crucial resident and breeding species that are frequently hunted, whose nests are destroyed, or whose chicks are stolen for trade. These species are among the most vital for Palestine’s ecological balance.

- ★ **Invasive Alien Species:** Despite being a significant pressure on biodiversity, this section excludes information from the National Strategy for Invasive Alien Species, which was developed by the Environment Quality Authority in 2021. As the main national reference on this issue, the strategy contains precise data that should have been included in the report. Instead, the report mentions invasive species only briefly in other sections, resulting in the reliance on inaccurate figures regarding the number and types of invasive species in Palestine. The report also includes figures that pertain to all of historic Palestine rather than the current Palestinian territories, leading to weak conclusions. Additionally, the report presents incorrect data on invasive plant species, failing to provide their scientific classifications (Latin names) and instead listing the least harmful and least widespread species, which diminishes the credibility and accuracy of the information.
- ★ **State of Biodiversity:** This section, which covers the known species and biodiversity records up to the report’s publication, is one of the most critical parts of this unit. However, much of the information presented is inaccurate and relies on outdated references that do not reflect the current state of plant and animal biodiversity. The report mainly relies on Environment Quality Authority data without consulting other available scientific sources from Palestinian researchers, environmental institutions, or academic bodies. Furthermore, the report lists species using only their Arabic names without including scientific classifications, making it difficult for readers to identify the species in question. This issue recurs throughout the biodiversity section. Additionally, some of the information about species is highly inaccurate. For instance, the report describes the ostrich as a common bird in Palestine, despite the fact that the last recorded sighting of wild ostriches in Palestine dates back to the 1930s-1940s, after which it was officially declared extinct in Palestine and the Levant. Moreover, the report incorrectly lists certain invasive bird species that should be controlled—such as parrots—as common Palestinian birds. This section also contains redundant information that could have been condensed. Additionally, some figures and illustrations, such as Figure 1 on page 348, are misleading and unclear.
- ★ **Climatic Zones:** This section is unnecessary in the national environmental report, as the information it presents does not add value to the report’s primary objectives. The section is overly detailed, with much of the content being repetitive in different forms. It could have been summarized in half a page or a single paragraph. Furthermore, it includes unrelated information, such as which regions are known for cultivating grapes and olives, or a table listing agricultural characteristics by climatic zone, which does not pertain to natural biodiversity or the ecological status of these zones (see Table 4). The accompanying maps are also inaccurate and outdated. For instance, in Figure 2, the central mountain range is marked with a specific color, but the same color is also used for the city of Jericho. Does this mean that Jericho is part of the central mountain range in Palestine? Additionally, this section relies on unscientific and unreliable references, including general internet sources, even though numerous scientific sources could have provided more accurate and reliable information.
- ★ **Biodiversity Areas:** This is a crucial section in the report; however, it relies on information from the Fifth National Report, which contains outdated data up to 2014. Meanwhile, the Sixth National Report and the National Biodiversity Strategy and Action Plan (NBSAP), issued by the Environment Quality Authority in 2021-2022, include updated information that the report fails to incorporate. Consequently, the data in this section is outdated and does not accurately reflect the environmental reality of 2023. For instance, the report states that there are 50 biodiversity areas in Palestine based on a reference from 2015 (EQA, 2015), whereas the current number is actually 14.

The updated information shows that these 14 areas encompass biodiversity zones, key bird areas, and nature reserves in Palestine. This section requires a fundamental review and updates to ensure it reflects the current state of biodiversity areas. Additionally, the accompanying maps are inaccurate, outdated, and fail to represent the actual situation.

- ★ **Agrobiodiversity:** This section is unnecessary and of little relevance to biodiversity in the national environmental report. Instead of addressing natural biodiversity, it discusses domesticated species, crop diversity, and agricultural varieties such as wheat, barley, lentils, and olive trees, as well as Palestine's contributions to these crops and their origins. It also includes statistical data on olive oil production over the past decade, which has no direct connection to biodiversity.
- ★ **Ecosystem Services:** This section is crucial due to its direct link to biodiversity. However, the coverage in the report does not adequately highlight the importance of these services or their relationship to biodiversity. Instead, the section should have been titled "Ecosystem Services" rather than "Habitat Services", as the former is the globally and locally recognized term.
- ★ **Forests:** Forest ecosystems play a significant role both locally and globally. They serve as habitats for numerous species, contribute to climate stability, regulate ecosystems, protect biodiversity, and play a fundamental role in the carbon cycle. They also reduce soil erosion, preserving natural habitats, and provide food and shelter for various organisms. However, the report's coverage of forests is neither accurate nor sufficiently detailed. It states that there is a lack of published information on forests, even though the Ministry of Agriculture holds the primary responsibility and has up-to-date data on this topic. The report also relies on outdated sources, such as a 2006 study by ARIJ. Additionally, it includes irrelevant information, such as the amount of firewood produced from forests and woodlands in each governorate, rather than focusing on the role of forests in biodiversity conservation and environmental sustainability.
- ★ **Red List:** The Red List of Threatened Species is a critical tool for biodiversity conservation planning, as it provides important indicators of biodiversity status. However, the report relies on International Union for Conservation of Nature (IUCN) data, which does not necessarily reflect the local situation in Palestine. It also fails to acknowledge the absence of a Palestinian-specific Red List for species within the national territory. The report does not incorporate data from local environmental institutions and researchers, which could provide a more accurate picture of threatened species in Palestine. Moreover, the comparisons between Palestine and neighboring countries are based on IUCN data, which does not accurately reflect local conditions.
- ★ **Natural Heritage Sites:** The report introduces four sites listed or proposed for UNESCO's World Heritage List but does not highlight their importance for biodiversity conservation or how they contribute to protecting nature in Palestine. Consequently, this section lacks value in its current form.

Recommendations and Improvement Strategies

Despite the recommendations included in this section of the National State of the Environment Report, several additional recommendations can be proposed to enhance the report's effectiveness, as follows:

- **Analysis of Pressures and Driving Forces:** Accurate and comprehensive data on the impact of pressures on biodiversity in Palestine should be provided, including the percentage of affected areas and documented examples of habitat destruction and biodiversity degradation. Additionally, the analysis of pressures should be expanded to include the impact of overgrazing, specifically on endemic and semi-endemic plant species, with identification of the most affected areas and classification of endangered plant and animal species.
- **Industries and Economic Activities:** The environmental analysis should be expanded to cover additional industrial sectors, such as cement production, intensive agriculture, and olive oil mill waste, while assessing their direct and indirect impacts on biodiversity and ecosystems. Moreover, the activities of quarries and industrial establishments should be regulated and monitored to minimize their negative effects on protected areas and biodiversity.
- **Data and Information Development:** Improving biodiversity management in Palestine requires periodic updates of maps and data related to vegetation cover and biodiversity areas based on updated national strategies. Additionally, accurate and up-to-date lists of invasive alien species should be included, with their scientific classification and documented impacts on biodiversity. Comprehensive environmental surveys should also be conducted to document wildlife and update national biodiversity records.
- **Species and Habitat Management and Protection:** Effective programs should be established to monitor and curb illegal trade in wildlife, as well as excessive harvesting of wild plants, to protect them and ensure their population stability. Identifying endangered species in Palestine and issuing a national Red List for such species is crucial. Comprehensive management plans should also be developed for the network of nature reserves and forests, including planting native trees and plants adapted to local climatic conditions. Additionally, wetlands and water sources such as springs should be protected through sustainable management strategies.
- **Legislation and Procedures:** Strengthening biodiversity protection in Palestine requires updating environmental laws and regulations, including legislation on nature conservation and natural resources. Furthermore, environmental impact assessment procedures should be enhanced by incorporating scientifically based field surveys to study biodiversity and the impact of projects on ecosystems.
- **Climate Change and Solid Waste Management:** Concerning climate change, it is necessary to adopt and implement action plans related to the national climate change strategy and its impacts on biodiversity. Additionally, implementing the national solid waste management strategy will help reduce environmental damage and ecosystem degradation.
- **Ecotourism:** Ecotourism should be regulated and developed in a way that aligns with Palestine's natural environment, ensuring minimal negative impact on biodiversity and natural habitats. Establishing a central unit for the treatment and rehabilitation of wild animals is also an essential step in improving environmental response efforts.
- **Education and Scientific Research:** To achieve sustainable progress in biodiversity conservation, scientific research should be strengthened by encouraging academic and field studies on biodiversity and nature conservation. Moreover, new university programs focusing on biodiversity and sustainability should be developed, along with capacity-building initiatives for national and community-based institutions involved in environmental management.
- **Ecosystem Services:** The terminology used in the report should be revised to reflect accurate concepts, such as replacing the term "Habitat Services" with "Ecosystem Services" to encompass

all aspects related to biodiversity. The role of forests should also be better documented as natural habitats that play a significant role in preserving biodiversity, stabilizing the climate, and protecting soil.

- **Pesticides:** Regarding pesticides, clear plans should be developed and implemented to reduce their use, with extensive research conducted on smuggled and internationally banned pesticides. Sustainable and safe alternatives should also be developed to protect the ecosystem.

These recommendations should be part of a clear implementation plan that includes measurable objectives, specific timeframes, and designated responsible entities to ensure tangible and sustainable improvements in biodiversity management and protection in Palestine.

2.1.9 Solid Waste

Proper solid waste management is essential for preserving all environmental components, including air, water, biodiversity, natural habitats, land, and coastal environments. This field primarily relies on implementing circular economy principles and sustainable production and consumption practices to ensure environmental protection for current and future generations. This chapter addresses solid waste management issues in Palestine by reviewing the current situation, achievements, challenges, institutional and legal frameworks, and the progress made in achieving sustainable development goals related to waste management.

Summary of Subsections (As Presented in the National Report)

The report provides comprehensive coverage of solid waste management, addressing its various stages, including administrative, institutional, legal, technical, and financial aspects, while linking waste management systems to sustainable development. It begins by discussing “driving forces and pressures” such as population growth, economic expansion, and environmental challenges. The report highlights obstacles imposed by the Israeli occupation, including restrictions on licensing environmental facilities in Area C and prohibiting the entry of essential materials needed for environmental infrastructure in the Gaza Strip. Additionally, it addresses the dumping of waste from Israeli settlements and waste generated by the occupation within landfill sites in the West Bank.

The report then examines the current state of solid waste management, focusing on municipal waste, detailing aspects such as waste generation volume and composition, collection and transportation methods, and the status of recycling and waste valorization in Palestine. It also discusses waste disposal in both regulated and unregulated landfills. A dedicated section explores the environmental management of waste disposal sites, cost coverage, and disparities in fee collection across governorates.

Furthermore, the report reviews the sustainable development goals (SDGs) related to solid waste management, identifies key institutions involved in the sector, and discusses the legislative framework governing waste management. It also addresses non-hazardous waste types, such as sludge from wastewater treatment, construction and demolition debris, agricultural waste, and industrial residues (kumkha).

Regarding environmental impacts, the report outlines the effects of solid waste on air, water, and land resource consumption, emphasizing that open waste burning, particularly from agricultural activities, deteriorates air quality and increases greenhouse gas emissions and harmful pollutants.

In terms of responses, the report presents waste management strategies and plans, institutional development efforts, joint service councils, and partnerships with the private sector for waste-to-energy projects. It also highlights major solid waste management projects in Palestine, alongside investments in waste collection and disposal infrastructure.

Finally, the report concludes with recommendations aimed at improving solid waste management in Palestine.

Strengths (As Presented in the National Report)

This section of the report was prepared under the supervision of experts with extensive experience and in-depth knowledge, lending coherence and strength to the chapter. The report objectively and accurately reflects the actual state of solid and hazardous waste in Palestine. The list of sources used demonstrates that the report relied on a diverse range of primary references, and the team conducted interviews with representatives of relevant institutions, enhancing the accuracy and credibility of the content.

The report covers all stages of the solid waste management system, from collection to final disposal, using updated data from 2022, sourced from the 2023 Local Governance Report. While some uncertainties remain regarding the quality of recycling data—as a significant portion of recycling activities are unregistered or lack official licensing—the report provides a comprehensive overview of the sector.

Additionally, the report devotes significant attention to pressures affecting the sector, particularly those linked to Israeli occupation policies. It illustrates the real-world impact of these policies, adding an analytical dimension that highlights ongoing challenges. Overall, the report offers a thorough assessment of the current state of solid waste management in Palestine.

Key Gaps in the National Report

This section highlights the major challenges and gaps that were not adequately addressed in the National State of the Environment Report under this chapter, as follows:

- ★ **Inclusion of Data from Previous Reports:** The report did not include essential data from previous reports issued by the United Nations Environment Programme (UNEP), which are crucial for enriching the environmental chapter comprehensively and accurately. It is also important to highlight that some points mentioned in those reports do not align with the Palestinian position, such as considering solid waste landfills as serving all residents of the area, repeated calls for establishing joint committees and councils, and holding the Palestinian people entirely responsible for environmental pollution, including the management of solid waste and external interventions that accompanied the publication of these reports.
- ★ **Inaccuracy of Some Data Related to the Waste Sector:** It was observed that some data were somewhat outdated, such as the number of establishments and workers involved in waste recycling, treatment, and trade activities in Palestine in 2017. The report did not allocate sufficient space to discuss the challenges facing the solid and hazardous waste sector, nor did it provide an adequate analysis of the financial situation, including costs, calculation mechanisms, tariffs, cost recovery, and mechanisms for compensating operational losses. Regarding measuring the achievement of sustainable development goals related to solid waste management in Palestine, the report did not provide any future directions on how to achieve these goals, nor did it indicate Palestine's position compared to regional or global standards.

- ★ **Institutions Related to Solid Waste:** The section on institutions involved in solid waste management was very brief and did not include a survey of these institutions and their respective roles. The report focused on presenting data from the Ministry of Local Government, reflecting the work of Joint Service Councils, even though many communities do not fall under these councils and provide this service independently.
- ★ **Legislative Framework:** The report did not address the extent of compliance with the legal and legislative frameworks governing the sector, nor did it highlight any legal gaps or conflicts in responsibilities between relevant institutions, or even call for a legal review of these legislative frameworks.
- ★ **Failure to Cover Other Types of Waste:** The report identified four types of waste: sludge, agricultural waste, demolition and construction waste, and industrial waste residues. However, it was expected that a more comprehensive review of various waste types, their locations, quantities, and their environmental, health, and social impacts would be included. Other reports have documented dozens of specific waste types, such as olive press residues, electronic waste, and solar energy system waste, which were not covered.
- ★ **Failure to Address Sector-Related Impacts:** It was essential to detail each impact systematically and comprehensively, highlighting its health, environmental, economic, and social implications, as well as the measures taken to mitigate negative effects and prevent their escalation.
- ★ **Evaluation and Analysis of Institutional Performance:** The report did not provide any analysis of the current institutional landscape in terms of success, failure, or the need for assessment or modification. Many questions regarding the roles and effectiveness of related institutions remain unanswered. For example, has the Joint Service Councils' model succeeded as an alternative to local authorities? Is there a need for a new department within the Ministry of Local Government to handle solid waste? Is the steering committee fulfilling its role, and what are the available opportunities to improve performance?
- ★ **Absence of Service Quality Evaluation Standards:** This chapter did not discuss whether standards exist for assessing the level of solid waste services and setting annual service targets. The absence of such standards makes it difficult to evaluate the quality of services and determine the extent of citizen satisfaction with them.
- ★ **Lack of Discussion on International Institutions' Interventions and Programs:** There are numerous programs and activities implemented by international institutions, particularly regarding medical waste management, which did not receive adequate attention in the report.

Recommendations and Improvement Strategies

The report included several recommendations covering topics such as monitoring sites forcibly established by the occupation, developing monitoring systems for Israeli waste and its impacts, as well as recommendations related to improving the environmental conditions of solid waste facilities, mechanisms for enhancing recycling systems, developing environmental information systems related to solid waste, improving tariff structures, enhancing the role of the private sector, exploring more sustainable disposal methods, circular economy approaches, and sustainable development. However, the recommendations overlooked several critical aspects of solid waste management. They did not sufficiently address how to prepare for international agreements related to waste, failed to highlight the significant role that civil society organizations can play through engagement, and lacked any recommendations concerning awareness or training.

Despite the recommendations included in the national report under this chapter, the following additional recommendations are proposed to enhance its effectiveness:

- It is important to update existing laws and regulations related to solid waste management to reflect technological advancements and modern environmental concepts, such as the circular economy and sustainable resource management. This review should address legal gaps that may hinder adaptation to new methods and technologies in waste management, thereby enhancing the ability to process waste in environmentally friendly and efficient ways.
- To effectively implement waste management strategies, the efficiency of relevant institutions should be enhanced, and the skills of sector workers should be improved. This can be achieved through regular training programs that include best global practices and the development of plans to enhance operational and administrative efficiency within these institutions, ensuring better and more sustainable solid waste management.
- A comprehensive assessment of the performance of joint service councils should be conducted to determine their suitability as an alternative to traditional municipal services in solid waste management. This assessment can focus on the effectiveness and quality of the provided services, their cost, and the potential financial and environmental savings achieved through service consolidation under a single entity.
- Ensuring service effectiveness, it is crucial to measure citizen satisfaction with the solid waste management services provided. Regular survey studies can be conducted to gather public opinions on service quality, identify any challenges or gaps encountered by beneficiaries, and develop solutions that meet expectations and improve service levels.
- Consideration should be given to establishing a new specialized department for solid waste management within the Ministry of Local Government. This may contribute to better organizing efforts, coordinating programs and services in this field, and improving the efficiency of planning and implementing waste-related policies.
- A feasibility study should be conducted on establishing a regulatory body for solid waste services to ensure compliance with required standards and service unification. This would enhance transparency and accountability, guarantee service quality, and address challenges related to the implementation of solid waste management systems.
- Establishing clear standards for waste services and recycling contributes to achieving balanced and standardized performance. These standards should cover all stages of waste management and define the expected service levels, thereby enhancing service quality and sustainability.

- Developing guidelines for implementing recycling and reuse programs will facilitate their organized and effective implementation. This includes defining waste sorting mechanisms, identifying best reuse practices, and encouraging citizens to participate in these environmental efforts.
- Enhancing the capabilities of the private sector, joint service councils, and local government entities to implement the four processes (reduction, reuse, recycling, and recovery) will improve service levels and raise environmental awareness. This development includes forming partnerships between the public and private sectors to encourage the adoption of modern technologies and increase efficiency in solid waste collection and processing.
- Coordination between municipalities, the private sector, and non-governmental organizations should be encouraged to improve solid waste management. This can be achieved by supporting partnerships that enhance service efficiency, providing necessary resources, and implementing local initiatives that raise awareness about environmental conservation.
- Studies should be conducted to improve waste collection mechanisms, such as timing and movement, to enhance efficiency. This will help reduce fuel consumption and operating costs, optimize collection routes, and ensure effective and sustainable service delivery across all areas.
- Defining a unified policy for vehicles and containers will contribute to organizing operations, reducing maintenance costs, and enhancing service efficiency. Standardizing these systems will also improve recycling and waste disposal processes in compliance with environmental standards.
- Illegal dumpsites pose a source of environmental pollution; therefore, a plan should be developed to gradually close them and launch campaigns to educate citizens about the dangers of these sites. The plan should include improving alternative waste management services to provide safe solutions and monitoring violations.
- An incentive system and programs should be introduced to enhance the performance of service providers, researchers, and developers. These incentives may include financial support or technical training, aiming to encourage better service delivery and improve waste management.

2.1.10 Waste and Hazardous Materials

Hazardous waste in Palestine represents an escalating environmental challenge, encompassing various types such as industrial waste, medical waste, and rapidly increasing electronic waste, all of which lack adequate infrastructure for proper management. The restrictions and measures imposed by the occupation

hinder the development of specialized facilities for treating these wastes, further complicating their safe and sustainable management. Additionally, colonial activities exacerbate the problem by establishing waste disposal facilities within Palestinian territories and smuggling hazardous materials, thereby increasing environmental and health risks .

Summary of Subsections (As Presented in the National Report)

The report highlights hazardous waste in Palestine, beginning with an analysis of the driving forces and pressures, which include population and economic growth, particularly technological and industrial advancements, and the impact of climate change on hazardous waste production. This includes waste from solar panels and batteries used in the renewable energy sector, as well as hazardous waste generated by the healthcare sector and chemical compounds used in agriculture. The report also emphasizes that the policies and actions of the occupying state pose the greatest challenge to the efficient management of this sector.

The section on the current situation examines the volume and types of hazardous waste and the efforts made to manage them, including recycling and export for treatment. The report provides a detailed overview of industrial, electronic, medical, and hazardous agricultural waste, as well as the composition of various chemical substances. Additionally, it reviews the legal and institutional framework for managing hazardous materials and waste, along with the international treaties signed by Palestine and their relation to relevant Sustainable Development Goals (SDGs).

Furthermore, the report highlights the severe impacts of certain chemicals on humans, animals, and ecosystems. It reviews efforts to develop legislative frameworks, Palestine's accession to international agreements, key achievements in medical waste management, policies for handling electronic waste from government institutions, efforts to combat smuggling and illicit trade, and measures to prevent waste incineration. The report concludes with a series of detailed recommendations for developing this sector across various areas.

Strengths (As Presented in the National Report)

This section of the report is comprehensive and detailed, covering the various types of hazardous waste present in Palestine and outlining the activities contributing to their generation and accumulation, such as industrial development and the shift toward solar energy. This adds a strategic dimension to understanding the future of hazardous waste management. The section also demonstrates a deep awareness of the challenges imposed by the occupation and its policies on hazardous waste treatment, making it comprehensive in addressing non-environmental influencing factors.

Furthermore, the report effectively highlights the significant difficulties in documenting data related to this sector, reinforcing its credibility and emphasizing the need to improve information infrastructure. Additionally, it identifies the legal and institutional gaps hindering hazardous waste management, underscoring the importance of developing a regulatory framework that aligns with Palestine's environmental challenges.

Key Gaps in the National Report

This section highlights the major challenges and gaps that were not adequately addressed in the National State of the Environment Report under this chapter, as follows:

- ★ **Outdated Data:** The report relied on data from 2016 regarding hazardous waste quantities, despite the emergence of new types of waste since then. Additionally, data on electronic waste is only available up to 2019. This gap in updated information does not reflect the current reality of hazardous waste management.
- ★ **Limited Coverage of Treatment Sites:** While the report mentions two hazardous waste treatment facilities, it does not specify the percentage of waste being treated relative to the total amount generated. This also applies to material recovery and waste reduction sites, weakening the understanding of the current efficiency of hazardous waste treatment.
- ★ **Lack of Information on Safe Disposal of Solar Energy Waste:** With the increasing adoption of solar energy systems, the report does not provide guidance on safe disposal methods for waste generated by these systems, such as solar panels and batteries. Given the growing scale of this waste, this omission represents a critical oversight.
- ★ **Comprehensive Legal Framework Without Addressing Overlapping Jurisdictions:** Although the legal framework covers all aspects of hazardous waste management, the report does not address the issue of jurisdictional overlaps and scattered legislative responsibilities among various institutions. This legal fragmentation complicates the implementation of integrated waste management and creates obstacles in enforcing regulations and legal commitments.
- ★ **Lack of Clarity in Some Recommendations:** Some recommendations are vaguely formulated, such as "developing national plans for different types of hazardous waste" without specifying the scope of these plans or the targeted stakeholders. Similarly, the recommendation to "enhance technical capacities" lacks clarity regarding the entities it applies to (whether private sector, government, or municipalities).
- ★ **Absence of Recommendations to Address Institutional Fragmentation:** While the report acknowledges the fragmented institutional structure and unclear responsibilities among different entities, it does not provide specific recommendations to resolve this issue. There is a need for legal and regulatory frameworks that define responsibilities clearly and support the implementation of integrated hazardous waste management.
- ★ **Failure to Highlight the Impact of Institutional Fragmentation:** The report does not discuss how institutional fragmentation affects the enforcement of hazardous waste management regulations, making it a weak point in assessing the practical implications of this issue.
- ★ **Lack of Reference to the Role of Civil Society Organizations in Waste Management:** Despite the significant role played by civil society organizations in managing solid waste, the report neglects to mention their contributions to hazardous waste management. Additionally, the report does not reference the 2017 Gender Strategy in the Environmental Sector issued by the Palestinian National Authority, which focuses on water and solid waste. Similarly, although the 2023 World Bank Report on Solid Waste Management was used as a data source, it was not cited in the references. This report highlights the roles of civil society organizations and how to strengthen and support their contributions.

Recommendations and Improvement Strategies

Despite the recommendations included in this section of the National State of the Environment Report, several additional recommendations can be proposed to enhance the report's effectiveness, as follows:

- **Introducing a System for Periodic Data Monitoring and Updates:** Establishing a periodic monitoring and updating system for hazardous waste data ensures the availability of accurate and up-to-date information reflecting ongoing changes in waste types and quantities. This requires building a comprehensive digital database that includes details on hazardous waste sources, treatment methods, stored quantities, and locations. Such a system will help monitor the development and usage of new materials and waste, ensuring safe handling while identifying the environmental risks associated with each type. This system will be valuable for decision-makers in planning effective strategies to mitigate risks and improve hazardous waste management.
- **Developing More Detailed Recommendations:** To enhance technical capacities and clarify institutional roles in hazardous waste management, it is essential to define the responsibilities and references between various entities, including the public sector, private sector, and municipalities. This includes recommending specialized training programs and accredited certifications to delineate responsibilities and expertise. Strengthening this institutional coordination ensures an effective response to hazardous waste challenges. Additionally, recommendations should focus on supporting technical capacities in critical areas where hazardous waste monitoring and management are most needed.
- **Including an Analysis of the Impact of Institutional Fragmentation on the Implementation of Regulations:** The current institutional fragmentation in hazardous waste management weakens the enforcement and compliance with regulations. Conducting an analysis of these challenges will highlight how overlapping responsibilities among different entities hinder environmental management efforts. This analysis will also emphasize the need for a unified regulatory structure to manage hazardous waste and establish more effective law enforcement mechanisms, ensuring smooth collaboration among different institutions in this sector.
- **Reassessing the Institutional and Legislative Framework and Proposing a Specialized Regulatory Authority:** Effective hazardous waste management in Palestine requires a specialized regulatory body to oversee law enforcement and regulatory compliance, minimizing task overlaps and responsibility conflicts. Reassessing the institutional and legislative framework involves evaluating the alignment of current roles with existing laws, identifying legal gaps, and improving transparency and accountability. The presence of such a regulatory authority will facilitate the implementation and compliance monitoring of regulations while focusing on reducing environmental risks and enhancing public safety.
- **Establishing an Incentive System and Programs to Improve Hazardous Waste Services:** Encouraging and incentivizing service providers, researchers, and developers in hazardous waste management is crucial for improving overall performance. Incentive programs could include financial grants, funding opportunities for developmental projects, or specialized training programs to foster innovation in this field. Linking incentives to achieving specific quality and efficiency standards will push service providers to enhance their performance and contribute to the development of safer and more sustainable hazardous waste management solutions.
- **Enhancing the Role of Civil Society Organizations in Decision-Making for Waste Management Systems:** Civil society organizations should be actively involved in shaping waste management policies, including setting waste collection fees, promoting awareness of waste reduction and recycling, and providing training programs. Additionally, universities and research centers should be empowered to lead technological advancements in both solid and hazardous

waste management, contribute to monitoring and evaluation, and support the development of robust environmental databases.

2.1.11 Energy

Global transformations in the energy sector are driving changes in electricity production and consumption in response to major challenges such as fossil fuel depletion, worsening climate change, and rapid technological advancements that encourage the adoption of smart grids, electric vehicles, and a transition from fossil fuels to renewable energy sources.

In Palestine, where all forms of energy are critically needed to achieve economic and social development, the energy sector faces severe restrictions that hinder its development in both the West Bank and Gaza Strip. These limitations force Palestinians to rely heavily on Israeli energy sources.

Electricity demand in Palestine has been increasing at an annual rate of 3-5%, leading to recurring supply shortages during peak periods. Amid these challenges, renewable energy, particularly solar power, remains a viable option, as Palestine benefits from high solar radiation levels, evident in the widespread use of solar water heaters. However, the cost of generating electricity from other sources remains high.

With rising fuel prices and the Palestinian aspiration for energy independence, long-term strategic planning becomes crucial to developing the electricity transmission and distribution network in the West Bank and Gaza Strip. This development would ensure network performance during peak demand periods, reduce technical losses, and meet the growing energy demand efficiently.

Summary of Subsections (As Presented in the National Report)

The report highlights the key pressures affecting energy consumption in Palestine, starting with the impact of population growth, which increases electricity consumption by an estimated 4% annually in the West Bank, underscoring the need to explore future energy alternatives. It also discusses the dependency of the Palestinian economy on the occupying state, as energy demand continues to rise due to the encouragement of domestic investments in key sectors.

The report further examines the effects of climate change, particularly rising temperatures, which have led to increased energy consumption for air conditioning and cooling, in addition to meeting the energy needs of essential facilities such as water supply, agriculture, and wastewater management. Moreover, the report outlines the significant restrictions imposed by the occupation's policies, which hinder the development of the Palestinian energy sector.

The report details current energy sources, including electricity purchased from the Israeli Electric Corporation, neighboring countries, and local renewable energy production. It also notes the increase in imported electricity from Jordan to 80 megawatts while emphasizing the gap between energy demand and available supply.

Additionally, the report reviews the legal frameworks and institutions operating in the energy sector, as well as the challenges facing this sector and its links to the Sustainable Development Goals (SDGs). In terms of environmental impacts, the report highlights emissions generated by the sector and their health, social, environmental, and economic consequences. Regarding response measures, the report discusses

existing laws and strategies, encourages investment, and promotes projects aimed at improving energy conditions. The report concludes with a set of recommendations.

Strengths (As Presented in the National Report)

The report provides a comprehensive approach to the energy sector, clearly identifying existing gaps and thoroughly covering the associated challenges. Additionally, it relies on up-to-date data from 2023, ensuring the accuracy and relevance of the information presented.

Moreover, the report highlights the Palestinian government's awareness of the importance of transitioning toward renewable energy, referencing a national plan aimed at expanding sustainable energy sources.

The report also acknowledges the availability of local expertise that facilitates the adoption and effective implementation of renewable energy technologies, thereby enhancing the sector's capabilities. Furthermore, it highlights the growing interest of the private sector in investing in renewable energy technologies, a crucial step toward increasing reliance on sustainable energy solutions.

Key Gaps in the National Report

This section highlights the major challenges and gaps that were not adequately addressed in the National State of the Environment Report under this chapter, as follows:

- ★ **Detailed Analysis of Strategies for Energy Independence:** While the report discusses dependence on Israeli energy sources, it would be beneficial to provide strategic recommendations or a clear roadmap for gradually achieving energy independence. This could include proposed projects or partnerships that would progressively reduce reliance on external energy supplies.
- ★ **Comprehensive Plan for Expanding Renewable Energy Projects:** Although the report mentions the potential of renewable energy, particularly solar power, it would be useful to outline a concrete plan or timeline for scaling up renewable energy projects across different regions in Palestine, including future large-scale initiatives.
- ★ **Assessment of Financial and Regulatory Barriers:** The report could benefit from a more in-depth focus on financial and regulatory challenges facing renewable energy projects. For instance, it could analyze policy constraints, financing difficulties, and investment barriers that may hinder development, while also proposing solutions.
- ★ **Development of Digital Infrastructure and Smart Grid:** While the report mentions the transition toward a smart grid, it lacks a clear strategy for technological upgrades and infrastructure improvements. It could provide more details on implementation phases, required technologies, and projected timelines.
- ★ **Long-Term Demand and Supply Projections for Strategic Planning:** The report references energy demand projections for 2030, 2040, and 2050, but it could further clarify how current plans align with future needs. A detailed roadmap linking immediate actions with long-term goals would strengthen strategic planning.
- ★ **Analysis of the Socioeconomic Impact of Energy Dependence:** There is a gap in discussing the broader socioeconomic effects of reliance on Israeli energy sources, including its impact on economic stability, energy prices, and community well-being. Highlighting these issues could further emphasize the urgency of an independent energy strategy.
- ★ **Community and Private Sector Engagement:** The report could be enhanced by including strategies to encourage greater involvement of local communities and the private sector, particularly in adopting renewable energy technologies and energy-efficient practices.

- ★ **Integration of Climate Change Adaptation in Energy Sector Planning:** Given the increasing energy demand due to climate change and rising temperatures, the report should include strategies for adapting to these phenomena. It could focus on managing energy demand during extreme weather conditions and enhancing energy resilience in the most vulnerable areas.

Recommendations and Improvement Strategies

Despite the recommendations included in this section of the National State of the Environment Report, several additional recommendations can be proposed to enhance the report's effectiveness, as follows:

- **Reducing Dependency in the Energy Sector:** Develop strategic plans aimed at reducing reliance on imported energy from Israel while taking steps to enhance the sustainability of local energy production and build greater independence in this critical sector. This would help address the political and economic challenges associated with energy dependence.
- **Enhancing and Expanding the Renewable Energy Sector in Palestine:** Strengthen regulatory frameworks and policies supporting renewable energy projects to create a more favorable environment for investment in this sector. Additionally, provide incentives for investors to enter the Palestinian energy market, positioning Palestine as a regional hub for renewable energy development.
- **Building a Unified and Sustainable Electricity System:** Develop a detailed plan for establishing a unified national electricity grid that covers power generation, transmission, and distribution across all Palestinian cities. This plan should include a timeline for expanding transmission networks between the West Bank and Gaza while increasing reliance on local energy sources, both conventional and renewable.
- **Planning for Future Energy Needs:** Design a comprehensive framework for meeting energy demands by 2030, 2040, and 2050, accompanied by strategic projects to fulfill medium- and long-term energy needs. This approach would provide greater flexibility and stability in energy supply and pricing, benefiting all Palestinians.
- **Developing the Digital Infrastructure of the Electricity Sector:** Accelerate digital transformation by integrating the electricity grid with advanced information technology systems to deliver more efficient and transparent services. This requires expanding the use of modern applications and digital platforms that enable direct interaction with citizens, allowing for faster service responses while promoting social accountability. The ultimate goal is to gradually transition the current grid into a smart grid that supports Palestine's economic and social development.
- **Strengthening Electrical Interconnection with Neighboring Countries:** Foster regional cooperation by expanding electrical interconnections with neighboring countries to enhance energy security in Palestine. The recent increase in imported electricity from Jordan to 80 MW represents a significant step toward meeting energy needs while reducing dependence on limited sources, thereby improving the stability of the Palestinian power grid.

Annexes and Appendices

- ★ **Annex (1):** List of Interviews and Workshops with Stakeholders
- ★ **Annex (2):** Summary of the Expertise of the Advisory Team

- ✧ **Annex (3):** List of References and Sources Recommended for Future Reports
- ✧ **Annex (4):** Maps

Annexes and Appendices

Annex (1): List of Interviews and Workshops with Stakeholders

Expert Name	Institution	Institution Representative	Meeting Date
Mr. Mohammad Al-Hamidi	Applied Research Institute - ARIJ	Dr. Jad Isaac	28/8/2024
	Environment Quality Authority	Ahmad Abu Thaher	7/9/2024
	Ministry of Local Government	Yusriya Ramadan	10/9/2024
	Hydrologists Group	Dr. Abdul Rahman Al-Tamimi & Dr. Ayman Al-Rabi	16/9/2024
Dr. Yara Dahdal	Palestinian Meteorological Department	Eng. Issam Issa	28/8/2024
Dr. Anton Khalilieh	Environment Quality Authority	Imad Al-Baba & Ahmad Abu Thaher	17/9/2024
Dr. Anton Khalilieh & Dr. Yara Dahdal	Palestinian Central Bureau of Statistics	Issam Tumayeh	28/8/2024
	Applied Research Institute - ARIJ	Dr. Jad Isaac	12/9/2024
	Land Research Center	Mohammad Hassasna & Mohammad Al-Salimiya	16/9/2024
	Ministry of Agriculture	Eng. Thaer Al-Rabi, Eng. Ahmad Safi, Bilal Nazzal & Yana Saadah	17/9/2024
Dr. Iyad Yaqub	Ministry of Agriculture	Eng. Ibtisam Abu Al-Hayja	12/9/2024
	Hydrologists Group	Dr. Abdul Rahman Al-Tamimi & Dr. Ayman Al-Rabi	16/9/2024
	Land Research Center	Dr. Mohammad Al-Salamiya	16/9/2024

	Applied Research Institute - ARIJ	Jean Hilal	24/9/2024
Eng. Emile Abdo	Hydrologists Group	Dr. Abdul Rahman Al- Tamimi & Dr. Ayman Al- Rabi	16/9/2024
	Water Sector Regulatory Council	Dr. Mohammad Al-Hamidi	18/9/2024
	Water Authority	Eng. Majeda Alawneh	22/9/2024
	Birzeit University	Dr. Maher Abu Madi	23/9/2024
	An-Najah National University	Dr. Anan Al-Jayousi	25/9/2024

Annex (2): Summary of the Expertise of the Advisory and Expert Team

#	Expert Name	Brief Biography
1.	Mr. Mohammad Al-Hamidi	CEO of the Palestinian Water Sector Regulatory Council and a founding member of several water and environmental institutions in Palestine. Graduated from Loughborough University, UK, in Water and Waste Engineering for Developing Countries (1987) after obtaining his B.Sc. from Birzeit University, Palestine (1982). Mr. Al- Hamidi has worked as an expert

		in water and environmental sectors with NGOs, governmental institutions, the private sector, and academic and international organizations. He managed reconstruction efforts in Iraq and led an environmental auditing firm in the UAE. With over 40 years of experience, his expertise spans infrastructure, water and environmental programs, rehabilitation efforts, humanitarian aid, governance, food security, emergency response, and educational programs.
2.	Mr. Waseem Barghal	<p>Founder and CEO of A2Z Consulting, holding a Master's degree in Planning and Development and a Bachelor's degree in Law.</p> <p>With over 19 years of professional experience, Mr. Burghal specializes in socio-economic development, governance, human rights, democracy, and youth issues. He has extensive experience working with local governments, civil society organizations, and national, regional, and international stakeholders. His expertise includes strategic planning, research studies (qualitative and quantitative), policy papers, organizational capacity assessments, monitoring and evaluation, and capacity building. Over his career, he has developed (27) research studies, (10) policy papers, and (125) strategic development plans for governmental and civil society organizations, and conducted (30) organizational capacity assessments and evaluations of diverse projects for various Palestinian organizations.</p>
3.	Dr. Yara Dahdal	<p>Project Manager at Palestine Nature Association, specializing in environmental issues, climate change, water desalination, and wastewater treatment.</p> <p>Dr. Dahdal is dedicated to promoting scientific diplomacy and collaboration in addressing environmental challenges. Actively involved in youth capacity building, she works on empowering future generations with the knowledge and skills needed for sustainable environmental protection. She has published multiple research studies offering valuable insights into environmental health, water management, and climate adaptation. Additionally, she serves on the boards of several civil society organizations, advocating for policies and projects that support community and environmental health.</p>
4.	Dr. Anton Khalilieh	Executive Director of Palestine Nature Association, an environmental expert specializing in ornithology (bird science) and conservation. He has extensive experience in implementing environmental projects and has published numerous peer-reviewed studies on biodiversity in Palestine. His work has played a significant role in shaping policies and strategies for biodiversity conservation and ecosystem protection in Palestine.
5.	Dr. Iyad Yaqub	<p>Assistant Professor at the Graduate Studies Faculty, Arab American University - Ramallah, Palestine. Holds a Ph.D. in Environmental Engineering from the University of Cincinnati, Ohio, USA.</p> <p>With over 27 years of experience, Dr. Yaqub specializes in strategic planning, institutional assessments, and governance. He has led several strategic institutional evaluations, including for the Environmental Agency in Abu Dhabi. His expertise includes policy reform consulting, capacity building, and designing institutional frameworks for sustainability. He focuses on the Water-Energy-Food-Ecosystem (WEFE) Nexus, providing technical solutions for sustainable resource management and climate adaptation. He served as a consultant in the MENA Water Matchmaker 2 project, supervising wastewater reuse for irrigation using solar energy in Hebron, Palestine. Currently, he is the Executive Director of the Center of Excellence for Climate Change and Environmental Technologies at the Arab</p>

		American University, leading climate-smart agriculture, water management, and ecosystem conservation initiatives.
6.	Eng. Emile Abdo	Water and Environmental Engineer with over 15 years of experience in sustainable water management, environmental protection, and climate resilience. Holds a Bachelor's degree in Mechanical Engineering and a Master's degree in Water and Environmental Engineering. Currently serves as the Director of the Engineering Department at the Jerusalem Water Undertaking and Project Manager for the Regional Sanitation Project in Ramallah. Has worked with various institutions, providing environmental and social consultancy for municipal development projects. His experience includes designing, operating, and maintaining wastewater treatment plants, conducting transboundary water management assessments, and developing strategic investment and development plans for local authorities. His diverse expertise reflects a deep commitment to sustainable development and resilience, actively contributing to innovative infrastructure and environmental solutions.
7.	Dr. Imad Breik	Holds a Ph.D. in Electrical Engineering with a specialization in Energy Systems Engineering and Planning. Currently serves as Director of the Technology Transfer Office and Associate Professor at An-Najah National University, Nablus, Palestine, while also working as a consultant. An expert in energy efficiency and renewable energy, he has managed and implemented multiple projects in these fields and conducted training programs on energy efficiency applications. With 25 years of experience in various energy system engineering fields, he has contributed significantly to the development and implementation of energy strategies in Palestine.

Annex (3): List of References and Sources Recommended for Future Reports

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Environmental Governance	منصور، باسل، و المدني، مراد. "التنظيم القانوني للبيئة في التشريع الفلسطيني. دراسة مقارنة (الأردن ومصر)" مجلة جامعة الاستقلال للأبحاث 4، العدد 2، (2019).
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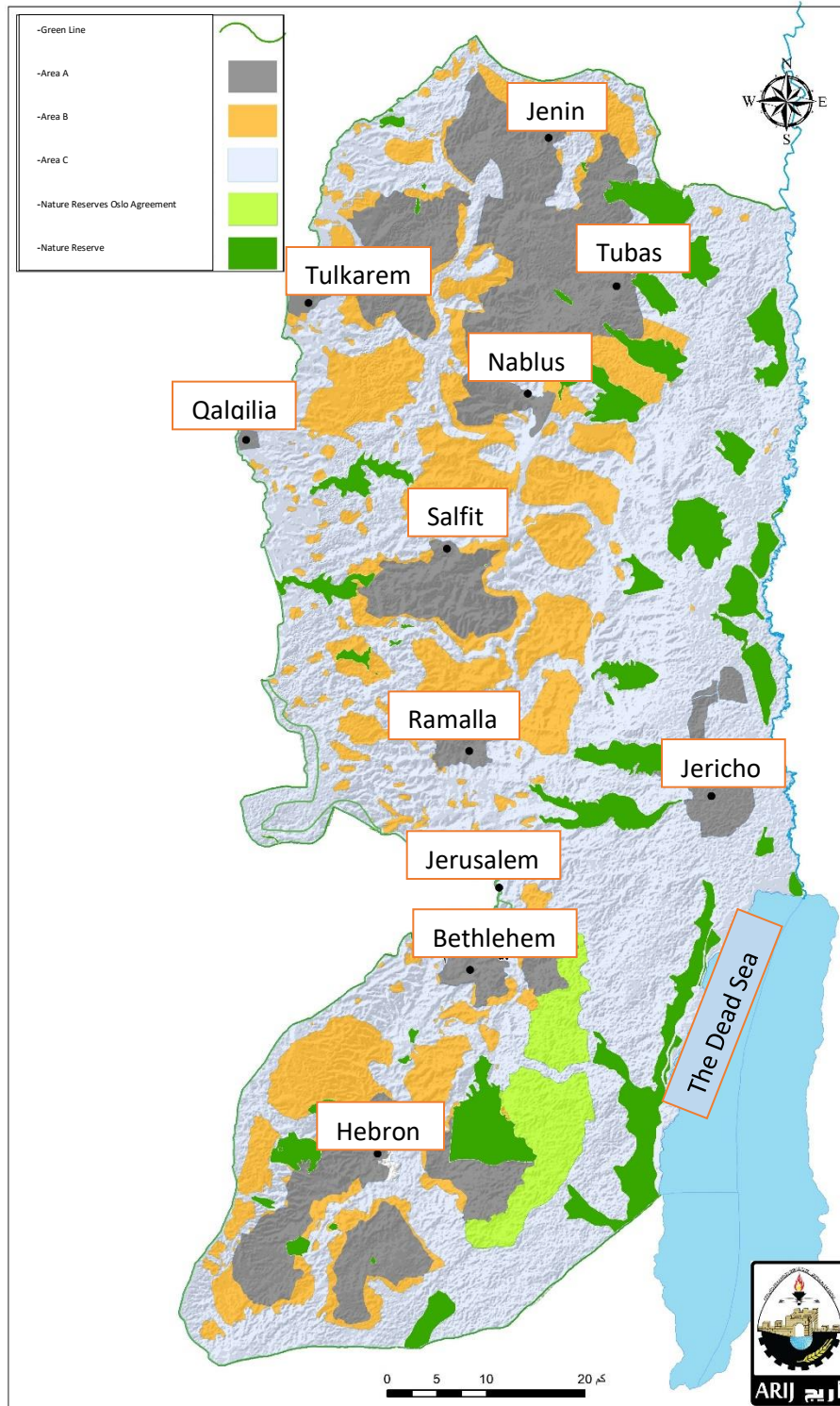
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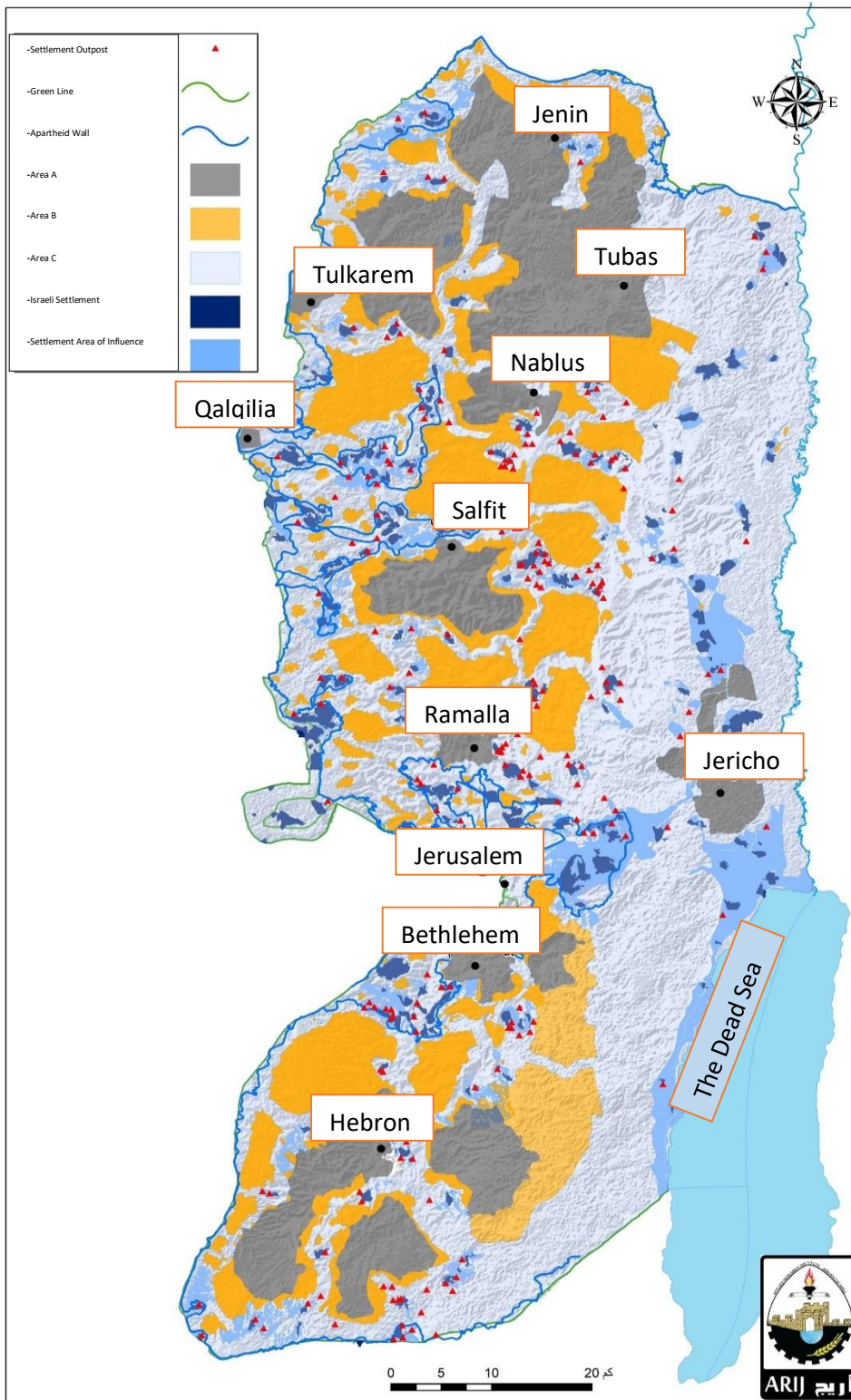
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Appendix No. (4): Maps
Map No(1) .



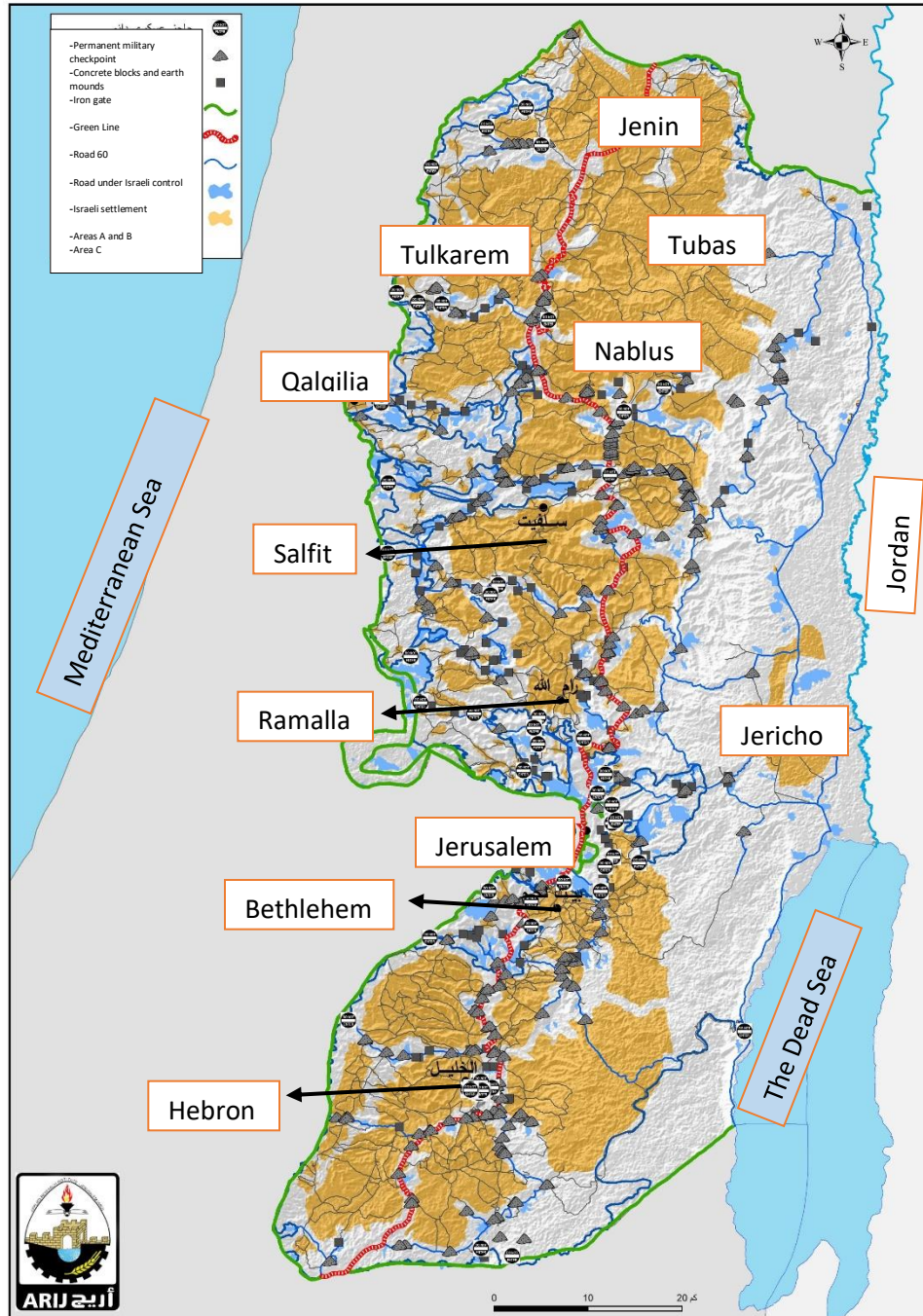
The geopolitical reality in the West Bank in terms of the division of “A”, “B”, and “C”, and it also includes the nature reserves.

Map No(3) .



Settlements, outposts, settlement jurisdiction areas and orders issued regarding state lands.

Map No(4) .



Current movement restrictions on the West Bank.