State of Palestine
Sixth National Report
To the Convention on Biological Diversity

2021

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State of Palestine

Environment Quality Authority

2021

Acknowledgement

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MINISTERO DELL'AMBIENTE
E DELLA TUTELA DEL TERRITORIO E DEL MARE

Preface

Palestine represents one of the most biodiversity rich regions in the world as it represents the meeting point of three continents and many bio-geographical zones. Conservation of this biodiversity is among the high priorities of the Environment Quality Authority (EQA). Decades of Israeli occupation have led to environmental degradation and posed many challenges which adversely affecting our management of natural resources. The continued Israeli occupation of our lands has left us with many social, political, economical and environmental challenges with more pressures on the available limited resources for subsistence and survival. In addition, the already fragmented agricultural lands that our farmers are cultivating are degraded every day by toxic wastes and pollution dumped on Palestinian lands by illegal Israeli colonial settlements.

State of Palestine became an observer member state of the United Nations in November 2012, and as an emerging country, we are taking urgent steps to address our local environmental problems and conserve the biodiversity and natural resources. This brings with it a grave responsibility for stewardship over our biodiversity heritage and natural resources. Biodiversity Protection and preservation in the State of Palestine will have many environmental, health and economic benefits. EQA core mission is to promote sustainable environmental development via protecting the environment with all its elements and prevent the environmental pollution, hazards, threats and dangers facing life of all living organisms. Palestinians are committed to the preservation and sustainable use of State of Palestine's rich heritage of biodiversity, land, water and marine natural resources, therefore, ratified the convention on biological diversity.

As a party to the Convention on Biological Diversity (CBD) since 2015, Palestine has been consistent in fulfilling obligations to report on national biodiversity strategies and actions. Palestine's Sixth National Report to the CBD (6^{th} NR) is the second national report on biodiversity and uses the comprehensive guidance and technical support formulated by CBD Secretariat to ensure high quality, data- driven and gender-inclusive reporting.

Biodiversity and ecosystems whose natural processes are deeply inter-connected provide many services, resources and functions important for the livelihoods and human well-beings of the people, wildlife, economy, and mitigating climate hazards. While biodiversity provides fundamental goods and services upon which all life depends, it is particularly important to the most vulnerable groups of our society. The State of Palestine has developed a series of policies, strategies and action plans, aiming to conserve and sustain such biological resources. Now, in my capacity as Chairman of Environment Quality Authority, I am pleased to adopt the

Palestine's 6th NR to the UN Convention on Biological Diversity, covering the period between 2015 and 2020. I am not only proud but also encouraged that significant progress has been made by the country towards the Aichi biodiversity targets and for the updating of the NBSAP. It is worth recalling that our national biodiversity targets were adopted in line with the NBSAP which is now under the development and updating. Among the expected significant achievements, Palestine's managed to establish its protected area (PA) system to make sure that our rich and unique ecosystems are used sustainably and conserved effectively for the present and future generations, The Sixth National Report also confirms that Palestine is on track to achieving many other targets, including, for instance, having in place the necessary legislations, policies and guidelines for the conservation of specific ecosystems; for the sustainable production and consumption. In developing the 6th NR, we also identified areas requiring additional efforts and commitments. Although some work is under way, developing the national Biosafety Framework, the National Strategy for Invasive Alien Species. as well as expansion of both ex-situ and in-situ conservation of genetic resources.

Chairman of EQA

Mr. Jamil Mtour

Executive Summary

The State of Palestine signed the CBD and its Cartagena protocol on 2 April 2015. Since then, it has been eligible to attend and participate in the Conference of the Parties (COP) and Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) meetings. Palestine has prepared this 6th National Report (NR) in compliance with Article 26 of the Convention on Biological Diversity (CBD), in line with the national reporting guidelines adopted by the Conference of the Parties to the Convention in Decision XIII/27. It presents an assessment of progress toward Palestine's national biodiversity targets. This report represents the most detailed and final report to the Convention of Parties regarding the state of the work done at the state level to protect the rich biodiversity in our country. The report supplements the only other available report from Palestine, which is the 5th National Report (2015). Yet, the format of the two reports are somewhat different. The State of Palestine followed the online format, which mostly focused on state's progress in achieving each of the 20 Aichi targets. We decided not to replicate any information mentioned in the 5th National Report but to expand and supplement by including key information not included in that 2015 report including developments between 2015 and 2020.

Palestine did make significant progress in those pivotal years despite the very peculiar position of the country. Palestine is still striving to assert its sovereignty but remains under Israeli colonial occupation. The lack of sovereignty and continued Israeli occupation harmful practices harms the Palestinian environment and access to natural resources for the local people and certainly limited what can be achieved by Palestinians to comply with CBD. For example, most of our nature reserves are under effective Israeli military and civilian rules and the native Palestinians have no say in protecting our rich natural resources. Yet it is fair to say that we did very good progress on some of the Aichi targets especially those we actually could work on without Israeli interference.

To start with, Aichi target 1 has seen very good progress in environmental education and awareness thanks to efforts from governments (like the EQA and Ministry of Education), Academic Institutions, NGOs, and motivated individuals. Significant progress in fulfilling ABT 2 target (integrating biodiversity values) occurred between 2015 to 2020 led by EQA but we think much more will be done after adopting the new NBSAP and the assessment and strengthening program for a national network of protected areas (starting in 2021). For incentives and disincentives (ABT 3), use of Natural resources (ABT 4), stopping loss of habitats (ABT 5), we made marginal and uneven progress. This is in line with many other countries. Sustainable fisheries (ABT 6) had almost no progress because the Mediterranean Coast off Gaza is illegally occupied by the state of Israel.

Better progress was made for ABT 7 (areas under sustainable management) and ABT 8 (reducing pollution). As for invasive species (ABT 9), Palestine's biodiversity is clearly impacted with this and a study is underway to develop and implement new policies to deal with that. Much still needs to be done to protect our vulnerable ecosystems (ABT 10).

In Palestinian areas, there are 51 protected areas (ABT 11) though the level of protection is variable. Now the state is trying to develop better systems even as the effective control is still mostly with the Israeli occupation. Protected area networks are being developed. Some

progress was made in preventing extinctions (ABT 12) for example protecting the endangered toad *Pelobates syriacus* and controlling hunting and trading of endangered species such as Gazelles. There is also progress in protecting agrobiodiversity (ABT 13). We had little progress in ecosystem services (ABT 14) and ecosystem resilience including limited progress on mitigation and adaptation to climate change (ABT15). Palestine did not yet sign the Nagoya protocol and we need to work on fulfilling this ABT16. Now the State is engaged in updating its NBSAP (ABT 17) and this will give a great boost to other areas of biodiversity conversations.

Traditional knowledge (ABT 18) is being used in conservation efforts effectively and our biodiversity knowledge (ABT 19) is expanding very rapidly with establishment of centers like the Palestine Institute for Biodiversity and Sustainability (palestinenature.org), and many NGO's. Similarly, resources have been poorly mobilized (ABT 20) but much more needs to be done on this and other Aichi targets.

The State of Palestine is particularly proud that it had intended and started working on national targets in line with Aichi targets. Managing those resources under our rule has achieved some results for example developing management plans for many protected areas and implementing projects related to climate change and green technologies. Further, the environmental sector is recognized by the cabinet as a cross-sectoral theme and entered in a newly adopted spatial plan for the state. A national bird (Palestine Sunbird *Cinnyris osea*) and a national Plant (Faqua iris *Iris haynei*) were designated and provide great educational outreach tools.

For other projects, progress was delayed because of the COVID19 Pandemic combined with the Israeli occupation. For example, a national biosafety framework was carried out in 2021 instead of 2020. Similarly, review of international signed treaties and deciding on additional treaties/conventions to sign was delayed but is now underway (including aligning local law with signed conventions). A new developed and updated NBSAP for the state is being formulated and will be adopted in 2022. We anticipate it to line up with the new global consensus that is being developed by the COPs for the coming period.

For inexplicable reasons funding which the state of Palestine is supposed to be eligible for after signing CBD in 2015 was blocked. However, as summarized above and despite other challenges (occupation, colonization, policies of redevelopment under those etc.), we did achieve much. This printed version summarized progress. It is following similar format as the online form loaded to the CHM of the CBD (https://chm.cbd.int/) but the printed version adds this executive summary, a preface by the head of EQA, formatting, and compiling all the references at the end.

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List of Abbreviations

AAUJ	Arab American University of Jenin
ABT	Aichi Biodiversity Target
ANU	An-Najah National University
ARIJ	Applied Research Institute of Jerusalem
ATG	Alternative Tourism Group
BERC	Biodiversity and Environmental Research Center
BI	Birdlife International
BRC	Biotechnology Research Center
BU	Bethlehem University
BZU	Birzeit University
CAM	Complementary and alternative medicine
CBD	Convention on Biodiversity
CCD	Convention to Combat Desertification
CEPA	Communication, Education and Public Awareness Strategy
CITES	Convention of International Trade in Endangered Species
COP	Conference of the Parties
EE	Environmental Education
EEC	Environmental Education Center
EIA	Environmental Impact Assessment
EQA	Environment Quality Authority
EU	European Union
GBIF	Global Biodiversity Information Facility
GEF	Global Environment Facility
GMO	Genetically Modified Organisms
HSF	Hanns Seidel Foundation
KBAs	Key Biodiversity Areas
LMOs	Living Modified Organism
MDC	MAAN Development Center
MOA	Ministry of Agriculture
MOE	Ministry of Education
MOH	Ministry of Health
MOPAD	Ministry of Planning and Administrative Development (newer name)
MOPIC	Ministry of Planning and International Cooperation (older)
MOTA	Ministry of Tourism and Antiquities
NBC	The National Biosafety Committee
NBSAP	National Biodiversity Strategy and Action Plan
NGOs	Non-Governmental Organizations
NRs	Nature Reserves
NSP	National Spatial Plan
NSSWM	National Strategy for Solid Waste Management
OPT	Occupied Palestinian Territories
PARC	Palestinian Agricultural Relief Committee
PCBS	Palestinian Central Bureau of Statistics
PCC	Pioneer Consultancy Center for Sustainable Development
PENRA	Palestinian Energy and Natural Resources Authority
PIALES	Palestinian Institute for Arid Land and Environmental Studies

PIBS	Palestine Institute for Biodiversity and Sustainability
PMNH	Palestine Museum of Natural History, Bethlehem University
PNA	Palestinian National Authority (now State of Palestine)
PNARC	Palestinian National Agricultural Research Center
PWA	Palestinian Water Authority
PWLS	Palestine Wildlife Society
RSCN	Royal Society for Conservation of Nature (Jordan)
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNRWA	The United Nations Relief and Works Agency

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Chapter 1. Information on the targets being pursued at the national level

Please complete this template for each of your country's national targets. National targets entered in this section will be linked to other sections of the report. If your country has not set or adopted any national targets related to the Strategic Plan for Biodiversity 2011-2020 please indicate so in the first box and move to section II.

General information

Country: the State of Palestine

( ) My country has adopted national biodiversity targets or equivalent commitments in line with the Strategic Plan for Biodiversity 2011-2020 and the Aichi Targets

( ) My country has not adopted national biodiversity targets and is reporting progress using the Aichi Biodiversity Targets for reference. (Move to section II. In section III, the Aichi Biodiversity Targets should be used for the purpose of this report as the national targets and progress should be assessed towards their achievement in the national context.)

(X) My country has adopted national biodiversity targets but chooses to report progress using the Aichi Biodiversity Targets for reference.

Please provide information on why your country is choosing to report progress using the Aichi Biodiversity Targets and not its national targets.

Justification: The targets/national priorities that were developed such as those in NBSAP 1999 are general but little implemented before the State of Palestine acceded to CBD. After starting to work and build capacity related to CBD, the EQA started to look at the ABT targets as standards. This is why we measured our progress in the past five years based on existing ABTs.

Chapter 2. Implementation measures, their effectiveness, and associated obstacles and scientific and technical needs to achieve national targets

Using the template below, please report on the major measures your country has taken to implement its national biodiversity strategy and action plan. Please also provide an assessment of the effectiveness of these measures. The template should be replicated for each measure reported

➢ Updating the Biosafety strategy

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

The State of Palestine has ratified the Cartagena Protocol of CBD on 2 April 2015. Yet, little work was done on this issue until 2020 (see below). The biotechnology field and its biosafety in Palestine is still in its early developmental stages, with minor efforts to catch up with the rapidly developing area of biotechnology, especially in the fields of food, medicine and agriculture. However, several universities have recently established graduate and undergraduate biotechnology/genetic engineering programs. (Unpublished, Palestine Biosafety assessment Report 2021, EQA)

The biological diversity and natural resources richness of Palestine should be taken into consideration when developing the national biosafety policies; The objective of the national Biosafety policy and regulations is "to protect human, plant and animal health, the environment and biological diversity, by regulating the production, importation, exportation and contained use of Living Modified Organism (LMOs), and the release of products of such organisms". Moreover, to ensure the regulations require that the risks posed by or as a result of modern biotechnology be identified and managed through regulating activities involving LMOs/ Genetically modified organisms (GMO's). At the same time, the biosafety policy should not impede sound and orderly technological development/research and the promotion of modern biotechnology that may otherwise reflect positively on society."

The following Principles should be followed for establishing the national policy and regulations:

- The Biosafety Legislations and Regulations in Palestine (see ABT17)
- The National Biosafety Committee (NBC)
- The regulation of biotechnology requires developing appropriate regulations, procedures and policies through establishing a National Biosafety Committee (NBC) under the supervision of the Environment Quality Authority (EQA).

NBC responsibilities consist of:

- The formulation of the national biosafety policy and guidelines; also by updating, development, and execution of the national biosafety legislations and regulations;
- Applications approval or rejection for importing, exporting and/or using LMOs and their products;
- Leading the national authorities and co-ordinate the efforts in an emergency created by the release, whether intentional or unintentional, of a LMO into the environment, and/or of an unintentional trans-boundary movement of a LMO;
- Guiding the capacity building of governmental authorities and institutions that are responsible for biosafety and for the development of modern biotechnology in the country;

- Periodically assess biosafety criteria and review decisions on import, export and/or domestic use of LMOs and their products;
- Monitor domestic handling and use of LMOs and their products and assure appropriate application of all procedures;
- Provide the national focal point for the Biosafety Clearing-house with all information on its decisions on import and domestic use of LMOs and their products and any other information required; and disseminate information on biosafety issues at the national level;
- Inform the public of planned releases of LMOs and their products, promote public participation in decision-making concerning GMOs, and generally promote public awareness of biosafety issues;
- Report at least annually to the Government.
- Providing guidance for safe use of modern biotechnology;
- Establishing and monitoring the implementation of policies and procedures for the purpose of handling LMOs; and assess any risks posed by LMOs and products of LMOs;
- Promotes research, development, educational and training activities relating to biosafety;
- Establishes mechanisms to facilitate the collection, storage and dissemination of data relating to biosafety; and performs obligations arising from agreements, conventions or treaties relating to biosafety to which Palestine is a party, if directed by the Minister to be harmonized with national legislations.

The NBC consists of the following members and representatives:

- Environment Quality Authority (Chairman)-headed by the Minister
- The Ministry of Agriculture (MOA);
- The Ministry of Health (MOH);
- Palestinian Standards and Measurement Institute
- The Ministry of finance and planning
- The Ministry of National Economy
- The Ministry of Higher Education
- The Ministry of Education
- The Ministry of Interior
- National Agricultural Research Center (NARC)
- Agricultural Engineering Association
- Consumers Protection Association
- Palestine Polytechnic University (PPU):Palestine-Korea Biotechnology Center
- Bethlehem University: A- Medical Laboratory Sciences Department, and B- the UNESCO Biotechnology, Educational and Training Center.
- Arab American University: Biology and Biotechnology Department
- Biodiversity & Environmental Research Center (BERC). Biodiversity and Biotechnology Institute (BBI).

It is revealed that the Environmental law No.7- for the year 1999 in Palestine requires an urgent update and modification so as to be harmonized with the international treaties and agreements and should provide the EQA with the authority and responsibility to control the intended release of GMOs in Palestine. Furthermore, the environmental law No. 7 lacks many environmental themes that should be adopted such as biosafety and biotechnology issues related to Cartagena Protocol and its provisions, the Nagoya Protocol and its provisions, and the climate change agreement (UNFCCC). In fact, within the Palestinian environmental laws there has not been any implementation for regulation to control the Biosafety related to GMOs/LMOs (Unpublished, Palestine Biosafety assessment Report 2021, EQA).

This ABT is directly related to the infrastructure of research facilities and researchers' capacities in Palestine. Research centers are scarce in quantity and quality but with recent initiatives like the establishment of Palestine Institute of Biodiversity Studies and Palestine Museum of Natural History (PIBS/PMNH), the status of (molecular) research will be flourishing rapidly. At PIBS, a molecular research laboratory is being established that will utilize advanced molecular techniques (e.g. Metabarcoding, eDNA) to survey the fauna and flora of Palestine. Outputs of such surveys will be shared and made accessible according to global standards (the Nagoya Protocol). At BERC a well-equipped molecular lab is already well-established in which several studies have been carried out regarding the genetic diversity of some crops including fig

landraces, Cucumis landraces, some wild native vascular plants including Quercus caliprinos, and fungi including candida and dermatophytes (e.g. Abu Zaitoun et al. 2018). The full genome sequences of Palestinian isolates of different plant viruses including Fig viruses, SLCV, WmCSV, and ToBRFV, have been published and deposited in the NCBI genebank. Data is being shared constantly collected and Palestine has embarked on a new reevaluation of all regulations and policies relating to bio- and chemical safety (2021). Equitable sharing of benefits is the fourth objective of Palestine's 1999 NBSAP and the current reevaluation of the NBSAP (2021) will ensure developing specific programs to address the needs per this ABT and the new CBD guidelines being developed. Limited access (due to Israeli occupation) to natural resources and the use of the West Bank land to dump toxic wastes from Israeli industrial and other activities contrary to the fourth Geneva Convention makes virtually impossible to achieve the targets per ABT 16 (Hammad and Qumsiyeh 2013; Khlaif and Qumsiyeh 2017).

Related Aichi Biodiversity Target(s)

16. Nagoya Protocol on ABS 17. NBSAPs

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

- Measure taken has been partially effective

Tools or methodology used for the assessment of effectiveness above

Between 2015-2020, little planning on issues of biosafety was done and we know of biosafety measures happening in centers like universities and hospitals (as per ministry of health requirements). Dr. Omar Dar Issa of Bethlehem University was tasked to do a study in 2021 (delayed from 2020 due to COVID19) for development of a biosafety Framework relating to Palestine (Darissa & Omar 2021. Development of National Biosafety Framework for Palestine. Unpublished report January 2021 to EQA). There are existing gaps in legislation and those are being remedied via reevaluation of Palestinian environmental laws relating to biosafety (in 2021).

➢ Intensive Awareness Programs by EQA (focusing on students and relevant stakeholders)

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

See relevant Aichi targets 1 and 19 for details on success of these measures. We consider these to have had great progress since the fifth national report

Related Aichi Biodiversity Target(s)

1. Awareness of biodiversity values 19. Biodiversity knowledge

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

- Measure taken has been effective

Tools or methodology used for the assessment of effectiveness above

Awareness has been very effective and is verified by our own surveys of knowledge of the public in areas like knowledge of human impact on the environment, need for recycling and more. See more detail under Aichi Targets 1 and 19.

➢ Projects implemented by EQA for conserving natural resources

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

EQA received support for major projects related to biodiversity. Examples include:

1- Support from the Italian government for generating the sixth National Report and updating the NBSAP.

2- Support from Swedish Development Agency (SDA) for development of the national biosafety framework and the fourth national report in compliance with the Cartagena protocol.

3- Support from the SDA for development of national strategy for dealing with Invasive species.

4- Update of Environmental laws and regulations from the SDA.

5- Assessment and evaluation of the national system of protected areas.

Related Aichi Biodiversity Target(s)

4. Use of natural resources
9. Invasive Alien Species
11. Protected areas
17. NBSAPs
19. Biodiversity knowledge
20. Resource mobilization

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

- Unknown

Tools or methodology used for the assessment of effectiveness above

Many of these projects were slated to start in 2020 but were delayed to 2021 due to COVID19. So we will know the effectiveness of the measures taken in due course.

➢ Environmental sector is recognized by the cabinet as a cross-sectoral theme

Title of measure: Environmental sector is recognized by the cabinet as a cross-sectoral theme

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

A cross-sectoral strategy (EQA 2017) by the Palestinian Government 2017-2022 was developed and shared with key stakeholders and committed resources and experts to increase environmental awareness and find funds to work on study and conserve the environment (https://info.wafa.ps/userfiles/server/pdf/en_2017-2022.pdf). A new environmental awareness and education strategy is being developed by the EQA in 2021.

Related Aichi Biodiversity Target(s)

5. Loss of habitats
17. NBSAPs
20. Resource mobilization

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

- Measure taken has been partially effective.

Tools or methodology used for the assessment of effectiveness above

There is still a need to develop stronger cooperation between different government agencies like EQA, local government, ministries of Agriculture and Education, NGOs, academia etc. The new NBSAP will address these (being worked on now)

➢ Reviewing and updating local laws

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

The NBSAPP of 1999 coincided with publication of the environmental law for Palestine (http://environment.pna.ps/ar/files/Law_No_7_For_The_Year_1999_Concerning_The_Environment.pdf). Yet even as early as 2005, the EQA started to address the gaps in the law and especially areas to comply with newly signed international conventions (most signed from 2005 onward). That is why a decision was made in 2020 to review all international treaties (signed ones for obligations and unsigned ones for benefit and responsibility if they are signed) and also review local laws and regulations to ensure concordance and smooth aspects of implementation relating to environment in general including biodiversity. This includes harmonization of local laws with signed agreements as well as considering signing additional conventions.

Besides CBD, the state of Palestine signed a number of International Conventions that relate to biodiversity and that become essentially local laws (obligations are being fulfilled):

- Convention Concerning the Protection of the World Cultural and Natural Heritage
- Cartagena Protocol on Biosafety to the Convention on Biological Diversity
- Paris Agreement Under the UN Framework Convention on Climate Change
- United Nations Framework Convention on The Climate Change
- United Nations Convention on the Law of the Sea
- United Nations Convention to Combat Desertification
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal
- Stockholm Convention on Persistent Organic Pollutants (Stockholm Convention)
- Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides International Trade (Rotterdam).

Related Aichi Biodiversity Target(s)

17. NBSAPs

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

- Measure taken has been partially effective

Tools or methodology used for the assessment of effectiveness above

The environmental law for the year 1999 needs updating and is being reconsidered in 2021-2022. Enforcement was sporadic and weak but strengthened during the period of this report (2015-2020) through the establishment of environmental police and strengthening local EQA monitors.

➢ Designation of a national bird and a national flower of Palestine by EQA

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

The EQA recommended in 2016 the designation of a national flower which is the Faquoa (*Iris hayenae*) and a national bird which is the Palestine Sunbird (*Cinnyris osea*). The ministerial committee/cabinet adopted a

resolution regarding this matter. This increased awareness not only of those two species but also of the importance of protecting biodiversity in general.

Related Aichi Biodiversity Target(s)

1. Awareness of biodiversity values
19. Biodiversity knowledge
12. Preventing extinctions

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

- Measure taken has been effective

Tools or methodology used for the assessment of effectiveness above

This was evident by our surveys of both stakeholders and the general public about the importance of designating and knowledge about national species.

➢ Signed CBD and its Cartagena Protocol

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

The State of Palestine signed the CBD and its Cartagena protocol on 2 April 2015. Since then, it has been eligible to attend and participate in the COP and SBSTTA meetings. This also made Palestine eligible for funding from the GEF but the GEF blocked funding for Palestine for political considerations.

Related Aichi Biodiversity Target(s)

1. Awareness of biodiversity values
2. Integration of biodiversity values
3. Incentives
4. Use of natural resources
5. Loss of habitats
10. Vulnerable ecosystems
11. Protected areas
12. Preventing extinctions
13. Agricultural biodiversity
17. NBSAPs
19. Biodiversity knowledge
20. Resource mobilization

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

- Measure taken has been partially effective

Tools or methodology used for the assessment of effectiveness above

Due to lack of funding and the cancellation of GEF funding, the financial resources available for biodiversity are very limited including the limited small national budget and some allocations from other projects related to the environment.

➢ Adoption of a national spatial plan

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

In 2014 there was an adoption of a national spatial plan and implementation proceeded rights after. The plan that takes into account protected areas within KBA for the sake of development regulation. The figure below shows this in detail.

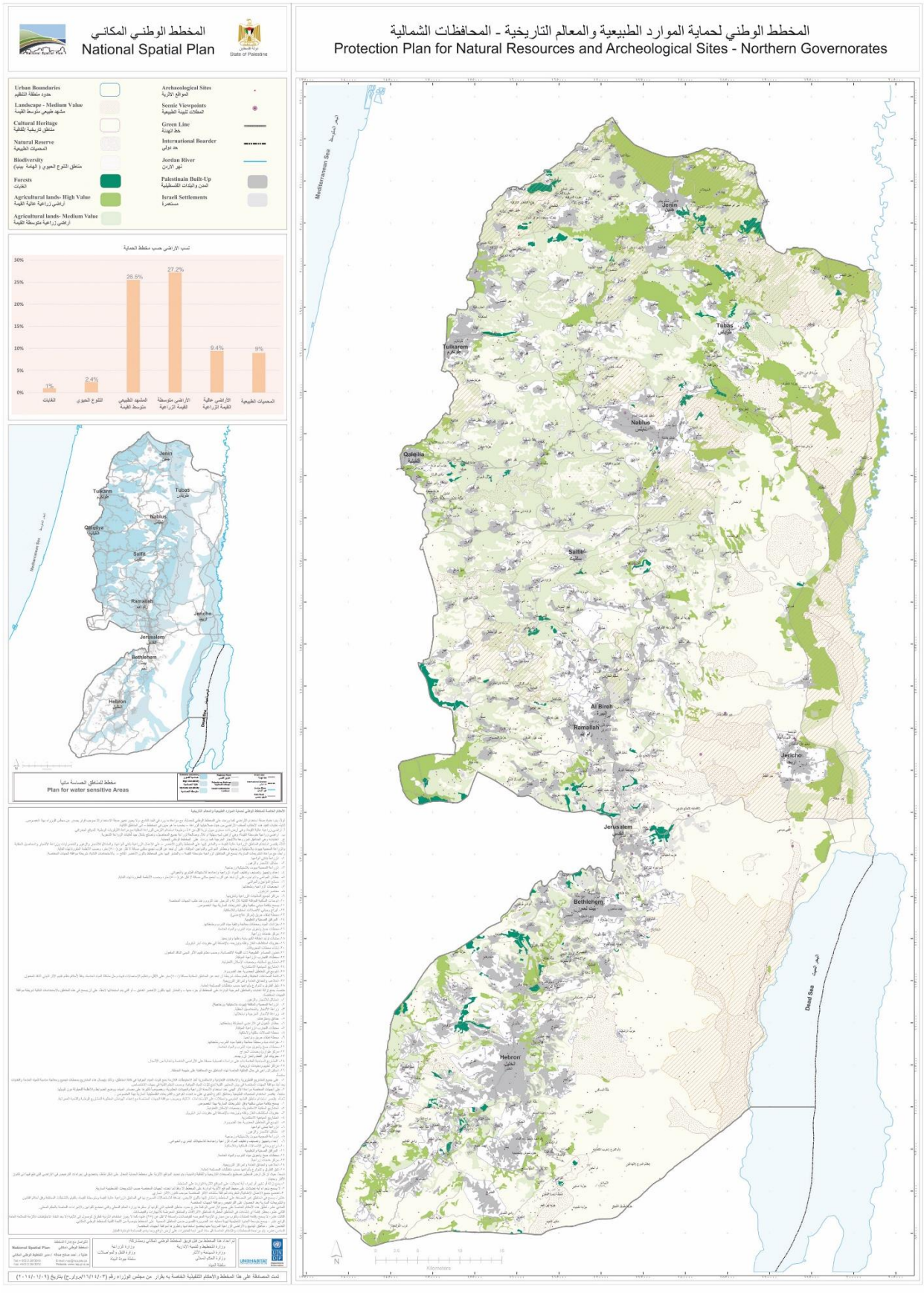


Figure 2.1 Protection plan for natural resources and archeological sites.

Related Aichi Biodiversity Target(s)

4. Use of natural resources
10. Vulnerable ecosystems
11. Protected areas
12. Preventing extinctions
17. NBSAPs
20. Resource mobilization

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

- Measure taken has been partially effective

Tools or methodology used for the assessment of effectiveness above

This is partially effective because of lack of Palestinian sovereignty over land of the state of Palestine. For example Israel exerts control over Gaza maritime zone (plus Gaza is blockaded) and Area C is most of the West Bank and is under Israeli civil and military control. This limits the State's ability to implement the spatial plan.

Chapter 3. Description of national contribution to the achievement of each global Aichi Biodiversity Target

Using the template below, please describe your country's contribution towards the achievement of each global Aichi Biodiversity Target. For Parties whose national targets are identical to the Aichi Biodiversity Targets, some of this information may be captured in sections II and III above. Please provide additional descriptions of your country's national contribution to the achievement of each global Aichi Biodiversity Target.

1. Awareness of biodiversity values

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

The first Aichi target has two main outcomes. First that Palestinian individuals should be familiarized with the critical value of biodiversity and second that they should take into consideration how to conserve biodiversity and sustain it. It is expected that a large proportion of people must be aware of these aspects extending from adults to students (universities and schools) by implementing the biodiversity concepts within their curricula. The strategy used to familiarize people with the importance of biodiversity and its sustainability was the National Strategy for Environmental Awareness and Education which has three main objectives:

- The creation of an environmental media to raise the level of environmental awareness.
- The introduction of effective and creative educational curricula and activities.
- The enhancement of modern concepts in environmental values and practices. Below we will summarize achievements in this target 2015-2020 under the categories of governmental, NGOs and Academia.

Governmental: In EQA, two divisions are in charge in public awareness and education; Division of Awareness and Division of Education. School children across the West Bank are main targeted group for most of the educational programs. EQA produced a "Communication, Education and Public Awareness Strategy (CEPA)" in 2014 with efforts directed at 1) Effective and active environmental Media in raising the level of environmental awareness; 2) An integrated and innovative educational activities methodologies, and educational curricula; and 3) Environmental upscale values and practiced by community groups. The General Directorate for Environmental Awareness and Education at EQA is responsible for integrating environmental concepts and the development of Palestinian curricula. However, integrating the concepts of nature protection and environmental education within the educational matrix was not achieved yet. Within EQA's General Directorate for Environmental Awareness there is the Environmental Awareness Division: which is the most active division with offices in Hebron, Bethlehem, Jenin, Nablus, Tulkarm, and small offices in Tubas and Salfit. 400 Environmental Clubs were established in schools across the West Bank and they communicate with each other via social media (Facebook). These school clubs are supported and encouraged to develop small environmentally friendly projects such as biogas, botanic and house gardens, composting, water reuse, etc. Furthermore, nine videos were prepared on various subjects such as biodiversity, water issues, desertification, the environment and pollution. Other activities include summer camps for school students, walking in natural trails and identifying plants and birds. A number of other publications were issued such as "Garden is a Friend of the Environment" stories for school children with emphasis on environmental concepts and a national strategy for environmental education. The Ministry of Agriculture also produced some awareness pamphlets and occasionally worked with schools on educational issues. However, work with the Ministry of Education to change its curriculum has had limited success. The 9th grade syllabus "Health and Environment in our Life" includes some good concepts like better managing resources like water and reducing waste. The EQA organized events on 11 relevant days in 2020 (like world environment day, Arab environment day, Palestine environment day, biodiversity day). Over 5000 citizens

engaged in activities done by EQA in 2020 (highest in Ramallah and Bethlehem). Also reached 3564 students and 901 teachers in schools and universities in 2020

NGOs: The EQA and academia work in collaboration with NGOs (such as Biodiversity and Environment Research Center, MAAN Development Center, Palestine Wildlife Society, and Applied Research Institute-Jerusalem, among others) to reach out to schools to integrate some concepts of environmental education both in the classrooms and in extracurricular activities. Work from some of those groups to help the Ministry of Education change its curriculum has had limited success. The 9th grade in class syllabus "Health and Environment in our Life" includes some good concepts like better managing resources like water and waste reducing and recycling. NGOs we spoke with told us they are proud to have helped environmental clubs and other environmental initiatives at schools. Environmental clubs are indeed now found in many schools in Palestine. There was more of those in the private schools than in the public schools (e.g. in Bethlehem all private schools had an environment club while only a small fraction of public schools have them). This is largely due to lack of support and encouragement. Some schools started environmental magazines and/or newsletters focused on the environment such as at the Evangelical Lutheran Schools (Environment Education Center). Many folded because of lack of funds but these initiatives could be supported to increase outreach and imprint conservation and environmental issues among school children. Details on the role of Department of Environmental Education and Awareness at EQA. Awareness is also evident via the formation of new formal (like NGOs) and informal groups since the last NR. For example, there is a new NGO called Nature Palestine (https://naturepalestine.org/) and there is an informal network that started in 2019 called Palestine Action for the Planet (https://www.palestinenature.org/palestine-action-for-the-planet/). There's also a Palestine Environment NGO Network (http://www.pengon.org/) that coordinates activities in over 15 NGOs including on issues of education. And a first conference for Environmental Journalism was held (see https://www.maan-ctr.org/magazine/article/2449/) and it revealed that there is much to improve in this area despite previous accomplishments. Workshop educating children about caring for Palestine's biodiversity: https://www.lutheranworld.org/news/preparing-young-palestinians-care-creation Under the patronage of the Prime minister Dr. Mohammad Shtayyeh the first environmental exhibition for the biodiversity funded by Hanns Seidel Foundation through the "Mahmiyat.ps" project took place in the Nativity church square on the 30th of September 2020 that includes 200 pictures (posters on stands) plus tables for NGOs and academic centers engaged in nature protection. This exhibition was the result of joint efforts in which members of the local community and the Environmental Quality Authority participated, who are the main partner in the exhibition. Around 400 people visited the exhibition. A video was developed for those who couldn't reach Bethlehem due to the pandemic and was distributed online. Another NGO led activities are ecotourism paths that took thousands of people locals and internationals across landscape of Palestine including protected areas. An example of this is Palestine Trail (phtrail.org).

Academia: Issues on water and environment courses are taught in five universities (of 13 total in the OPTs) and only 2.5% of master students studied environmental sciences (Isaac et al. 2019) but this has been growing over the years (e.g. a new master in environmental studies at Birzeit for example was launched in 2015). Bethlehem University via its Museum of Natural History worked with Qattan Foundation to bring hundreds of School students to a science festivals that focused on their responsibility to the environment. Efforts were made in collaboration with NGOs (such as ARIJ, BERC, MDC, and PWLS) and educational centers (such as EEC) to integrate some concepts of environmental education both in the classrooms and in extracurricular activities. In 2019, PMNH also held a total of five workshops in the villages that surround Al Makhrour valley (Beit Jala, Hussan, Battir, and Al-Walaja), whose aim was to increase the environmental educational awareness of the students in schools e.g. https://almakhrour.palestinenature.org/wp-content/uploads/2020/05/Educational-Awareness-Workshops.pdf. PMNH/PIBS engaged in hundreds of education activities relating to biodiversity (see palestinenature.org/education). Some universities also did environmental education via science festivals and direct school involvement. Furthermore, there are many undergraduate programs related to environmental sciences at the Palestinian universities. For example, Al-Najah university has established undergraduate programs related to the environment. Also, Hebron University offers a B. Sc. program in Environmental Science and Technology, while Al Quds University has a program in Earth & Environmental Sciences, with courses dealing with biodiversity. With a total of 9 universities who established directly environmental B.Sc. programs or indirect by adding courses related to environment in the Palestinian curriculum.

There are also many programs and courses for higher education related to Environment in Palestine, where at Birzeit University, three graduate programs are offered; Environmental Biology, Water and

Environmental Sciences and Water and Environmental Engineering programs, especially the vital course in Conservation Biology and Environmental Legislations & Ethics. Similarly, the graduate program at Hebron University offers several environmental courses such as (Wildlife Management, Conservation & Monitoring of Natural Resources, Economic of Environmental Resources and Forest Improvement & Development). Efforts should be invested in upgrading these courses, by training, inviting visiting professors from countries with experience, exchange programs for students, and more programs (Masters and PhDs) that need to be incorporated in our universities. The biotechnology field and its biosafety in Palestine is still in its early developmental stages, with minor efforts to catch up with the rapidly developing area of biotechnology, especially in the fields of food, medicine and agriculture. However, several universities have recently established graduate and undergraduate biotechnology/genetic engineering programs (Unpublished, Palestine Biosafety assessment Report 2021, EQA). There's a plan to introduce a master program in biodiversity and sustainability at Bethlehem University 2021.

Other: Environmental education and awareness reaches the public in many other ways. Environmental (e.g. Maan Centers media outlet Afaq albiy'aa wa Altanmiya) and social, media play a great role. Tools used include audio, videos, magazines, newsletters, journals, webpages and internet shows. For instance, "This Week in Palestine", a monthly-published magazine, highlights major environmental topics some of which include: fauna, flora, ecotourism and the environment. Examples were 2016 issue 220 "Animals in Palestine", 2018 issue 244 "Hiking Trails and Alternative Tourism", 2018 issue 243 "Sustainable Gaza", 2021 issue 276 "Our Environment". There are also >20 Facebook pages that actively post on topics relating to biodiversity in Palestine, which also contributes to public awareness. Examples include https://www.facebook.com/environment.quality.authority and https://www.facebook.com/PIBS.PMNH.

Conclusion: There have been a number of active movements raising awareness across Palestine including government bodies, academics, NGOs, and the voluntary individual actors. Taken together, all these movements suggest progress towards the target, as monitoring surveys and follow-up surveys document. PIBS conducted a public survey to estimate the public's general knowledge regarding biodiversity and protected areas in Palestine. Based upon a survey of 50 people, 46% claimed to have great knowledge regarding biodiversity, 50% claimed to have limited knowledge, and 2% claimed having no knowledge regarding biodiversity at all. When asked about possible ways to increase environmental awareness in Palestine, the two most popular answers were 1) introducing more environmental-related curriculums in schools and universities, and 2) discussing environmental topics and issues on media platforms.

2. Integration of biodiversity values

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

We review here issues like national policies and relevant other targets. Palestine divided its National Policy Agenda into four major sectors: governance, social, economic and infrastructure.

The infrastructure sector is subdivided into: energy, environment, housing, transportation, and water and wastewater management subsectors. The environment was given priority (MOPAD, 2014). In the last two decades, action programs and strategies proliferated. The National Strategy, Action Programme and Integrated Financing Strategy to Combat Desertification in the Occupied Palestinian Territory proposed "to prevent, halt and where possible, reverse the effects and impact of desertification, land degradation and droughts, in order to contribute to poverty alleviation, improve livelihoods of people and achieve Sustainable Development" (EQA 2012). The strategy has identified five priority projects that should be complementary to what has been identified in the NDP for the years 2011-2013, in the sum of USD 4.2 million, with lead agency as EQA in cooperation with other Palestinian stakeholders, including non-governmental and private sector. The main causes of soil pollution were summarized in the environmental strategy (MoEA, 2000) as: increased desertification and soil erosion, soil pollution due to mismanagement of liquids and solid waste, natural and manmade soil erosion, and soil pollution caused by Israeli occupation military activities. This strategy is a promising tool to improve and enhance agricultural productivity through the conservation and improvement of agricultural soil fertility. Moreover, it is considered an effective mainstreaming strategy for biodiversity and protected areas conservation and development. These were the beginnings and much more work has since been done especially after Palestine signed treaties like CBD.

Also, Palestine has signed international treaties, and has developed strategies and action plans related to the environment, including biodiversity issues. Palestine was not listed at CBD as having NBSAP (https://www.cbd.int/nbsap/about/latest/) because the NBSAP was developed in 1999 before accession to the treaty. The NBSAP 1999 was immediately followed with the Palestinian Environmental Strategy (MoEA 2000). To quote "The goal of the National Biodiversity Strategy and Action Plan for Palestine (NBSAP) is to aim at nothing less than the restoration and rehabilitation of Palestine's diversity of species, genetic resources and the ecosystems in which they can flourish." EQA published an Environment Sector Strategy in 2010 that included a SWOT analysis and identified six national priorities (EQA 2010). The most recent report (EQA, 2015) from the state of Palestine in compliance with CBD had the same priorities as the NBSAP (1999). The PNA developed a ten-year environmental strategy for 2000–2010 and in August 2000 a National Environmental Action Plan (NEAP) for plans and projects for the three-year period 2000-2002.

In 2015 besides CBD, Palestine signed a number of other conventions related to environment and biodiversity (Cartagena, UNFCC, UNFCCD, Basel Convention, see Annex of treaties). Accession to a treaty or convention by the state carries significant legal and other obligations (Jaradat, & Awad-Allah, 2015). As the main instrument for implementing the Convention, the NBSAPs are referenced in several COP decisions, pertaining to thematic areas, cross-cutting issues and stakeholder processes, indicating those areas that Parties have suggested should be included in NBSAPs. The main COP decisions that provide direct guidance for NBSAPs are decision IX/8 and decision X/2. Parties are encouraged to review these decisions for consolidated guidance on the NBSAP process, substance, components, support systems, and monitoring and review systems. Since the last Palestinian NBSAP published in the year 1999 (http://environment.pna.ps/ar/files/National%20Biodiversity%20Strategy%20And%20Action%20Plan%20For%20 Palestine .pdf) much has changed including new threats to biodiversity, new opportunities, updated methodologies and data are now being unincorporated into a new NBSAP for Palestine (due in 2022).

Table 3.1 Priorities of the environmental strategy (UNEP, 2003) were based on needs for the WB and Gaza strip:

Priority	Gaza Strip	West Bank
High	Depletion of water resources Deterioration of water quality Shoreline and marine pollution	Depletion of water resources Deterioration of water quality Land degradation
Medium	Depletion of natural resources Land degradation Deterioration of nature and biodiversity	Depletion of natural resources Air and noise pollution Deterioration of nature and biodiversity
Low	Air and noise pollution Landscape and aesthetic distortion Threats to cultural heritage	Landscape and aesthetic distortion Threats to cultural heritage

The 2017-2022 National Policy Agenda focuses on democracy and putting citizens first. It is people centered and has a little bit of resource allocation and very little on the environment (SP 2016). The document has three Pillars, the first is Path to independence, and the second is Governmental Reform, while the third is Sustainable Development. Under the third pillar, there is a section on Resilient Communities. This section contains five policies related to ensuring a better environment.

Most Palestinian organizations and institutions dealing with the environment have missions that focus on responsible human interactions with nature and hence protection of biodiversity. Noteworthy among them are governmental agencies (like the Environment Quality Authority), NGOs (like The Applied Research Institute - Jerusalem (ARIJ), Land Research Institute, Palestine Wildlife Society, Union of Agricultural Work Committees, Biodiversity & Environmental Research Center-BERC), international agencies (like Hanns Seidel Foundation), academic centers (like at Bethlehem University, Al-Najah University, Al-Quds University, Islamic University of Gaza). Many also view their functions as important forms of Sumood (resilience/persistence) in the face of the Israeli occupation. Their programs at all levels (national and local governments, communities, academia) are reflected in policies and procedures that produced results on the ground.

The current EQA (http://environment.pna.ps/ar/) had the responsibility to develop legislations, strategies and policies for the Palestinian Authority system, in the context of overall environmental policy development in the West Bank. It is linked directly with the Ministerial Council. The EQA is responsible for implementing

all articles in the Environmental Law for the Year 1999. In 2010, the EQA developed a three year strategy for 2011-2013 that identified and prioritized objectives for itself and for the Palestinian environment as a whole (EQA, 2010). EQA put 48 specific objectives, of which the following seven objective are among them: Issuing legal and other directives; Issuing information bulletins and statistical and other data information; Building human capacity at EQA; Documenting Israeli violations of the Palestinian Environment; Founding of an environmental information center which issues regular reports; Review and modernize the Palestinian Environmental Laws; Review and evaluate institutional structures related to the environment

Table 3.2 National Policies and Policy Interventions under National Priorit 10

Table 5: National Policies and Policy Interventions under National Priority 10

National Policy	Policy Interventions
• Ensuring Community and National Security, Public Safety and Rule of Law	• Implement measures to enhance community security and public safety. • Strengthen capacity for disaster response and crisis management. • Improve the governance of Palestine's security sector, strengthen institutional capacity and ensure efficient use of resources.
• Meeting the Basic Needs of Our Communities	• Expand community access to clean water and sanitation. • Expand community access to reliable energy. • Improve public transportation and road safety. • Support affordable, safe housing. • Ensure food security.
• Ensuring a Sustainable Environment and Adapting to Climate Change.	• Reduce and effectively control pollution and greenhouse gas emissions. • Expand solid waste management and recycling. • Expand wastewater management, treatment and reuse. • Manage, protect and promote sustainable use and conservation of natural resources (land, water and energy). • Keep Palestine green (conserve biodiversity, establish nature preserves and expand green spaces). • Increase energy efficiency and reliance on renewable energy.
• Revitalizing Agriculture and Strengthening Our Rural Communities	• Increase agricultural plant and livestock production and develop value chains. • Protect and support farmers, particularly in areas under threat.
• Preserving Our National Identity and Cultural Heritage	• Support cultural innovation and production. • Implement initiatives to preserve and develop Palestine's cultural heritage. • Develop traditional handicrafts. • Promote Palestine as a tourist destination.

However, the EQA suffers generally from the lack of human and financial resources to perform the overwhelming duties under the current stressful political conditions.

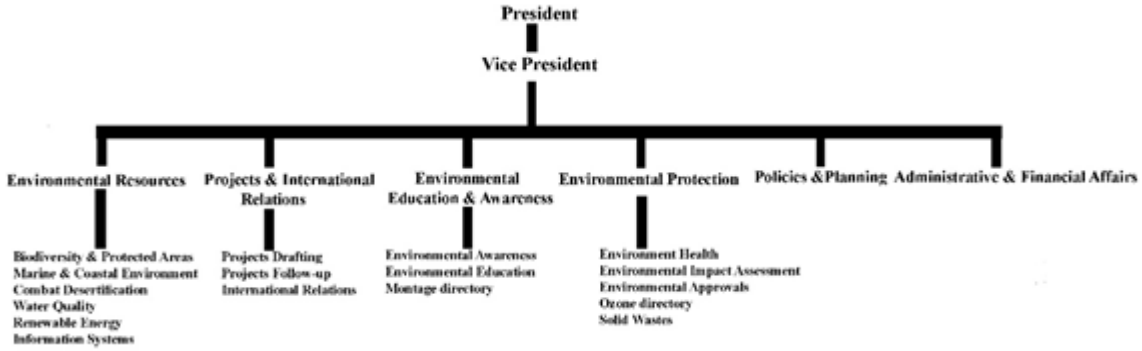


Figure 3.1 Structure of EQA

As demonstrated, the General Directorate of Environmental Resources is the main body responsible for preparation of studies on biodiversity (Fauna and Flora), and cooperates in protecting protected areas. One important function of EQA is to monitor the NGOs environmentally related issues through the Law of Charitable Organizations and National Authorities for the year 2000. Within the Environmental Protection section, a number of environmental inspectors are responsible for inspecting sites with environmental problems such as pollution, water resources etc. so as to implement the Environmental Law. Other sections such as the Marine & Coastal Environment and Water Quality are involved with monitoring such resources. Environmental Impact Assessment (EIAs) and how it is done in Palestine needs strengthening.

Conclusion: The EQA is the main body responsible for translating knowledge to policies in cooperation with other governmental agencies, NGOs and academia. Significant progress in fulfilling this ABT target occurred between 2015 to 2020 but we think much more will be done in 2021-2022 driven by four current projects: revision of the 1999 NBSAP for Palestine (2021-2022), a national biosafety plan (almost finished 2021), revision and updating of local environmental laws in compliance and harmonization with signed conventions and signing other international conventions (2021), and the assessment and strengthening program for a national network of protected areas (starting in 2021). However, there has been little integration of biodiversity values in the mainstream society. This should be addressed in the upcoming revision of the NBSAP.

3. Incentives

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

Aichi target 3 has two main objectives: first the removal, phasing out or the alternation of harmful incentives. Second, the development and application of positive incentives. Measuring the progress depends upon whether the relevant actions have been taken. There are some programs of providing seedlings and seeds that result in greening Palestine including of wild plants (such as rare and endangered species like hawthorns and summak). Such facilitation can be considered an incentive for the local people. There are also a number of projects that involves providing awards for citizens who engage in environmental work. Examples include awards for best photographs, amount of planted trees, and recognition of environmental educators.

Since Palestine is a developing country it has several obstacles and hindrances in its current solid waste management (SWM) field. The main goals behind recycling are to minimize the quantity of landfilled waste, to provide raw materials, and to sustain environment for future generations. Implementing any recycle program shall be successful only by the active participation of the public. Kattoua et al. (2019) have examined the main barriers that hinder the achievement of a local recycling program in Ramallah and Al-Bireh district of Palestine. They have detected that the main barriers halting the public from participating in the local recycling system are the following:

- Lack of awareness
- Lack of official recycling programs
- Lack of information on the process of separation and storage
- Lack of municipal authorities' encouragement

- Limited available facilities in the municipality or nearby
- Limited capacity of existing facilities
- Lack of knowledge on waste segregation processes

There is a clear sign of absence of the concept of waste minimization at source, recycling, and composting, since Palestinian experience in this field is still limited. As recycling processes are performed informally in Palestine at minimal rate less than 1% of the waste generated. There are no official recycling programs; a private company has contracts with several municipalities, commercial companies, and institutions (e.g., universities) for the collection of segregated paper and cardboard. Then, the recyclables are routed to Israel, where they are sold to another private company as a raw material. Only some NGOs conduct awareness campaigns about recycling and compost and practice in a limited scale.

The idea of recycling is still new to the Palestinian society. There are some scattered activities, but it is still not a culture, nor a high-level investment; the Ministry of Local Government and the Environmental Quality Authority are aiming at spreading awareness and target the creation of strategic recycling practices. Enhancing recycling is an important environmental action that should be taken into consideration in the enactment of future legislation and strategic planning at different decision-making levels within the Palestinian Territories.

there is urgent need to change citizens' underlying unwillingness to recycle. A mix of actions is required including legislation and policy revision, setting of new incentives, development of related infrastructure, environmental education so as to encourage citizens to cooperate in the three R's (reduce, reuse, Recycle). Moreover, the budgets assigned for SWM need to be increased and public awareness regarding SWM problems has to be raised (Al-Khatib et al. 2007). Moreover, the readiness of the public to pay for waste management services have a direct effect on the success and reliability of any SWM system (Afroz et al. 2011).

Due to the dilemmas in SWM field within Palestine. Saadeh et al, 2019 have conducted a study upon 12 Joint Service Councils (JSCs) for solid waste management. On one hand, only two of them revealed their acquisition of Public-Private Partnership (PPP) contract for the management and operation of the transfer station and the sanitary landfill. On the other hand, two JSCs are currently making arrangements and implementing studies for future PPPs on waste-to-energy, biowaste management and recycling projects. As a terrible scenario in implementing a recycling project was Jenin and Tubas Joint Service Council (JSC) who had 3-month-duration PPP contract which had failed to achieve its objectives. As any sustainable system depends upon the current financial resources and collaborative aid from citizens. The best measure to ensure that sustainability can be accomplished once the government-represented by the Ministry of Local Government (MoLG)-is involved; providing legal support to local authorities and incentives to potential contractors in order to encourage them to join PPPs. The best policies to achieve PPPs are by updating and reforming current incentives, laws and regulations, also by facilitating licensing procedure and activating the Investment Promotion Law.

Moreover, the involvement of the private sector in SWM in parallel with incentives to inspire investments in order to develop collection, sorting and recycling schemes and marketing of reusable and recycled materials could be one of the effective perspectives to improve SWM.

Disincentives come from issues like penalties for pollution and implementation of both local laws and signed international agreements and conventions that hinder locals from engaging in harmful practices. There is a review of local laws and regulations of signed conventions, besides the initiative of signing new conventions (Tender by EQA and bid won by Al-Theqa legal firm in partnership with both local and international legal and environmental experts). Generally the review shows good correspondence (data forthcoming) but the issue of enforcement remains weak. From the 5th NR (EQA 2015) there has been increased enforcement with creation and deploying green police (Part of the security forces) who work closely with the EQA. Call response times have improved over the past three years. For example there was confiscation of over 200 wild animals from hunters and from pet shops. These are then sent to animal rehabilitation centers such as the new one (opened 2018) at PIBS-BU.

Incentives are a different issue and need further development. For example, Jerusalem District Electricity Company Ltd has developed complicated (bureaucratically) regulations to install solar panels. Any solar power which is generated in excess of need is used by the Electric Company which then provides some credit for it. However, there are no incentives or disincentives to reduce use of plastics. There remains personal

education and personal incentives or institutional issues that need extra work upon them. For example, the permaculture farms producing organic eco-friendly produce do it as an internally incentivized process. Progress is assessed as insufficient because the country of Palestine faces an ongoing decline of farmland, forests due to Israeli occupation which could affect the target if land of high biodiversity value is halved, suggesting that positive incentives must be developed more effectively.

Another example of issues of incentives is that a factory in Hebron started recycling tires to produce floor matting for use in places like children playground. However, there was lack of demand and the factory shut down. It would be good in future planning to do increase campaigns of awareness (see ABT1) to include such issues.

The main body responsible for both licensing new facilities to ensure compliance and also for enforcing existing laws is the Environment Quality Authority (EQA). Enforcement has improved significantly in the five years of this report. For example, despite the pandemic, in 2020 the EQA accepted 90 projects and rejected 46 ones, performed >450 inspection rounds by EQA teams, acquired >150 environmental complaints and dealt with many turned over for legal action (https://bit.ly/3uoQSHp). These numbers are more than double those reported annually in the fifth national report. There was proliferation of wireless communication and the EQA approved 82 environmental applications for Jawwal and 80 for Ooredo (mobile phone networks). In 2020, the EQA appointed 10 new inspectors and bought two 4-wheel drive vehicles and equipment needed to strengthen inspections.

Conclusion: We do see a deficiency in areas of providing positive (enforcement) incentives for eco-friendly practices and negative icentives for destructive ones in Palestine and we propose to add this in the new NBSAP being worked on now. Further, much more work is needed in public-private partnerships that enhance environmental/biodiversity conservation via incentives for good practices (Saadeh et al. 2009).

4. Use of natural resources

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

The natural resources of the state of Palestine include water, habitats like forests and rangelands, mineral resources, and wildlife. There are many policies, laws and regulations about natural resources in the state of Palestine. For example, the Law on Natural Resources No. (1) of 1999. Article (6) under this Law provides that found natural resources within the Palestinian territories, territorial waters and its pure economic zone should be regarded as a public property except for the building materials. It shall be permissible for mining purposes, to appropriate the private lands for public benefit." Also, The National Strategy, Action Programme & Integrated Financing Strategy to Combat Desertification in the Occupied Palestinian Territory has identified four strategic objectives (EQA 2012) and one of them is: "Conservation and sustainable use of natural resources". There is yet to be well documented surveys of all these natural resources though some data exist. While the state of Palestine needs to develop better plans for managing the resources, a big impediment to implementation of the many existing plans (e.g. for water resources) stems from the fact that the State essentially has no control over most of its natural resources (due to the Israeli occupation). The report by the UNEP (2003) made over 100 recommendations to address the environment in Palestine and seven of them deal with natural resources (1, 2, 3, 4, 21, 23, 31, 40) but none could be implemented without having sovereignty over our land and resources. Further, the Israeli occupation is one of causes of habitat destruction leading to a decline in the biodiversity of Palestine. There are many ways how Israeli occupation affects the Palestinian nature and natural resources (ARIJ, 2007, 2015).

Figure 3.2 The organic relationship existing between environmental degradation in the OPT and the Israeli Occupation (ARIJ, 2007).

In 2005, the last Millennium Development Goals (MDG) was published by the Palestinian National MDG Steering Committee, led by the Ministry of Planning of the Palestinian Authority. In its remarkable honesty, it states that the targets for 2015 for sustainability and environmental issues will not be reached because of: "*lack of control over natural resources, particularly water and land, due to occupation, and early stage of environmental protection.*" There are very few biologists especially marine and wildlife biologists and taxonomists, oceanographers, conservation managers, etc., an adequate legal frameworks and environmental policy and legal framework on which to base all activities for the conservation and sustainable use of biodiversity and natural resources in Palestine. Furthermore, there are inadequate enforcement of laws, and weak coordination among national and local stakeholder agencies in biodiversity and inadequate awareness and commitment to biodiversity. There is a UN General Assembly Resolution regarding Palestine's control over its natural resources (A/RES/75/236). Examples of natural resources and their management issues are listed below:

- **Dead Sea Resources**: The Dead Sea is the lowest point on earth and its area falls under Israel, Jordan and Palestine. It has significant touristic and other values like minerals. It is also fed by the Jordan River and springs like Ain Al-Fashkha (a protected area). The Part of the Dead Sea that supposed to be part of the State of Palestine is under Israeli occupation (the whole state is under occupation). Contrary to the 4th Geneva Convention, its resources are being utilized by the State of Israel (Al-Haq 2012).
- **Water Resources**: Palestine is rich in water resources. The rainfall feeds into four major aquifers and there are dozens of springs in the West Bank. There is a National Water Sector Strategic Plan and Action Plan (2017-2022) which identifies issues, and sets objectives to improve the sector. Some strategic Goals and Objectives to be reached: first, the integrated management and sustainable development of the water resources (quantitatively and qualitatively). Secondly, improving the quality and reliability of water supply services by ensuring fair water distribution. Thirdly, by improving wastewater services and structure. Fourthly by the development of Water Sector institutions to reinforce Good Governance bases. And last but not least, by ensuring the financial sustainability of water utilities and water

service providers. The National Water Sector Strategic Plan and Action Plan (2017-2022) was adopted (PWA 2016). This strategy identifies issues, and sets objectives to improve the sector. Below are two tables with the issues and objectives reached.

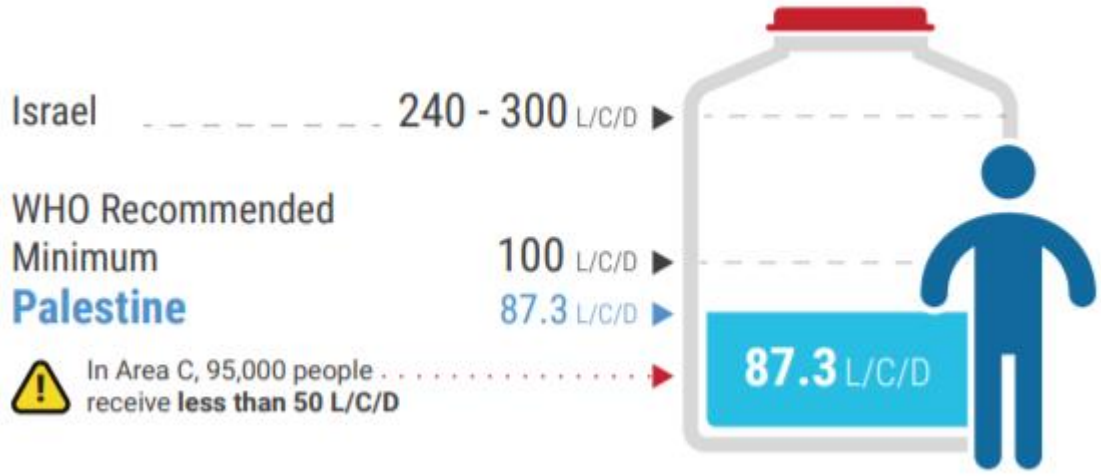


Figure 3.3 Daily consumption rate of water is low and highly effected by Israeli theft of Palestinian water (Unequal distribution) (SP 2020b)

Table 3.3 Water Sector Priority Issues (PWA 2016)

Water Resources	Water Supply	Wastewater	Institutional Arrangements	Financial Arrangements
• Weak integrated management of water resources • Lack of available water resources • Groundwater vulnerability to contamination and depletion • The Israeli control on water resources and • The International Community understanding of the Palestinian Water Rights.	• Weak quality and reliability of water and water supply service • Lack of fair distribution • No water networks in some communities • Weak regional connection between urban centers and • Weak regional storage capacity.	• No wastewater networks in a numerous number of communities • Weak infrastructure related to wastewater treatment (municipal and industrial) and • Weak use of treated wastewater.	• Non-completion of legal, organizational, and functional procedures for restructuring the Water Sector as to become consistent with the New Water Law • The absence of an effective system to encourage and build the capacities for Water Sector institutions • Low level of monitoring and power of the monitoring authorities in general • Scientific research and its response to Water Sector main priorities and • Continue applying Item 40 of Oslo Agreement and its addendum related to the Joint Water Committee.	• Available international funds for the Water Sector projects • Weak financial capabilities in implementing the operational and investment programs • Reinforcement of service providers' financial independence • Limited efficiency of collection systems and high indebtedness • No self-funded available to fund large projects and • Lack of consistency and compliance of funding programs to the Water Sector Palestinian priorities.

Table 3.4 Water Sector SDP (2017-2022) Objectives (PWA 2016)

Item	Water Resources	Water Supply	Wastewater	Institutional Arrangements	Financial Arrangements
Strategic Objectives	• Integrated management and sustainable development of the water resources (quantitatively and qualitatively)	• Improving the quality and reliability of water supply services as well as ensuring fair water distribution	• Improving wastewater services and structure (collection, treatment, and reuse)	• Development of Water Sector institutions to reinforce good governance bases within an integrated legal and institutional framework	• Ensuring the financial sustainability of water utilities and water service providers

However, all these great plans are contingent on being allowed to be implemented by the occupying power (the State of Israel). For example, the second Israeli Military Order issued immediately after the occupation (issued 7 June 1967) designated all water resources in the newly occupied Palestinian Territories as "state owned by Israel" (UNEP, 2003).

- **Forests and other natural resources**: See the other ABTs that cover protected areas and forested areas as natural resources. The coverage of the forests in Palestine was explained in the 5th NR to CBD. In the section for ABT 11, we noted that much of the protected area natural resources are made inaccessible because of the Israeli occupation (which should be the responsibility of the Palestinian EQA and MoA). The Directorate for Forests, Rangelands and Wildlife has offices in all governorates of the West Bank. Forty rangers are responsible for inspecting and patrolling the protected areas and the natural forests throughout the areas under the jurisdiction of the Ministry of Agriculture (MoA). Of the 19 protected areas that were handed over to the Palestinian Authority under the Oslo agreement, only eight are under the actual control of MoA, amounting to less than 15 sq km. The remaining 10 are within area C or overlapped areas. A pamphlet released by the Department of Nature Reserves, Ministry of Agriculture, includes a list of 48 protected areas, and these are discussed in the section on protected areas.

Table 3.5 Amount of timber production from forests in Palestine by Governorate and year, 2017 – 2018, unit: Ton (PCBS data).

Governorate*	Year (Ton)	
	2017	2018
Jenin	190.0	98.5
Tubas & Northern Valleys	168.8	0.3
Tulkarm	281.5	83.0
Nablus	293.0	213.5
Salfit	78.0	25.5
Ramallah & Al-Bireh	14.0	-
Hebron	9.0	6.0
Palestine (Total?)	1,034.3	426.8

- **Energy resources**: There are significant natural gas fields off the coast of Gaza that are theoretically available to the state of Palestine (but only after the end of the occupation). For now the energy situation of the state of Palestine is largely dependent on Israeli sources. Even the Jerusalem Electrical Company which has been given license by the British mandate to produce electricity in Palestine has been curtailed in its activities and is forced to buy electricity from Israeli sources. There are few exceptions: solar energy is being used at significant amounts in the Palestinian areas (including majority of households heating water via solar energy) and there is a desalination plant being built in Gaza (https://www.un.org/unispal/document/auto-insert-202217/).

Figure 3.4 Energy Infrastructure Map by Office of the Quartet (http://www.quartetoffice.org/).

- **Waste Effect on Natural Resources**: It was reported that Palestine annually produced 7,103 tonnes of hazardous waste (6.4% of total waste) of which 1,420 tonnes are of hazardous medical waste's origin in the last available estimate (SP 2020a). Per capita waste production was about 0.9 kg/day but it is estimated that since population is rapidly growing (reaching 10 million soon), thus the situation of waste production is expected to grow as well. There is waste from Barqan industrial settlement that impacted the natural resources of the valley nearby as well as human health (Hammad and Qumsiyeh 2013). Moreover, electronic waste generated in Israel is illegally transported to areas like Idhna where it has significant health impact (Green Land Society 2016; Khlaif and Qumsiyeh 2017). The Ministry of Local Government (MoLG) has overall responsibilities for municipal SWM, and operations are covered by municipalities and Joint Services Councils for Solid Waste Management (JSCSWM). http://www.bjscswm.org/wpeng/?page_id=7). As part of the preparations for the National Strategy for Solid Waste Management (NSSWM), a team led by EQA prepared the Interim Action Plan for Hazardous Waste Management in the Palestinian Territory (EQA 2011) has identified the following challenges:

  - Poor hazardous waste management due to insufficient regulations (no existing hazardous waste by law) and inability to enforce them.
  - Weak enforcement of environmental law to discourage industries from reducing pollution streams that contain hazardous waste.
  - A lack of awareness of hazardous waste issues across the PT industry, for priority waste streams in particular.
  - Absence of hazardous waste treatment and disposal sites.
  - There are no hazardous waste recycling facilities and waste exchange activities.
  - Absence of hazardous waste transfer stations.
  - The need to explore alternative delivery mechanisms for hazardous waste facilities such as public/private partnership
  - Updating what was done in the first NSSWM, the NSSWM in Palestine (2017-2022) is willing to align the Palestinian SW policy on the Sustainable Development Goals of 2030, especially Goal 3 (Health and Well-being), as well as Goal 11 (Sustainable cities and human settlements) (CESVI, 2019).

  Where the strategic objectives of the current NSSWM are:
  - A modern and effective legislative and organizational framework for SWM.
  - Strong implementing institutions.
  - Effective and environmentally safe management of SW services.
  - Financial sustainability and efficient SWM services and activities.
  - Appropriate treatment and inventory of medical, hazardous and special waste.
  - A growing participation of the private sector in SWM.
  - A more participating and aware public.
  - Effective information and monitoring systems.

Some of the production plans so as to retain natural resource use within safe environmental limits. According to EQA (2015) "Organic farming has grown into a thriving business. Now, at least $5 million worth of organic agricultural products, mainly the olive oil, are exported every year. An average of 17,000 tons of olive oil is produced in the West Bank every year by thousands of farmers." Anabtawi (2016) showed that small scale permaculture farms can be the key to sustainable food security in an environmentally sensitive way in Palestine. Moreover, Kruijssen et al. (2007) explained how small-scale actions with farmers can help in biodiversity conservation. Furthermore, Krasny and Tidball (2009) explain how community gardens can work to promote civic engagement including on environmental issues. These and other examples suggest that work in agriculture to reduce insecticide, develop family farming, and promote permaculture can be proven successful. In the Palestinian areas there are a number of new initiatives for permaculture farms that work as eco-farms also educating about biodiversity http://www.maan-ctr.org/magazine/article.php?id=1126f2y1124082Y1126f2

- **Management of Natural Resources**: Management of Natural resources is ultimately the responsibility of the Palestinian government, especially the EQA despite the problem of the Israeli occupation discussed elsewhere. However, all our people are ultimately responsible for our natural resources. At present, 12 NGOs deal with conservation, education, ecotourism, training and research

related to biodiversity and environmental issues. Table below summarizes activities of these key NGOs in Palestine. Missions of these NGOs vary from public awareness and education to tasks related to biodiversity and conservation. Unfortunately, one of the listed NGOs stated in their mission and objectives several tasks that did not match their performance as manifest in their annual reports. To sum up, these loosely connected NGOs tend not to work well together. The EQA signed a number of MOUs with local authorities to enhance cooperation and development of networking between the different players with the goal of promoting nature conservation including responsible consumption and production.

Table 3.6 Summary table for key NGOs activities related to conservation and environmental issues in Palestine (according to these NGOs). After Qumsiyeh and Amr (HSF 2017)

NGO	Capacity building	Public awareness	Education	Ecotourism	Research	Conservation
Applied Research Institute-Jerusalem	●	●	●		●	●
Arab Youth Climate Change Movement		●	●			
Biodiversity & Environmental Research Center		●	●		●	●
Center for Environment	●	●		●		
Environmental Education Center		●	●	●	●	●
Environmental Field Research Center	●	●	●	●	●	●
Green Life		●		●		●
MA'AN Development Center	●	●	●			
Palestine Association for Education & Environmental Protection	●	●				
Palestine Institute for Biodiversity and Sustainability	●	●	●	●	●	●
Palestine Wildlife Society		●	●	●		●
Nature Palestine Society		●	●		●	

Table 3.7 Examples of MOU's signed by EQA and local agencies and authorities.

Authority	Year	Objectives
Palestinian Central Bureau of Statistics	2013	· Enhance and consolidate the cooperation and exchange data and information. · Implement specialized environmental surveys. · Build central administrative records. · Update, develop and computerize common interest statistics.
Custom Police	2014	· Enhance cooperation in controlling solid and hazardous waste smuggling.

Political and Moral Guidance Commission	2014	· Enhance cooperation in environmental awareness of the youth. · Conduct studies, reports, and reinforce the concepts of environmental protection.
Ministry of Women Affairs	2013	· Ensure mainstreaming of gender in environment issues (Focusing on water and solid waste management).
Palestine Institute for Biodiversity and Sustainability, Bethlehem University	2020	· Mutual benefit in education and conservation in biodiversity.

Table 3.8 Key governmental entities concerned with natural resource protection.

Ministry or Authority	**Role relevant to environmental issues**
Environment Quality Authority	Planning and policies for environmental protections; approval of projects that could impact environment after a EIA study
Ministry of Agriculture	Some participation in ranger duties and planting
Ministry of Planning and Administrative Development (MOPAD, Previously MOPIC) currently ministry of finance and planning	Seeking funds from potential donors; overall planning of Palestinian Development. Initiated National Development Strategy which includes environmental issues (MOPAD, 2014)
Ministry of Local Government	Coordinates involvement of local communities with projects and initiatives related to protected areas; control of feral dogs and cats; local projects
Ministry of Health (through Department of Environmental Health)	Address and monitor environmental issues related to human health.
Ministry of Tourism and Antiquities	Encouragement and marketing ecotourism locally and internationally; management of areas with archeological value
Ministry of Education	Education for awareness on environmental issues in schools (curricular and extracurricular)
Ministry of Culture	Promote protection in the local communities and integrate protected areas in the network of cultural areas; may also be involved in museums and educational initiatives considering cultural and natural heritage
Ministry of National Economy	Provide funds to execute activities and projects related to protected areas and biodiversity.
Ministry of Interior	Law enforcement of environmental and agricultural laws.

There was good progress on issues of consumer education, protection, safety, and on responsible consumption. Some of the institutions and entities created that deal with these things are (after EQA 2016) the following:

- General Administration of Consumer Protection of the Ministry of National Economy (MNE) which has a laboratory for testing locally produced and imported goods.
- The Palestinian Council for Consumer Protection.
- Palestinian Standard Institute (PSI) accredited and issued specifications for thousands of products.
- The customs controllers of the Ministry of Finance.
- The Ministry of Health which includes the department for water health and modern central laboratories.
- The Control and Inspection Department of the Ministry of Agriculture (checks fresh products at the borders).
- The Pesticide Department of the Ministry of Agriculture, which is responsible for registering, monitoring and importing chemical pesticides.
- NGOs that work in the field of consumer protection, such as the Palestinian Society for Consumer Protection (PSCP) and the Palestinian Food Industries Union (PFIU).

Some of the laws and regulations relating to production and consumption such as:

- Law of Consumer Protection No (21) of 2005.
- Law on the Palestinian Specifications and Standards No. (6) of 2000.
- Law of Public Health No. (20) of 2004.
- By law No (19) of 2009 for the Palestinian Council for Consumer Protection.
- Procurement Law in 2011 reflects United Nation Commission on International Trade Law (UNCITRAL 1994)) including safety and responsibility.
- Penal Code of 1960 on safety of food products.
- Law on Natural Resources No. (1) of 1999. Article (6) under this Law provides that found natural resources within the Palestinian territories, territorial waters and its pure economic zone shall be regarded as a public property except for the building materials. It shall be permissible for mining purposes, to appropriate the private lands for public benefit.

Examples of good initiatives by particular entities on production and consumption

- "Growing hope for conservation in Palestine": The Critical Ecosystem Partnership Fund has a funded a number of projects to protect rare plants and fragile ecosystems in Palestine (see https://www.birdlife.org/middle-east/news/growing-hope-plant-conservation-palestine)
- "Biodiversity Conservation and Community Development in Al-Makhrour Valley in Bethlehem, Palestine" September 2018 – March 2021 aimed to conserve biodiversity in Al-Makhrour Valley of Bethlehem (Palestine), benefiting the local communities through sustainable use of ecosystem services, including (a) promoting agriculture/green practices, (b) developing ecotourism, and (c) reducing human impact via environmental awareness and education programs while promoting sustainable lifestyles. The range of implemented and ongoing activities of the project was conducted via research, education, & conservation activities. Inventory and assessment for biodiversity at both habitat and species level were conducted and have consolidated the scientific data. Conducted biodiversity inventory for Al-Makhrour valley; including comprehensive surveys for ecosystem, habitats and species prepared baseline evaluation reports that monitored indicators for ecosystem/biodiversity status at Al-Makhrour Valley and progress towards biodiversity; established ecology and biodiversity management plans for the Valley, while restoring 3 dunum (3000 m^2); published seven scientific publications relevant to this project; formulated a committee for traditional farming; conducted land preparations, weed removal and organic compost additions for selected land-farms; distributed agricultural inputs and installed an irrigation network to cultivate diverse summer and winter vegetable crops at selected farms; conducted more than 300 field visits meetings, culminating in harvest festivals following summer/winter cultivation seasons; organized a two-day workshop for cooperatives' partnerships and business enhancement; studied the Valley visitors' path and identified the best places to mark it; raised awareness and built capacities of local communities and stakeholders to better manage their natural resources; conducted four workshops to enhance marketing networks, initiating small business enterprises, and methods of governance and protection of traditional knowledge for farmers and relevant cooperative; ran four "two-days training sessions" for best sustainable farming practices for benefited farmers.
- The Palestinian Environmental Friends Association in Rafah established composting plant of agricultural waste. The compost is sold to FAO, which in turn distributes the compost free of charge to farmers to reduce food insecurity. Currently, the NGO is upgrading the composting pilot into a big project that will compost and recycle 100 tons of waste.
- PENRA has implemented many solar initiative projects. See http://www.penra.gov.ps/
- The Palestinian Museum (https://www.palmuseum.org/) was built with Green design (opened 2016).
- UNRWA had an innovative project to construct an environmentally friendly, zero emission 'green school' in Khan Younis, southern part of Gaza Strip.
- UNDP's initiative on renewable energy in Gaza.
- Sustainable tourism: The Plan of Action of MoTA for 2014 promotes and facilitates the private activation and utilization of historical, natural and cultural sites.
- "Building the Capacity to Protect Palestinian Land and Heritage through Museology and Eco-Tourism": The project conducted by PMNH had focused on innovative means for the protection and preservation of all Palestinian cultural heritage forms relating to the natural history and

agriculture. This project has 1) created the Palestine Ethnography exhibit at PMNH which was visited by over 3,000 visitors since its opening in April 2019; 2) collected and conserved both tangible and intangible cultural heritage related to agriculture and nature, 3) during July and August 2019, PMNH with their partner Masar Ibrahim Al Khalil (MIAK) had implemented 20 workshops in 19 villages/cities. 471 (303 females, 164 males) attended these workshop.; 4) developed an educational game application aimed to educate children about cultural heritage related to nature and agriculture through simple interesting games which are children-friendly.

- "Gardening and Permaculture for Sustainability in Marginalized Bethlehem Communities": The overall objective aimed to develop a community garden and permaculture education center serving local marginalized communities and focusing on children. The project conducted by PMNH had created a community garden infrastructure that can serve up to 30 families at a time. Where PMNH run workshops and training for more than 50 persons (60% children) about the principles of intensive environmental agriculture through a set of theoretical and practical workshops. PMNH selected twenty-five applicant families in the first round, and demonstrated the benefit of growing varied crops. It also helped build hydroponic system beds for 12 families in their homes in order to sustain domestic agricultural production in light of the scarcity of agricultural spaces in the city.
- "Socio-Economic Sustainable Development and Environmental Conservation at the Northern Transition Zone to Wadi Qana Protected Area": The project's aim is to research and to conserve the unique fauna and flora of the seasonal Uskar pond, the sole location known in the West Bank for endangered fauna and flora including the Syrian spadefoot toad and the Pond Water-crowfoot. Extensive research documented the value of this pond and its fauna and flora. PMNH has engaged in community education and awareness including erecting a sign on site (in partnership with EQA) that designates the area as a protected area. And it has presented its achieved work in a meeting in Uganda (African countries plus Palestine) as a model for partnerships that lead to policy changes and to conservation.
- "Climate Change and Environment in Palestine": PIBS-BU and the EQA cooperated with Zoï Environment Network to raise awareness of youth on the potential impacts of climate change in Palestine and engage them in mitigation and adaptation measures. Achievements include the following: 1) Engagement in research to identify priority areas and activities that are globally and locally relevant (sensitive to local needs); 2) Translated the research into six awareness modules: Climate change, Geography, Energy and Transportation, Biodiversity, Agriculture, Wastes and Chemicals. These were printed (Arabic and English) (see below) as banners and brochures but also used in workshop presentations and discussions; 3) Conducted 14 workshops in 14 school for more than 400 students in Bethlehem and Hebron to raise awareness by using the printed materials in the training.; 4) Adjusted museum exhibits and tours to include climate change; 5) Guided 12 tours for 12 school students in the museum to raise awareness about climate change and environment in Palestine through the exhibits and the educational modules.; 5) Distributed more than 20,000 brochures on climate change and the environment in Palestine, in addition to distributing more than 300 posters to 50 schools for educational use; and Two members of PNMH team travelled to Geneva to attend and participate in project meetings on climate change and biodiversity.
- Palestine Action for the Planet (PAP): has the mission to "Think Globally, Act Locally" and "Work Locally, Achieve Globally" in areas of environmental conservation. Rather than a new organization or NGO, this informal group consists of like-minded people in our country and abroad, networking with groups such as Extinction Rebellion, all concerned for the future of our planet.
- Medical Zoology: Funded by the Ministry of Education and Higher Education, this project aimed to create a medical zoology unit to do research on areas directly relevant to the health of human beings in Palestine including animals that act as vectors of human or livestock disease. In 2019 we initiated a number of research projects including 1) mosquitos, 2) sandflies, and 3) poisonous animals (scorpions and snakes). A database was created and educational efforts are taking place.
- "Unity and Diversity in Nature and Society": The main vision of this project is sustainability of human and natural systems by leveraging actions that enhance diversity (agricultural, human, natural). Basically, we increase respect for ourselves, for each other (regardless of background, nationality, gender etc), and for nature. Funded by the EU Peace Initiative, the three year project

leverages resources of the Palestine Institute for Biodiversity and Sustainability (PIBS) at Bethlehem University, the Palestine Center for Rapprochement (PCR), and the Galilee society (GS) to create three regional centers: a Biodiversity Center (BC), a Human Diversity Center (HDC), and an Education center (EC). While located at those three organizations they operate and function via collaboration on areas of research, service, conservation, and learning towards behavioral change.

- Green Playground (Children's Ecological Garden for Play and Learning): Taking inspiration from nature and using ideas seen in other successful playgrounds using recycled and natural material, PMNH had rehabilitated a section of the land in the museum and developed an interactive exploration playground/children garden. Based on recent research, it was proven that children learn through play. Thus, we have strong evidence that outdoor play experiences in natural settings constitute essential components for building knowledge and personal skills. We designated three areas of the garden as safe children's areas built around the existing greenhouse and the aviary/animal room: a community garden, playground and discovery area. We sought and received complementary funding from Playground for Palestine, Rotary Foundation, Western Lieutenancy of the Equestrian Order (USA), the Jerusalem Fund, and the Association France Palestine Solidarity which collectively cover the costs for (a) infrastructure for garden including an amphitheater, terracing, soil, wood, etc., (b) playground and exploration area material, (c) supplies for gardening (tools, seeds, seedlings, etc.), (d) program development and activities (trainer, transportation, etc.).
- "Actions for Environmental Sustainability in Wadi Al-Zarqa Al-Ulwi": The project focused on actions for environmental sustainability, studying biodiversity and implementing strategies to protect the area of Wadi Al-Zarqa Al-Ulwi (henceforth WZU). The project aims included: 1) surveying the fauna and flora of the area to identify the species at risk, 2) performing a SWOT analysis (strengths, weakness, opportunities, and threats) of the area and providing practical recommendations for action that maximize benefit while minimizing use of resources, 3)reaching out to the community via tested permaculture models and environmental education programs (women, school children, and farmers) to increase community benefits from environmental conservation and 4) increasing local community and students' public awareness through a series of 10 workshops.
- Other initiatives: Bank of Palestine led a way by providing green loans in 2015 for encouragement of developing environmentally friendly projects. Despite the aforementioned laws, regulations and initiatives from public and private entities, there is a lot to be done to have green production and consumption. Progress was made on transitioning to green energy like solar, however it is still a very small part of energy consumption. Since more than 10% of procurement is government procurement, that can be a good starting model to ensure governments and ministries go to paperless systems, reduce consumption of disposable items (plastics, paper cups etc.). Also, need more regulations for sustainable buildings (a major part of the logical economy) including affordable energy efficient housing. Government can 1) give incentives for efficient housing, 2) encourage research in sustainable housing architecture and engineering, 3) integrate such issues in vocational training (see also EQA 2016). It is important to engage the stakeholder and the government each time in each project to increase its effects and become feasible, moreover; locals from different communities should be a root part of this kind of project to help in diffusing knowledge and increasing environmental awareness. Egypt adopted something like this approach in its work in the occupied Palestinian territories from 1996 until the present now (GEF\ UNDP, 2013).

Ecotourism, cultural and landscape tourism could supplement religious and other classic tourism aspects in Palestine (Isaac 2010a, b, c; Tabash 2017). Tourism in Palestine was based on religion, political, and heritage, but in the past 5 years the term ecotourism have popularized among Palestinian, which aims to walk in a specific trail in nature, in protected areas. There is also a project related to the Production and consumption implemented through EQA which is the Ecotourism project including the identification of the ecotourism sites of the protected areas and the rich biodiversity sites and identification of the ecotourism trials for ecotourists. In addition the project identifies the national priorities for the consideration of the ecotourism sites and the trials. The project also includes the rehabilitation of 10-sites of ecotourism importance and preparing lifts for the trials in 10-sites also. Thus on one hand the government started to mark the pathways and to study the effects of this tourism on the environment. While on the other hand,

introducing the locals and even people from outside Palestine to our environment and biodiversity itself is a kind of environmental awareness (Qumsiyeh and Handal, 2018). Also, Quttaineh (2015) assessed developmental indicators for ecotourism in the West Bank – Palestine via a computational model that facilitates the indicators development and the evaluation of the destinations.

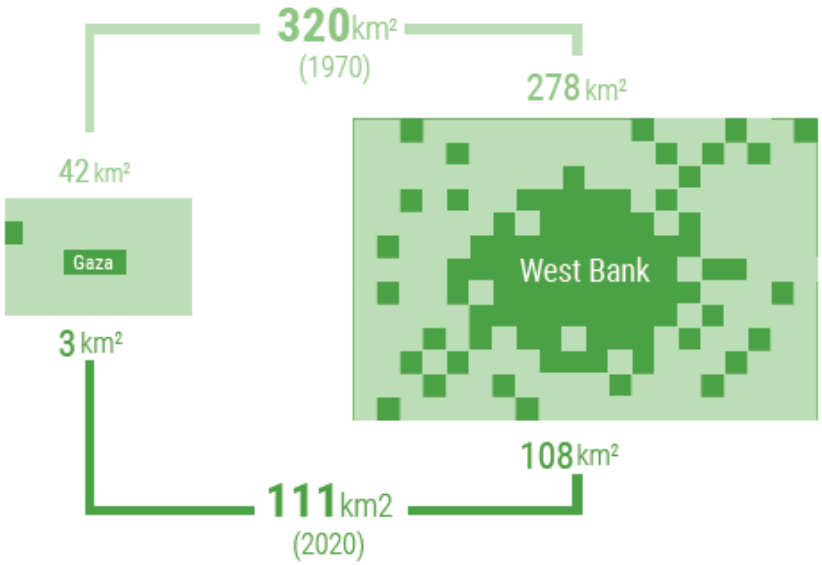
Palestine signed a number of treaties and convention that related to natural resources and those technically become an adjunct to local law to ensure equitable sharing and protection of natural resources. Here are some relevant agreements either signed or that Palestine tries to relate to on issues of the environment: CBD and its Cartagena Protocol on Biosafety to the Convention on Biological Diversity, UNCCD, UN Framework Convention on Climate Change, Convention Concerning the Protection of the World Cultural and Natural Heritage among others. There is now a project to consider signing many other conventions some of them also relate to natural resources.

Conclusion: While there are strategies and action plans for use of some natural resources exist, there is very uneven development of good indicators going forward (e.g. https://www.bipindicators.net/about). This is largely due to Israeli occupation but there are also local issues that impede development and protection of resources. This is one of the reasons why we needed the new NBSAP slated to come out in 2022 to be very careful, detailed and most importantly must be IMPLEMENTED. There are many challenges to doing so. An example is enforcement of laws relating to environmental protection is limited due to the lack of Palestinian sovereignty issues. The state of Palestine has signed more than 42 international conventions and treaties in 2014 including basic human rights, international humanitarian law, and international criminal law, law and international public, environmental agreements pertaining to natural resources and arms. Earlier, 8 agreements were signed with the UNESCO after obtaining the State of Palestine membership in UNESCO in 2011. An excellent review entitled “Legal implications of accession of the State of Palestine to international conventions on resources and protection of natural resources” was published (Jaradat and Awad Allah, 2015). Joining international agreements consolidates the legal, political and international personality of the newly formed Palestinian State. In addition, it promotes momentum of the international solidarity, the sovereignty of the Palestinian State over its natural resources and geographical boundaries. These conventions and treaties are excellent podiums to address the world the Israeli occupation violations on all aspects of Palestinian people rights.

5. Loss of habitats

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

Palestine is located between Europe, Asia and Africa with an area of 27,000 km^2 (West Bank: 5,879 km^2, Gaza: 378 km^2) (UNEP 2003) and belongs to the African Tectonic plate which as a result of the plate collision resulted in having the northern part of the great Rift Valley located here (including the lowest point on earth at the Dead Sea). Palestine is also the western part of the Fertile Crescent where humans first developed agriculture (Qumsiyeh, 1996). Its unique geography and geology gave Palestine more biological diversity than some countries ten times its size. The diverse habitats cover five ecozones: the central highlands, the semi-coastal region, the eastern slope, the Jordan valley and the coastal region. Palestine also spans five phyto/bio-geographical regions (Mediterranean, Irano-Turanian, Saharo-Arabia, Coastal, and Sudanese). The total wooded areas in the State of Palestine in 1974 was 314,713 dunums (5.2% of the land mass) of which 209,510 dunums are naturally wooded (Abu Ayyash et al. 2007). This decreased by 29% from 1974 to 2007. Data is limited on further decline (see below). Like in other countries, decline stems from population growth, the industrial revolution and the consumerist society that developed leaving us with legacies like climate change and habitat destruction. Yet in our case, there is added pressure such as from political instability and the Israeli occupation.



Source: Ministry of Agriculture, Records 2020, 2020.

Figure 3.5 Forest areas in the State of Palestine between 1970 and 2020 (SP 2020b).

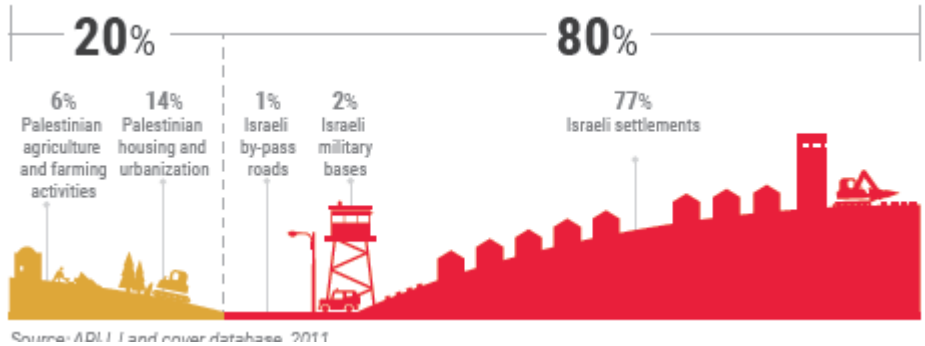
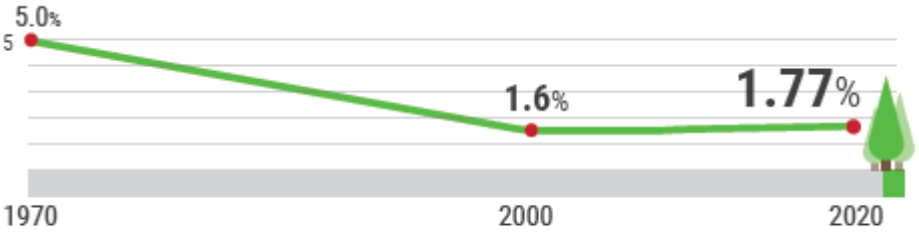


Figure 3.6 Causes of loss of forests (SP 2020b).



Source: Ministry of Agriculture, Records 2020, 2020.

Figure 3.7 Forest area as a percentage of the State of Palestine (SP 2020b).

After the 5th National report, Palestine improved its conservation efforts especially in Protected areas. The protected areas in Palestine account for 515 km^2 and the total area of WB and Gaza is 6,020 km^2 so that is about 9% of the State of Palestine. There are areas like Wadi Al Makhrour, Wadi Janata, Wadi Zarka Ulwi, Jinsafut in Wadi Qana, Faku'a village, and Wadi Quff that fared well (see ABT 11).

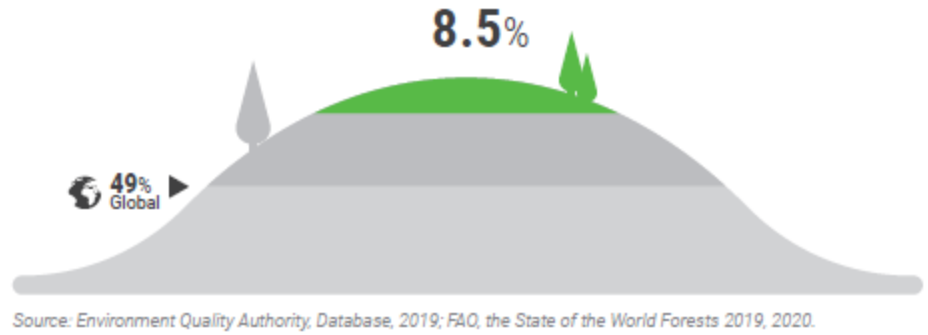


Figure 3.8 Coverage of protected areas of important sites for mountain biodiversity (SP 2020b).

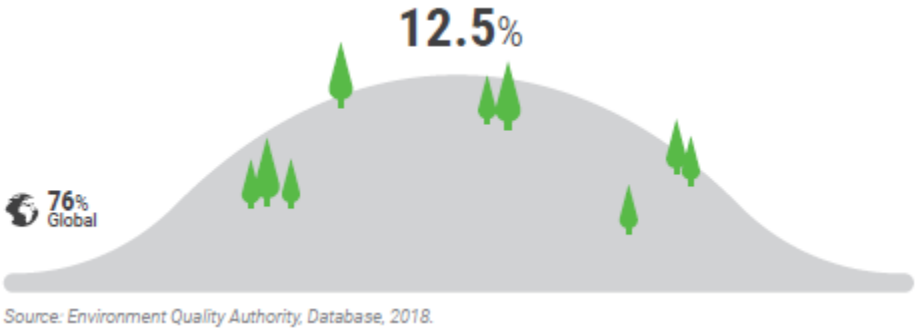


Figure 3.9 Mountain green cover index (SP 2020b)

After writing the cross-sectoral strategy (EQA 2017) the Palestinian Government committed resources and experts to increase environmental awareness and find funds to work on study and conserve the environment.

Conservation Plans were applied to increase the environmental knowledge between school students all over the West Bank and Applied by many NGOs and Academics organizations to increase awareness and decrease the damage to natural habitats. In Palestinian and Arab culture there are elements that can enhance protections. Galaty & Johnson (1990) explained the idea of Hima -- a communal property system developed by the nomadic pastoralists in the Middle East and North Africa but it was used widely by non-pastoralists as well. It restricted and regulated the use of lands for grazing, provided areas for use during droughts, and maintained the productivity of the range lands. Hima remained an important aspect of pastoral techniques in the Middle East and North Africa (e.g. from Jordan: https://www.iucn.org/downloads/iucn_aug_30.pdf).

Many areas benefitted from good management plans and progress in implementation in those areas with references (this is all done in the protected areas sections, see ABT 11).

According to the Palestinian Central Bureau of Statistics Data, the annual increase in the area of cultivated land reached 7,900 dunums during the year 2019, and it is expected to increase this area through reclamation and rehabilitation programs and greening projects to 9,671 dunums during the year 2021. The area of the new green areas that will be increased annually is about 2,000 dunums. This may contribute to improving the current status of the ecosystem, restoring it and limiting degradation.

Environmental threats are global in nature but are exacerbated in developing countries especially in regions of conflict. In Palestine, even in ancient times there is evidence of Canaanitic villages stripping their populations of gazelles. In the more modern era, forests in the Eastern Mediterranean region were cut down for household, industrial and commercial uses. Under British occupation (1917-1948), and Israeli and Jordanian rule (>1948) destruction continued but also interventions that were supposed to be beneficial like forestation were done mostly with European pine trees (monoculture of *Pinus halepensis*) (Qumsiyeh 1996). Under Israeli occupation and colonization, Palestinians were prevented not only from doing much of their usual agriculture but also from managing lands. Many forested hills were converted to residential Jewish-only colonial settlements (e.g. Jabal Abu-Ghneim became Har Homa colony near Bethlehem) and generated far more pollution than similar settlements inside Israel. The modern threats were not

unanticipated. For example, Ives (1950) discussed the land's capacity and the fact that trends started in the 1930s if continued would devastate the area. Not only was he right but more threats evolved since the 1950s (Qumsiyeh 1996; Tal 2002; Qumsiyeh 2004). Alon Tal acknowledged even before he wrote his book (2002) that: We came here to redeem a land and we end up contaminating it" (Beyer 1998).

The ranking of threats to the Palestinian Environment according to the 5th national CBD report are available and seem reasonable though could be adjusted when and if additional data become available (EQA 2015; Table. 1). Another report used the Delphi approach to ask some 'experts" what the main threats are and came up with a somewhat different answer (Abdallah and Swaileh 2011; AlHirsh et al. 2016). But the key threats need not even be prioritized to be analyzed. AlHirsh et al. (2016) used interviews with selected individuals involved in environmental issues in Palestine to see what are the threats that are most prominent to the majority of those individuals.

Table 3.9 Selected threats to the Palestinian environment (after EQA 2015)

Threats	**Threat ranking**	
	West Bank	Gaza
Habitats fragmentation (due to urbanization, destruction of forests, climate change, desertification, Israeli colonial activities)	Very High	Very High
Desertification and soil erosion (due to overgrazing, climate change, infrastructure construction etc.)	High	Very High
Urbanization and population growth	Very high	Medium
Removal of rocks for construction (stone queries etc.)	Very low	Very high
Uprooting trees	Low	High
Overgrazing	Low	Very low
Land degradation (poor planning, soil erosion etc.)	High	Very High
Invasive alien species	Medium	Medium
Climate change	Low	Medium
Overexploitation (including poaching, overfishing etc.).	High	Very High
Pollution (waste water, solid waste, use of chemical pesticides/insecticides/fertilizers)	Medium	Very high
Colonial residential and industrial settlements and associated infrastructure (like the Segregation wall) and its associated adverse effects including vegetation cover shaving, waste water pollution, and habitat fragmentation	Very high	Very low

Here we highlight three of the main threats to habitats:

- **Climate Change:** Human induced climate change will drastically effect the Arab world (Verner 2012). A World Bank study shows impacts include water resource decline will be drastic by 2040. In the West Bank and Gaza, while demand will double, supply will shrink dramatically! When coupled with population growth and habitat destruction (see Table 3.9), both the World Bank (Verner 2012) and the UN predict situation to become unlivable (UN 2012). Newer models attempt to integrate species own responses (ecologically, genetically etc.) in predicting changes in species distribution following climate change and its impact on the habitat (Lavergne et al. 2010). But preliminary data in Palestine in at least one study shows decline in vertebrate biodiversity as desertification spread into the Bethlehem District (Qumsiyeh et al. 2014).
- **Water and Liquid Waste**: The situation of water is becoming very critical in the MENA region. While it is clear how it impacts human health and wellbeing, it is also critical for the ecosystem. The government of the state of Israel which controls Palestinian (native) water claims there is a water shortage but the reality is there is simply unequal distribution (Stauffer 1996). For example, Israel diverts and uses most of the water resources of the Jordan River basin for irrigation farming through the so called "Israel national water carrier/canal" (Elmusa 1998). From 1250 million cubic meters (mcm) per year the river's flow decline to < 20 mcm (Soffer 1994). Palestinians used 140

pumping units along the Jordan river before 1967 and all were destroyed or confiscated by the occupation authorities. Now Palestinians use <0.5% of the river basin waters. After a thorough review of the hydrological data, Elmusa (1998) concluded that: "Israel takes 80-90% of the freshwater resources of geographic Palestine. … The disparity in extraction between the two sides has translated into a conspicuous water gap in all sectors. … The gap is even more conspicuous between the Palestinians and the Israeli settlers who consume five to six times as much per capita as do the Palestinians and are profligate irrigation water users (Elmusa 1998). The UN Commission on Human Rights reported in 2000 that: "The Palestinian use of the Jordan River before 1967 was through 140 pumping units. Israel either confiscated or destroyed all of those pumping units. In addition, Israel closed the large, irrigated areas of the Jordan Valley used by Palestinians, calling them military zones that later were transferred to Israeli settlers. At present Israel extracts more than 85 per cent of the Palestinian water from the West Bank aquifers"

Through military orders, all water in the occupied territories is designated "state owned by Israel" even though this violates the fourth Geneva Convention (UNEP 2003). Palestine (a state not recognized by Israel as the occupying authority) did attempt to draft water and other natural resources' laws. The Palestinian authority even failed to get Israel to agree to many waste water and solid waste projects. As Israel takes 91% of the West Bank Water resources, it provides much of it to illegal settlers (UN Commission of Human Rights 2000). It is obvious that all these measures contravene International law and conventions such as the 4th Geneva Convention and the International Covenant on Economic, Social and Cultural Rights (Elmusa 1998 Israel also declared places like the Jordan valley closed military zones. Vast tracks of Palestinian agricultural lands were thus essentially confiscated and many of them turned to Jewish settlements (Daibes and Daibes-Murad 2003).

The Oslo agreements was supposed to lead to ending the occupation but simply entrenched it with all attendant strengthening of Israeli control over the Natural resources including water. International treaties and laws pertaining to water were ignored in deference to "might makes right" (Tamimi 1996). Regardless of political outcomes, there is simply a very small geographic territory (historic Palestine) with one hydrological system (Elmusa 1998; Daibes and Daibes-Murad 2003). The situation in Gaza is now catastrophic and cannot continue (Baalousha 2006; UN 2012). Water desalination projects as solution in Gaza have their own environmental issues (see Assaf 2001).

The Israeli actions toward water sources have been catastrophic for nature biodiversity since the creation of "State of Israel", starting from drying out al Hula wetlands which eradicated life there and not ending with the Red Sea - Dead Sea Canal project. The latter is a prime environmental problem and should not have been implemented (the project already started). Its impact in the State of Palestine will be most acutely felt in the unnatural "replenishment" of the Dead Sea while leaving the Jordan valley essentially dry and with continued environmental deterioration. We did some work on this but much more research needs to be done and the summary of these things are beyond the scope of this report. More on these issues of water and waste are available under ABT8.

- **Occupation/colonization**: Palestine had an indigenous Canaanitic population going back thousands of years and living in small village communities with few urbanized areas (like Jerusalem, Hebron, and Nablus). At the dawn of the industrial revolution, the population was a few hundred thousand (3% Jewish, 13% Christian, 80% Muslim, 4% other). The industrial age and improvement in health resulted in population expansion but the Zionist project resulted in ethnic cleansing of most of the natives to be replaced by an immigrant mostly European Jewish population (Pappe 2006). Over 500 villages and towns were destroyed (most in 1948-1950, some in 1967). While Israel was created on 78% of Palestine, the remaining 22% was occupied in 1967. In 1967, Imwas village was depopulated and in its place Canada Park was built. In all other areas of the occupied territories, forests and vegetation cover was removed to build the Israeli settlements which now house hundreds of thousands of Israelis (Fig. 2). Simultaneously, rules were introduced that prevented Palestinians not only from doing much of their usual agriculture but also from managing forested lands or building in open spaces. Currently nearly one million Israelis live in the occupied West Bank (WB). The WB is also divided into several categories: Jerusalem annexed to Israel, area C under Israeli civil and military control, area B under Israeli military control only (18.3%) and Area A under Palestinian civil and partial security control (17.7%) (Isaac and Hilal, 2011; ARIJ 2015). 30% of the territory is designated as closed military zones and "nature reserves" (these are occasionally reclassified to

allow colonization). Israeli colonies were built on hilltops to fit into a pattern as to control the natural resources and control the native Palestinians (Benvenisti 2002; Weizman 2012). Environmental and human sustainability were not taken into considerations in these political decisions (ARIJ 2015). Untreated sewage water is discharged by settlers on Palestinian areas (ARIJ 2005; Newman 2009). Israeli polluting industries were built near Palestinian communities in the occupied territories (due totax incentives and lax laws). Gishuri Industries as an example manufactures pesticides and fertilizers next to Tulkarm. Significant pollution from this and other companies in this area has damaged citrus and vineyards (ARIJ 2015). We also showed significant genotoxic effect of the Barqan Industrial settlement on Burqeen village (Hammad and Qumsiyeh 2013). Israel built "by-pass" roads and other infrastructure in the occupied areas to serve the Jewish colonies. Lands were confiscated to build these, including extra "security zones and buffers" around roads, walls, etc. The landscape was severely damaged 51.2 km2 were destroyed just in 2000 for roads that do not served the local population. Land that was used by Palestinians or by wildlife thus was urbanized. Palestinians in the West Bank make 2.5 million people living in a built up area of 367.7 km2; a density of 6800 Palestinians per square kilometer which is 10 times more dense than for Israelis (ARIJ 2015). The disparity between settlers and natives in land control, economy, and access is also compounded by disparity in use of natural resources discussed earlier (Gordon 2008; Weizman 2012). There are many other issues where the occupation negatively impacts sustainable development and the environment (MOPAD 2014). For example, tourism industry was mostly taken over and it is supporting Israeli economy while negatively impacting the Palestinian economy and the Palestinian environment (Shay 2016; Isaac et al. 2016). Another example is the destruction of Bedouins life in the Negev (creating "concentration areas" for them) (Weizman et al. 2015).

Politics trumping facts can be devastating to understanding of issues like environment and water. For example, deliberately misstating facts, hiding them, selectively representing uncertainty and much more was done by Israeli officials to serve their political interests in the Jordan River basin (Messerschmid and Selby 2015). Israel's unilateral actions of colonial settlement expansion and destruction of native lives has had devastating impacts on the Palestinian environment and raises significant questions about the possibility of planning let alone sustainability under occupation (Isaac et al. 2004). There may be good reason to engage in legal proceedings that would be backed by good research and enlisting the services of good legal scholars and lawyers to pursue clams of environmental injustice and damages at local, national, and international fora. The term "Green-washing the occupation" comes to mind when we realize that in many cases Israel takes land on the pretext of protecting it only to build colonies on it (Etkes and Ofran 2007). Ras Imweis and adjacent areas is a good example of this (became the settlement Nahal Shilo). "Nature Reserves" and closed areas became pretexts for land confiscation. Such exploitation was obvious in Bethlehem Governorate, when Har Homa settlement was established in 1997 on Abu Ghneim Mountain

Conclusion: There is significant shortage of data on this target and it has not been managed well in the past. After writing the cross-sectoral strategy (EQA 2017) the Palestinian Government committed resources and experts to conserve the environment. The EQA has also just engaged with IUCN and others on analysis of levels of protection in different KBAs including a gap analysis. This project is for 2021-2022 and should result in better protection. However, much depends on political developments in the next few years and if a just peace agreement is implemented and our EQA and other stakeholders have actual access and responsibility on natural resources of Palestine, we can achieve much more in protection. Further better management and measures taken to stem loss of habitats and species should be now incorporated in the new NBSAP (to be completed in 2022). Also a new spatial plan going to 2050 is being worked on now that takes into consideration environmental needs and protection

6. Sustainable fisheries

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

Historic Palestine had access to both the Red Sea and the Mediterranean Sea. As the envisioned Palestinian state (in the making) includes only 22% of historic Palestine (West Bank and Gaza Strip). The Gaza Strip represents the only region in Palestine through which aquatic biodiversity is represented on the Mediterranean Sea. The Gaza Strip is a 378 km2 arid strip of the Palestinian land along the southeastern

Mediterranean. About 2.0 million residents, of whom the majority is United Nations-registered refugees, are living in the five governates of the Gaza Strip (North Gaza, Gaza, Middle, Khan Younis and Rafah). Gaza City is the largest city in the Gaza Strip. It has a total area of about 56 km2, and a population of about 700,000 people, making it one of the most densely populated cities in the world (Abd Rabou et al., 2019). In light of the Israeli occupation siege on the Gaza Strip and the lack of resources, the fishing profession has become one of the most attractive sectors in order to provide daily substance for the population, despite the obstacles and challenges of the Israeli occupation as a result of limiting the fishing area and the harassment faced by fishermen and researchers working at sea. This situation led to the overfishing of marine biodiversity and threatening of many marine species. It was found that the amount of Caught Fish in Gaza Strip in 2018 is 3,038.90 metric tons.

The Gaza Strip suffers from various environmental, political, economic and social crises that negatively impact scientific research on the marine and coastal environments and fisheries. The few existing studies are on species that are food stock or those that negatively affect fishermen and their fishing equipment. For example the Silver-cheeked Toadfish (*Lagocephalus sceleratus*) causes damage to fishing nets, lines and hooks and consumption of the Silver-cheeked Toadfish causes cases of hospitalization that have been reported in the Gaza Strip (Abd Rabou 2019).

Within Palestine, it was reported that reptiles are approximately 81 species, of which six are aquatic and the rest are terrestrial (Werner, 1989; Ali-Shtayeh & Hamad, 1995). The extinct species is the Nile crocodile. The Gaza Environmental Profile (1994) had identified the sea turtle species *Caretta caretta* (Loggerhead turtle) and *Chelonia mydas* (Green turtle) as existing in the coastal region of Gaza Strip. Turtle nesting areas are reported by The Coastal Zone Plan for Gaza Strip (MOPIC, 1996). However, these species and their eggs face extreme danger due to hunting and collecting. It was demonstrated that there are two dolphin species in the Gaza strip; the Bottlenose Dolphin *Tursiops truncatus* and the Common Dolphin *Delphinus delphis*. Moreover, the status of the Monk seals, *Monachus monachus*, remains unclear. However, studies conducted about marine biota are insufficient in Palestine, thus minor documents are found concerning the status of marine mammals in the Gaza Strip area (Gaza Environmental Profile, 1994).

University initiatives to preserve samples of some species, such as the biology exhibition of the Islamic University of Gaza provided some educational value, which was a reservoir of preserved vertebrate fauna of various categories which contain 60 species belonging to 31 families (Abd Rabou, 2020). Much more structural changes are needed to promote institutional or individual interest in the marine environment (Abd Rabou, 2013; Abd Rabou et al. 2007). The lack of human and material resources limited studies on marine organisms. Some documentation exists of species of economic value or those having an impact on the people of the area.

During the second scientific conference at the Islamic University of Gaza to determine the priorities of scientific research in Palestine, the chief aspects of scientific research in the field of aquatic biodiversity were classification of marine fishes, assessment of the status of the globally threatened marine turtles, the study of birds and mammals inhabiting the Eastern Mediterranean, diversity of marine invertebrates, the diversity and uses of marine algae, and fish diseases and parasites. Fisheries and fish farming include aquaculture and other tools to satisfy the increasing food needs of a rapidly growing population. Pollution of the marine environment by both wastewater and brine of the current and future seawater desalination plants affects the health of the marine ecosystem. The conference recommended establishing marine science departments and research centers within Palestinian institutions and universities. It also recommended expanding scientific research in marine biology aiming towards sustainability .

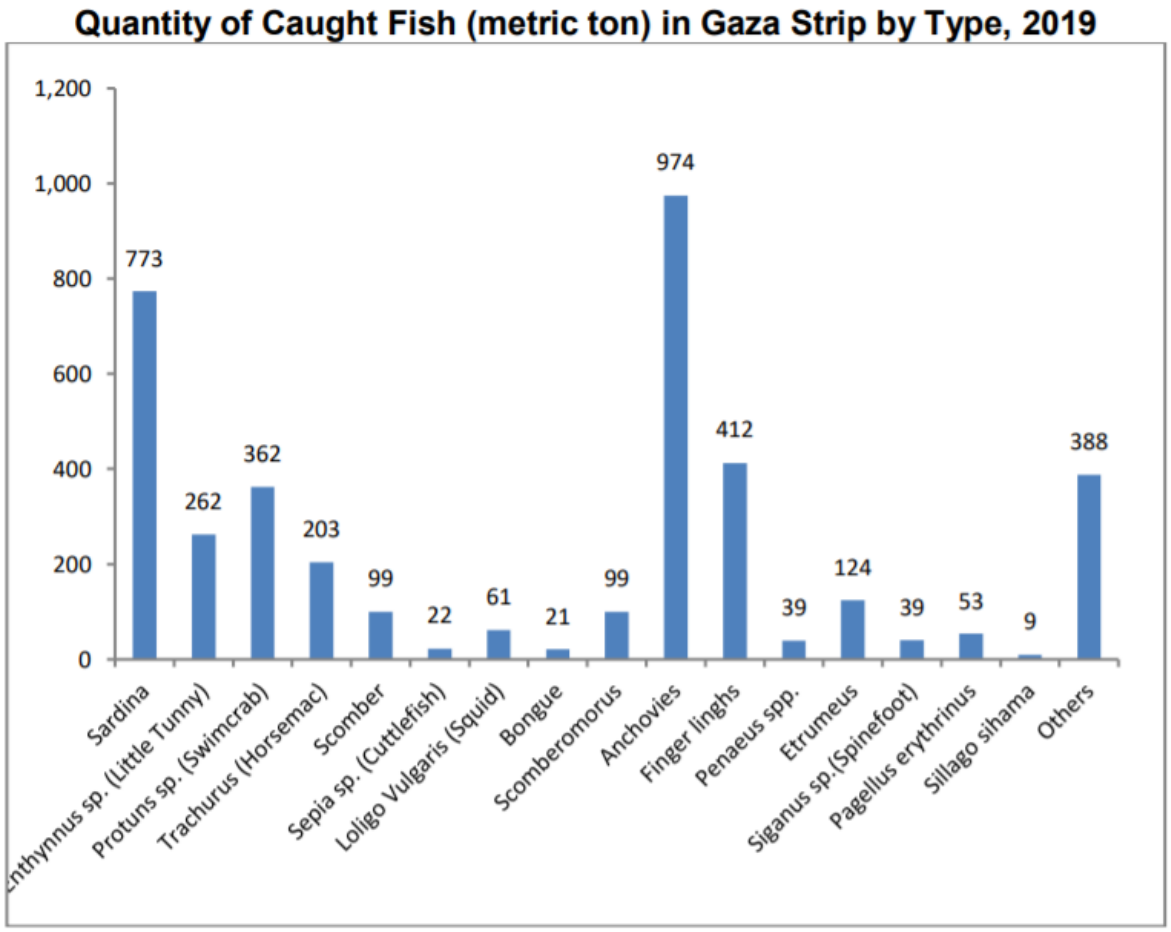


Figure 3.10 Quantity of Caught Fish (metric ton) in Gaza Strip by type, 2019.

The Gaza coastal line is 42 km long. The coastal land and sea zone of Gaza is facing serious environmental threats because of the limited land resources, large and rapidly growing population (most of it refugees), long term isolation as result of the regional political circumstances and an underdeveloped environmental protection system which caused serious deterioration of land and water resources as well as pollution of various compartments of the coastal environment. Meanwhile, depletion of sand resources, erosion, disturbance in marine and coastal ecology, pollution by wastewater and solid waste are the most significant problems and threats, resulting from faulty practices and activities posing a health risk for swimmers, marine life, the quality of fish and coastal pollution. There are other problems and threats institutionally such as lack of cooperation among the parties concerned and lack of access to information. As a result, different authorities and stakeholders may have different agendas for coastal and marine development issues and the fishery sector, and they have not yet set out their stall.

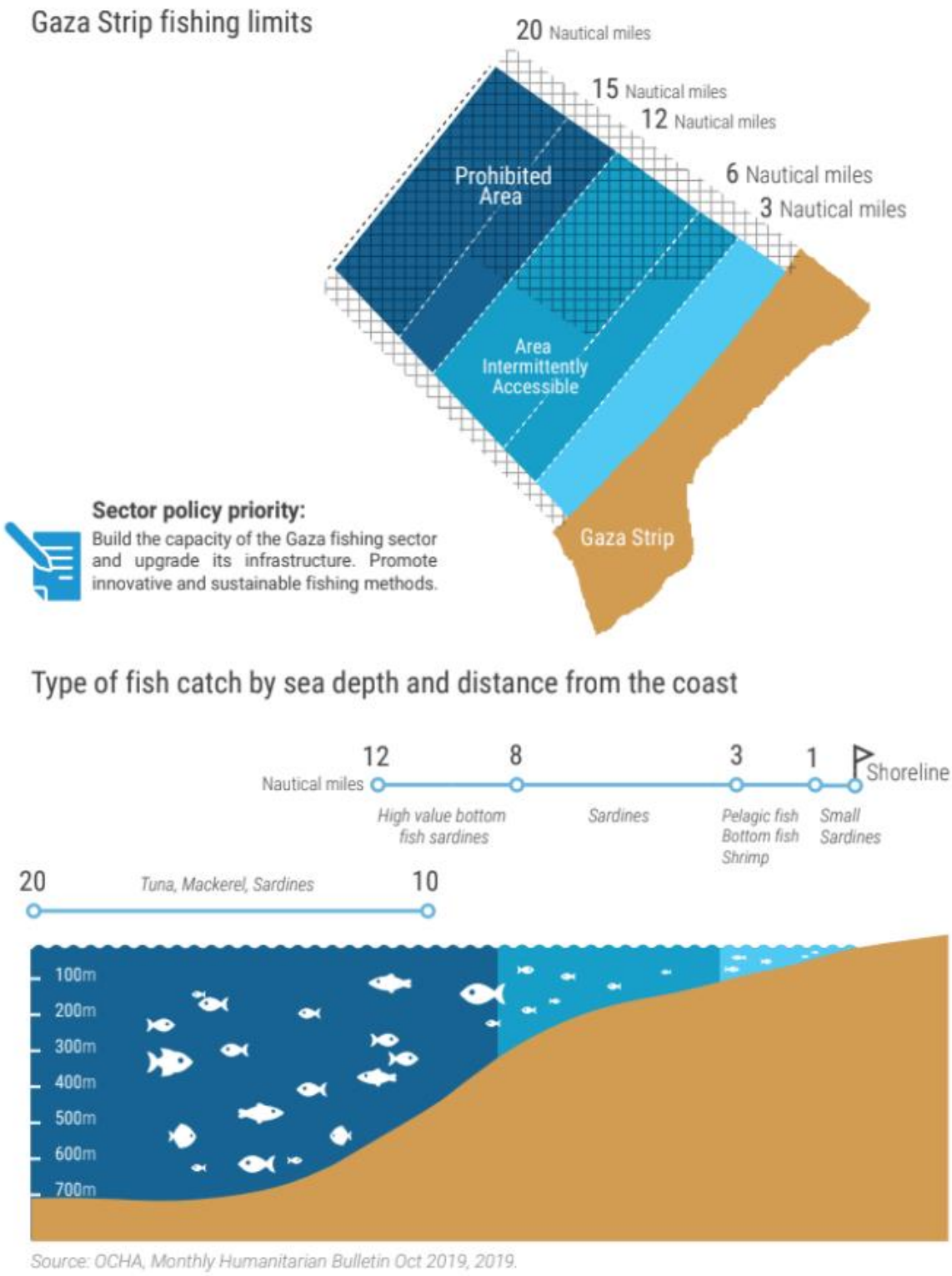


Figure 3.11 Gaza coastal areas with limited fishing due to Israeli occupation policies. Bottom: Type of fish caught and fishing zones distance from sea (SP 2020b).

The marine life of the Gaza strip is found in different types of habitats (Pelagic, Epipelagic, Benthic muddy, Benthic sandy, Benthic rocky, Benthic vegetation) and the use of multiple habitat types is common for many species. However, different fish species are coming under severe marine environmental pressure owing to the removal of rocks in the shallow coastal zone to be used in construction. In particular, the marine area of the Gaza strip between 20 and 200 meters where most fishing activities take place puts the fish under severe pressure.

Table 3.10 Pressures and the associated impacts of the marine ecosystem

Pressure	Impact
Increasing fishing efforts (Overfishing)	Deterioration of fish population Non-sustainable fish population growth Destruction of fish habitats, i.e. habitats for spawning, nursery feeding.
Waste water discharge	Untreated sewage affects marine life, including phytoplankton, zooplankton, crustaceans, macro-algae, and (juvenile) fish. Oxygen deficiency of water Eutrophication (the increase of the nutrient concentration) may cause: Algal blooms that may be harmful Excessive bacterial growth. Shift in species composition which encourages the abundance of benthic species rather than pelagic species. Poisoning of species by toxic substances An increase in turbidity may affect marine organisms.
Removal of rocks for construction	Destruction of fish habitat, shelter, and marine flora Increases erosion rate
Solid waste dumping	Affects respiration of fish Many solid wastes are toxic Decrease of habitat availability and quality Obstruction of fishing activities
Unlicensed fishing	Catch of fish including small fish, without control (in spawning season).
Agriculture (run-off and discharge of pesticides and fertilizers)	Toxic effects of pesticides and eutrophication by fertilizers
Pesticide fishing	Affects the fish population and the food chain, and may cause serious diseases to humans.
Oil spills	Toxic
Coastal structures	Habitat destruction Changed sedimentation or erosion rates
Wadi Gaza flooding	Pollution of marine water and destruction of marine habitat
Sand mining	Habitat destruction
Invasive species	Pressures include competition with native species and destruction of natural marine habitats (Abu Amra, 2018)

Proposed and needed projects to protect and sustain marine life in Gaza strip (adding to Safieh 2000) include:

1. **Sewage treatment project**: beach camp shore protection, rehabilitation of threatened plants in sand dunes, research, a training project for fishermen, and Wadi Gaza protection.
2. There is a **lack of marine studies** (research and education) which contributes to a gap in the knowledge in these areas and detract from proper planning for conservation.

3. There is an issue of **inaccessibility and lack of sovereignty of the native people on their coastal waters** (because of the Israeli occupation), limited fishing area, overfishing and pollution of the marine environment with different pollutants especially wastewater which adversely impact the health of the marine ecosystem and its biological content (Abd Rabou, 2013; Abd Rabou et al., 2007).
4. **High density of population and de-development** caused by large populations of refugees not being allowed to return to their homes and lands and by persistent occupation and its policies.

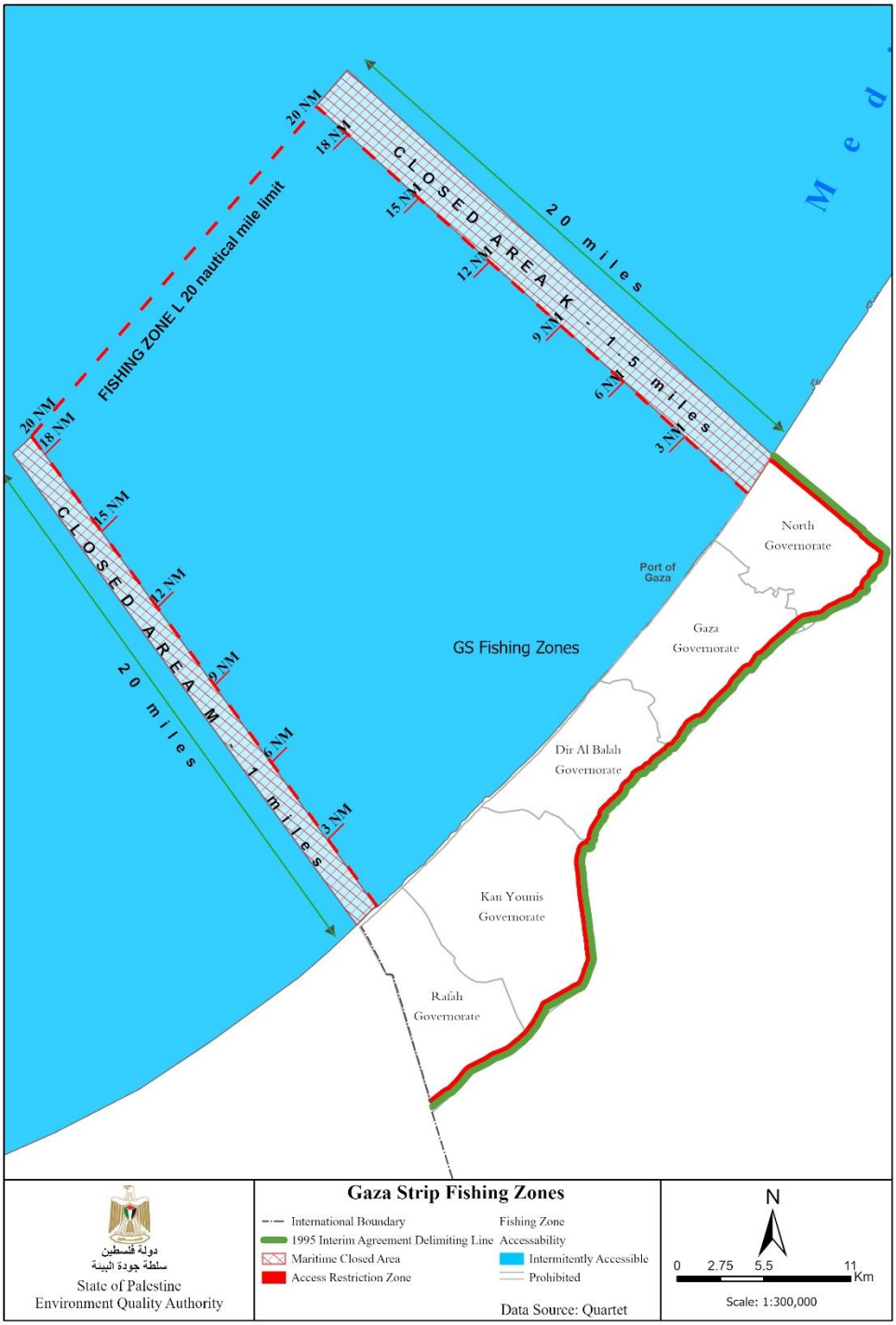


Figure 3.12 Gaza Strip fishing zones

Table 3.11 Quantity of Aquaculture of Fish in Palestine by Governorate and Type, 2018 (PCBS 2020). Quantity in Metric Tons

Total	Type of Fish					Governorate
	European sea bass	Gilthead seabream	Striped Bass	Carp	Nile tilapia	
599	50	450	2	5	92	Palestine
29	-	-	2	5	22	West Bank
570	50	450	0	0	70	Gaza Strip

Table 3.12 Quantity of Caught Fish in Gaza Strip by Governorate and Type, 2018

Governorate	**Gaza Strip**
Type of Fish	Quantity In Kilogram
Anchovies	562,189
Bongue	27,275
Enthynnus sp. (Little Tunny)	137,382
Etrumeus	91,557
Finger linghs	222,051
Loligo Vulgaris (Squid)	134,241
Pagellus erythrinus	66,918
Penaeus spp.	129,227
Protuns sp. (Swimcrab)	442,357
Sardina	480,158
Scomber	221,660
Scombero-morus	64,181
Sepia sp. (Cuttlefish)	16,057
Siganus sp.(Spinefoot)	82,535
Sillago sihama	51,172
Trachurus (Horsemac)	84,001
Others	225,904
Total	3,038,865

Table 3.13 Caught fish off of Gaza with number of fisherman and boats 2004-2018 (PCBS portal)

Variable	**2004**	**2014**	**2015**	**2016**	**2017**	**2018**
Amount of Caught Fish (metric ton)	2,951.30	2,853.84	3,226.42	3,305.74	3,206.40	3,038.90
Number of Fishermen	2,998	4,341	3,617	3,617	3,617	3,617
Number of Boats used in Fishing	725	1,071	1,261	1,261	1,261	1,261

Successive wars on Gaza strip and the thousands of tons of waste from building destruction which is polluted with things like depleted uranium and white phosphorus leaches also into the Mediterranean with rainwater adding harm to the marine environment.

Conclusion: The marine ecosystem of the coast of Gaza is suffering from overfishing and pollution (see also ABT 8). Part of the issue is the blockade of Gaza and ongoing Israeli violations of signed agreements and international law. The Palestinian government has essentially no access to manage this issue under occupation.

7. Areas under sustainable management

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

Palestinian agriculture was developed during the Natufian period and was relatively in harmony with nature for over 10,000 years. The modern practices of agriculture, especially pest control methods via chemical means, have resulted in significant environmental hazards. The introduction of pesticides came under British mandate rule, 1920-1948, and was expanded after the formation of the state of Israel in 1948. Pesticides are now used extensively in Palestinian agriculture, and this is partly due to the reduction in the land available to Palestinian agriculture. under the mistaken belief that use of pesticides is indispensable to increase yield (Saleh et al., 1995). Even in impoverished Gaza, there is significant pesticide use on limited land (see Abu

Middain, 1994) and nitrates seem to affect the health of people in Gaza (Abu Naser et al., 2007, Al-Absi, 2008). The national Spatial plan developed in 2014 regulates the different land use plans mainly the agricultural lands which are categorized as high value and medium value lands (SP 2014).

Nearly 30% of Palestinians are employed in the agricultural sector, and this is directly relevant to biodiversity and environmental conservation. With increasingly limited land and water resources, some intensive agricultural practices have been adopted that are harmful to our environment. For example, insecticide use has gone up in areas like Tubas district. Agricultural practices that are not ensuring agricultural biodiversity nor rotating crops (i.e. monoculture and "agriculture industry") are devastating to sustainability and environmental protection (Garnett et al., 2013; Tscharntke et al., 2012; Wezel, 2014). Agricultural biodiversity websites like this http://www.bioversityinternational.org/ are now important to study and be aware of and the MoA is the key to this. The conservation of agrobiodiversity became part of the national agenda when the MoA adopted a national policy for "promoting the conservation of Agrobiodiversity". Most of the agrobiodiversity relates to crops dependent on rainfall (ba'al or dryland farming) not irrigated crops.

The National Agriculture Sector Strategy "Resilience and Development" 2014 – 2016 identified four strategic objectives for 2014–2016: 1) Ensure farmers' resilience and attachment to their land, while fulfilling the contribution of the agriculture sector in providing essentials for the development of the State of Palestine; 2) Efficient and sustainable management of natural resources; 3) Enhanced agricultural production, productivity and competitiveness, as well as enhanced contribution of agriculture to food security; and 4) The agriculture sector has effective and efficient capacities, institutional frameworks, legal environment, infrastructure and agricultural services.

The Directorate for Forests, Rangelands and Wildlife has offices in all governorates of the West Bank. Forty rangers are responsible for inspecting and patrolling the protected areas and the natural forests throughout the areas under the jurisdiction of the MoA. Of the 19 protected areas that were handed over to the Palestinian Authority under the Oslo agreement, only eight are under the actual control of MoA, amounting to less than 15 sq km. The remaining 10 are within area C or overlapped areas.

Table 3.14 Protected areas that are under the Ministry of Agriculture control.

Nature Reserve	Governorate	Area in Donnom
Tayyasir	Jenin	1,200
Sirris	Jenin	1,118
Um-Altutt	Jenin	320
Shoubash	Jenin	5,000
Tammoun	Tubas	4,300
Al-Hashmee	Ramallah	200
Al Qarn	Hebron	50
Wadi Al-Quff	Hebron	2,500
Total		14,688

There are no new updates from the Palestinian Central Bureau of Statistics on agricultural statistics in Palestine after the year 2015.

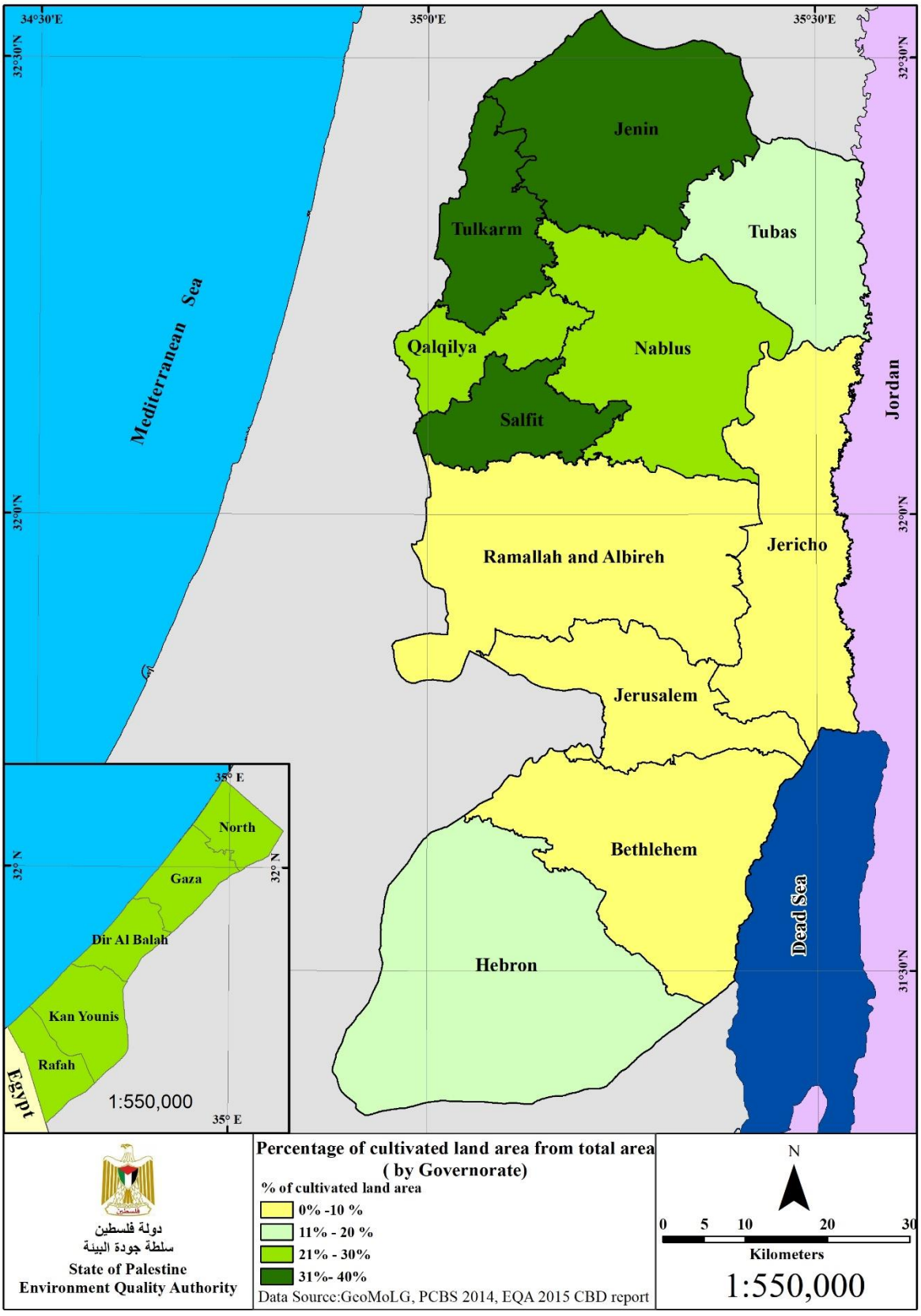


Figure 3.13 Percentage of cultivated land area from total area by Governorate, 2010/2011. (Raw data from PCBS, 2014 but modified by EQA 2015 CBD report).

Palestine is part of the fertile Crescent where humans first developed agricultural practices including domestication of plants and Animals. Wadi Al-Natuf as a valley in the northern West Bank was the first place archaeologists identified such areas and hence we speak of Natufian Agriculture (see Bar-Yosef 1998). Both irrigated agriculture and rain-fed farming are practiced (Isaac and Gasteyer, 1995). Rainfed agriculture makes up 95% of the agricultural land in the West Bank and 40% in the Gaza Strip. Irrigated agriculture, practiced by both Jewish Settlers and Palestinian farmers, could potentially have a negative effect on long-term sustainability. Intensive discharge of ground water and use of fertilizers, pesticides, other chemicals and non-degradable materials such as plastics, present a threat to biodiversity, as they are hazardous not only to the soil, but to all the surrounding plant species and wildlife.

Decline in agriculture: In 2011, PCBS reports estimated that the value of Palestinian agricultural production was $1,295 million (70% in the West Bank, and 30% in the Gaza Strip) (PCBS, 2012). But the agricultural sector's contribution to the Palestinian gross domestic product (GDP) was only 4.1% in the year 2013, and 3.4% of the GDP of the West Bank (PCBS, 2014). The cultivated area decreased from 1,904, 000 dunums during the growing season of 1994/1995 to 1,612,000 dunums during the growing season of 1998/1999, then to 1,034,901 dunums in the growing season of 2010/2011 (PCBS, 1997, 2001, 2011). One result has been that total cultivated area in the West Bank has fallen from 47% at the start of 1967, to less than 20% in 1994 (Isaac and Gasteyer, 1995). Also contributing to this was the lack of reliable markets, in large part because of Israeli restrictions which have led to many farmers working outside of agriculture, and thus spending less time than might be necessary in the maintenance of rain-fed crops. It is also the case that tenure arrangements and restrictions on land use have diminished the size of agricultural plots, thus greatly diminishing the production potential for any individual farmers. The combination of these things, along with an often low amount of rainfall and a variation in precipitation due to adverse effects of climate change in different years, has meant that much of rain-fed agriculture in SP operates far below its development potential.

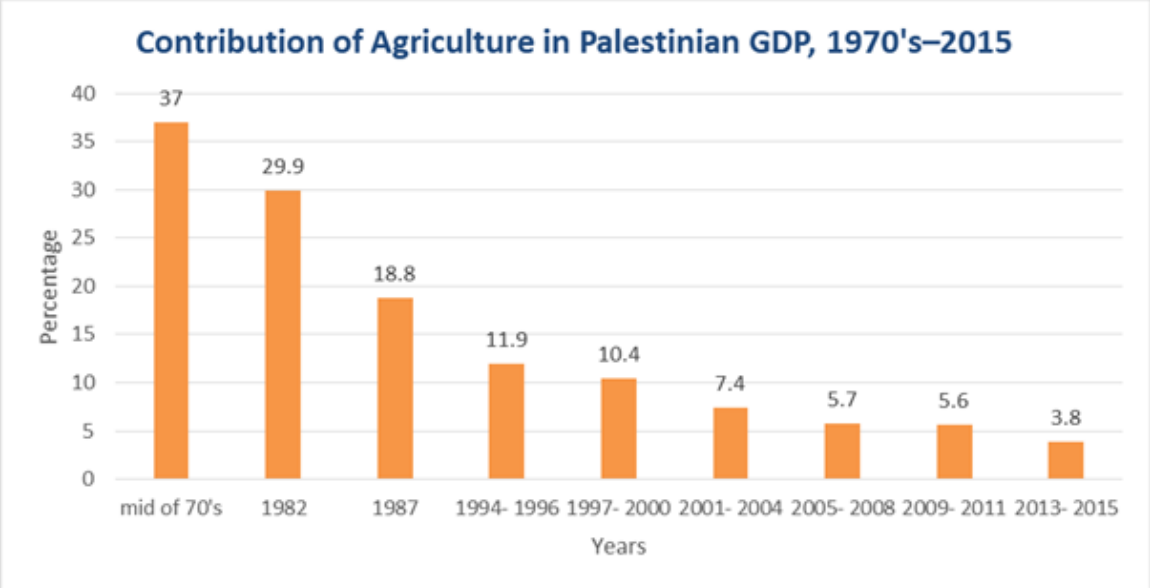


Figure 3.14 Contribution of Agriculture in Palestinian GDP, 1970's-2015 (MoA, 2016; El Zein, 2017).

There are several reasons for the decline of the agricultural sector's contribution to GDP over the years, but one of the main reasons is the growth in other sectors such as services, construction, and information technology. This has caused a significant reduction in agriculture's contribution to employment over the years.

Since 2006, the agricultural sector has witnessed a significant decline in the number of agricultural workers, for both women and men, due to restrictions imposed on the sector's development and its low production. In 2006, the labor force in the agricultural sector constituted 16.7% of the total labor force (12.6% male, 35.1% female), falling to 8.7% in 2015 (PCBS, 2000-2015). The percentage of men working in the sector was estimated at 7.8% of total male workers in 2015, while 13.1% of total female workers were employed in agriculture, which indicates the relative importance of the agricultural sector to women (MoA, 2016). Breghieth and Qanam (1998) remain the only group to assess both the use-values and non-use values of Palestinian Forests.

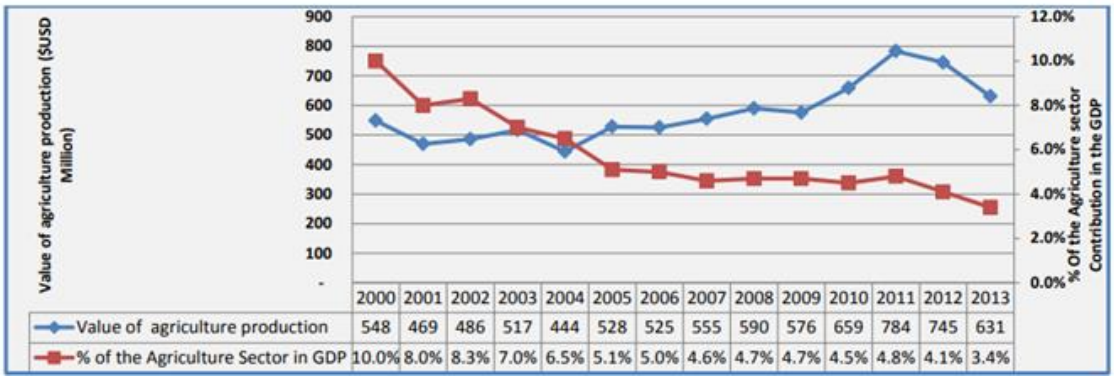


Figure 3.15 Agricultural sector's contribution to the Palestinian GDP, 2000 – 2013 (PCBS, 2014).

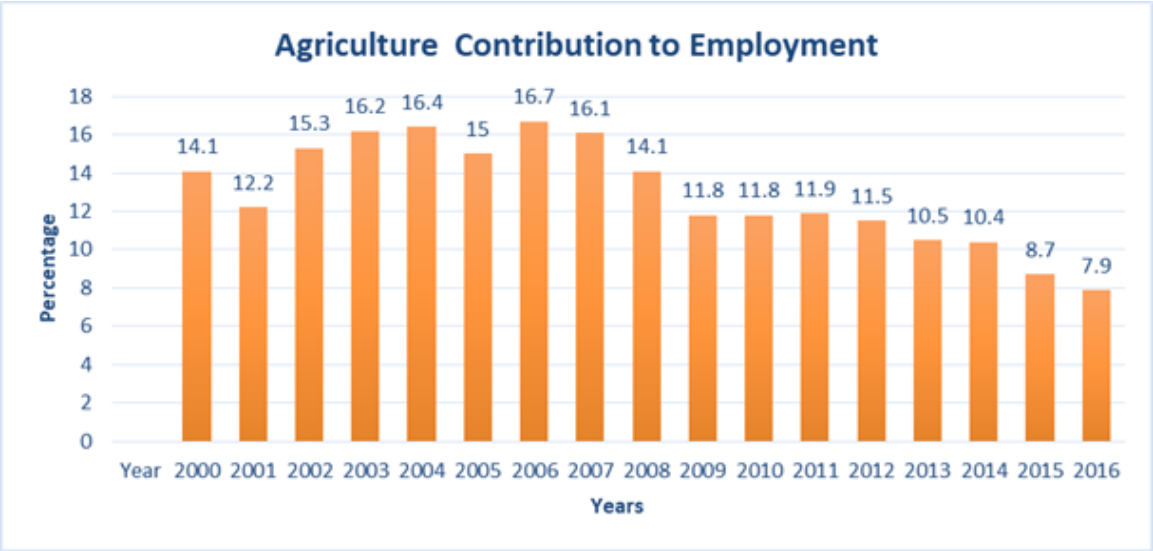


Figure 3.16 Agricultural Contribution to Employment. Source: PCBS, 2000-2016 and declining value relative to GDP. Value of agricultural production not adjusted to inflation.

Table 3.15 Basic Changes for the Livestock in Palestine, 2015 – 2018

Variable*	2015	2016	2017	2018
Number of Vaccines given to the Animals(1)	1,088,528	1,156,236	1,762,807	1,726,217
Number of Slaughtered Cows(2)	33,129	33,285	37,437	51,327
Number of Slaughtered Sheep(2)	42,354	37,365	41,351	61,399
Number of Slaughtered Goats(2)	4,004	4,384	3,957	6,197
Produced Broiler Chicks (thousand)(3)	75,536	86,739	98,016	88,630
Produced Layered Chicks (thousand)(3)	767.1	..	432.0	532

PCBS http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/livestock-2018-E-TimeSeries.html

Table 3.16 Values of Palestinian Forests

Table 3: Values of Palestinian Forests

Valuation Method / Output	Quantity	Value (US$1998)	Value (€2008)
Market price valuation			
Timber (m3)	1,500	125,000	141,400
Firewood (m3)	1,500	75,000	84,800
Seeds, stone fruits (t)	500	200,000	226,200
Medicinal plants (t)	700	245,000	277,000
Natural fruits (t)	300	90,000	101,800
Dyes and other colouring items (t)	50	15,000	17,000
Others	-	40,000	45,200
Substitute goods pricing			
Grazing (t of fodder)	5,040	504,000	570,000
Total direct use values		1,294,000	1,463,400

Source: Breghiet and Qanam 1998, cited in Merlo and Croitoru 2005, p. 142. Euro values converted to 2008 Euro based on harmonised historic inflation figures (HICP).

Table 3.17 Economic Forecasts in Palestine for the Year 2020, in light of the Current Coronavirus Pandemic for the most Important Macroeconomic Indicators (PCBS 2020b). Value in USD Million

Indicator	2019	Baseline Scenario for 2020	Scenario on the Continuation of the Pandemic 2020 for 3 Months	Losses in 2020 (Difference between Baseline Scenario and Pandemic Scenario)	Percentage of Change in Normal Status (Baseline Scenario for 2020(Compared to 2019 %	Percentage of Change in Pandemic Scenario for 2020 compared to 2019 %
GDP Components by Expenditure Side						
Gross Domestic Product	15,764	16,137	13,638	-2,499	2.4	-13.5
Final consumption	17,310	17,746	16,409	-1,337	2.5	-5.2
Gross Capital Formation	4,199	4,432	2,376	-2,056	5.6	-43.4
Net exports of goods and services	-5,745	-6,040	-5,146	894	5.1	-10.4
Gross exports	2,624	2,725	2,570	-155	3.9	-2.0
Gross Imports	8,368	8,766	7,716	-1,049	4.7	-7.8
Economic Activities						
Agriculture, forestry and fishing	1,092	1,131	931	200-	3.7	14.7-

Conclusion: The work done in central planning and management on this target were partially effective. The National Agricultural Sector Strategy Update "Resilient and Sustainable Agriculture 2021-2023" has introduced new measures and the new NBSAP (slated for 2022) will have more action plans that ensures better planning in this area. Yet, continued Israeli occupation had and could have more negative ramifications as many agricultural lands in the state of Palestine are being developed by Israeli agriculture that is

industrialized and sustainable management of these lands become difficult without sovereignty. Finally, a new national spatial plan is being worked on that if implemented would allow the state of Palestine to comply with the SDGs and with all the ABTs here as well as the new plans being formulated by CBD mainly the development of the post-2020 global biodiversity framework and to comply with other planned conventions. We are incorporating such issues in the new (released in 2022) NBSAP.

8. Pollution

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

Palestine has made some advances towards ABT 8 by doing more research on pollution in recent years. This includes research on noise pollution (Hustim et al. 2018), groundwater pollution (Aliewi and Al-Khatib 2015), drinking water pollution (Daghara et al. 2019), air pollution (Jodeh et al. 2018), heavy metal pollution (Zaqoot et al. 2018), and landfill impacts (Salah et al. 2019) among other studies. Qureitem et al. (2020) have published an inventory of main greenhouse gas emissions in Palestine. There have also been other studies on the reduction/control possibilities of pollution in Palestine (El Baba et al. 2015; Khayat 2020).

Analysis of Waste Management Policies in Palestine (ARIJ 2005): Solid waste and wastewater management in the West Bank has never been achieved on an environmental assessment basis due to neglected infrastructure during the Israeli occupation. The current waste management has negatively affected the environment and resulted deleterious damage in natural resources and biodiversity and also introduced serious public health problems and risks due to contamination of water, food and air. The study showed that Palestinians are aware of the aforementioned problems and willing to participate in decision making plans to find practical, economically feasible and environmentally friendly solutions to such problems.

Development of a National Master Plan for Hazardous Waste Management (EQA, 2010) The main aim of the plan is to establish a sustainable and environmental management of hazardous waste through a National Hazardous Waste Management Plan (NHWMP). This aim can be achieved through the accomplishment of an inventory, strategy and a capacity building program of the Hazardous Waste Management. The plan sets explicitly direct objectives: 1) effective management of hazardous waste, to prevent environmental pollution and adverse health effects due to its improper handling & disposal. 2) an appropriate master plan for the regulatory bodies, generators of hazardous waste, its re-cyclers and operators of facilities to minimize, recycle, treat and dispose of leftover hazardous waste in an environmentally sound manner. 3) design an implementation plan on management aspects of hazardous waste, and to fulfill obligations under the Basel Convention on Trans-boundary movement of hazardous wastes including their minimization environmentally sound management and active promotion of transfer and use of cleaner technologies. 4) appropriate clean technology for the industrial Palestinian sectors. The plan addresses the appropriate treatment of all hazardous waste (including industrial, medical, agriculture etc.). The implementation of the strategic management plan integrates all stakeholders including ministries and institutions that play part in strategic plans and policy making.

Country report on the solid waste management (GIZ, 2014). This report is an updated and restructured illustration of municipal solid waste management, legislation, policies, institutional and financial aspects. It also addressed several other streams such as hazardous waste, agricultural and green waste, oil and lubricant waste, medical waste, e-waste, and packaging waste which was not addressed in depth in the previous report. The municipal solid waste generation in 2013 is at 0.94 kg/capita/day, with an increase of about 1% per capita per year. Waste collection rate reached 91.5% of households in 2013. Sanitary disposal is increasing in the country where 33% of the waste generated is currently disposed of in sanitary landfills. The recommendations of the report are concluded:

- Developing standards and environmental operational guidelines for sanitary landfills and transfer stations
- Reviewing and amending the drafted bylaw on solid waste management to address new developments in the solid waste sector
- Capacity building to the justice sector on solid waste management issues to support laws enforcement
- Conducting inventory on e-waste and inventory on C&D waste.

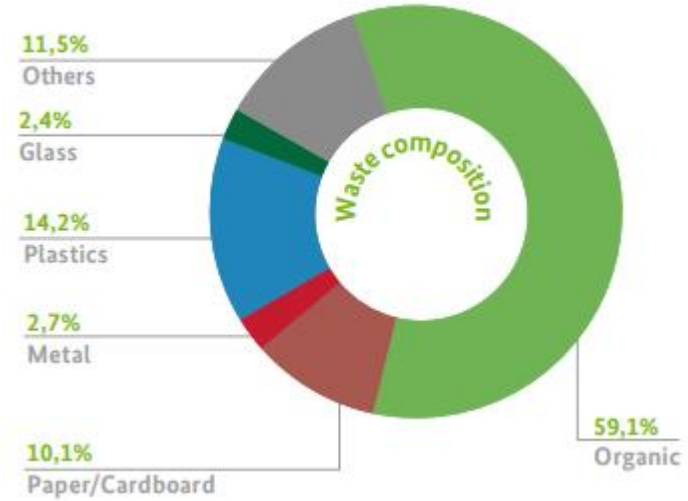


Figure 3.17 Waste composition in the West Bank (SP 2020b)

Figure 3.18 Sewage water effluent and sewage treatment plants in Gaza coastline (SP 2020b)

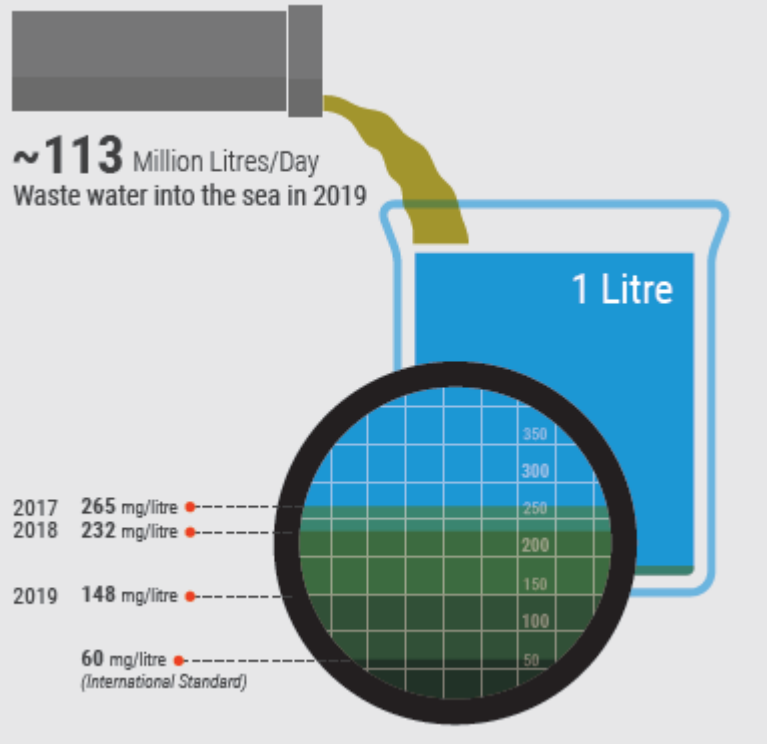


Figure 3.19 Pollution in Gaza Sea (SP 2020b)

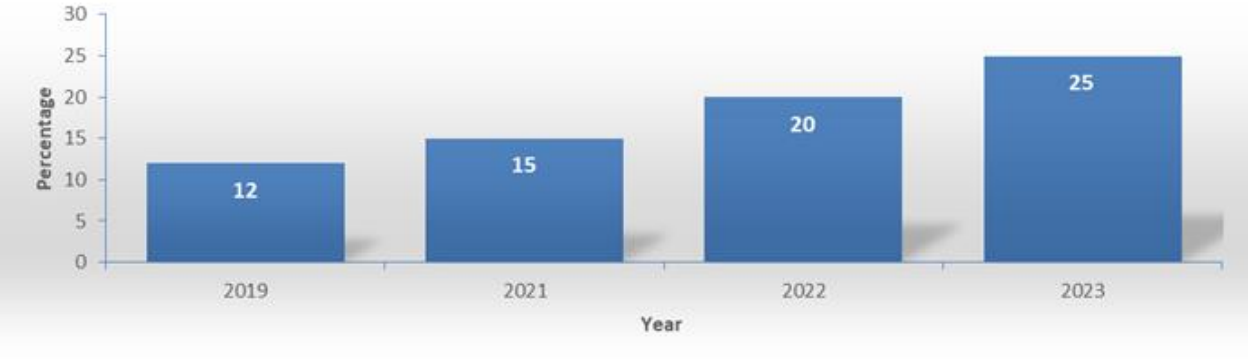


Figure 3.20 The expected percentage of treated waste water inside Palestine from the produced wastewater by year (PCBS 2021)

This increase could not be achieved without increasing the number of treatment plants, which are scheduled to increase from 10 stations in 2019 to 11 stations in 2021. In order to contribute to the restoration of the ecosystem, it is planned to increase the area of agricultural land irrigated annually from treated wastewater by around 1,800 dunums during 2021, according to the data of the Ministry of Agriculture.

Data from the Ministry of Local Government indicate that the percentage of solid waste that is dumped in a sanitary manner out of the total waste produced in 2019 was about 98%. This percentage is expected to reach 100% in 2023. According to the same source, and in regards to the percentage of waste that is recycled out of the total waste produced, it ranged from 1.5% in 2019 to 10% during 2023.

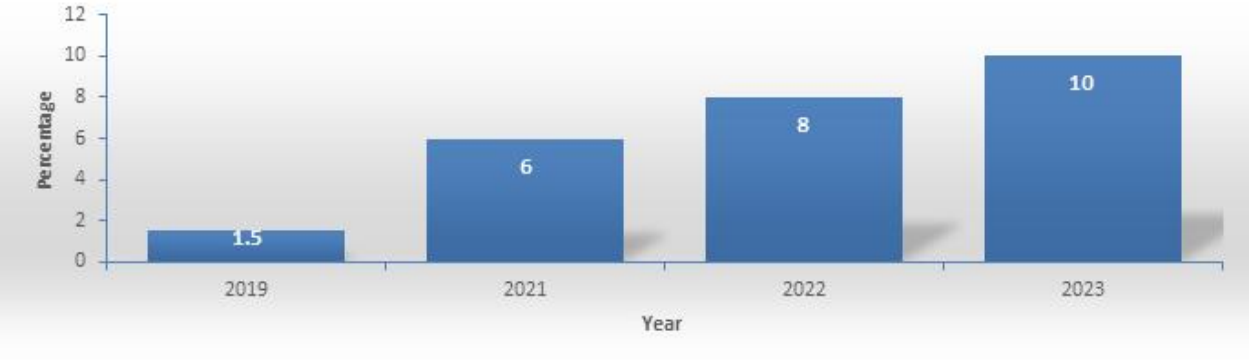


Figure 3.21 Percentage of expected waste recycled out of total waste produced by year

According to the Environment Quality Authority data, the percentage of hazardous waste that is treated out of the total waste produced reached 2% during 2019, , where this percentage, according to the data of the Environment Quality Authority and the Ministry of Local Government, is expected to reach 10% by 2023.

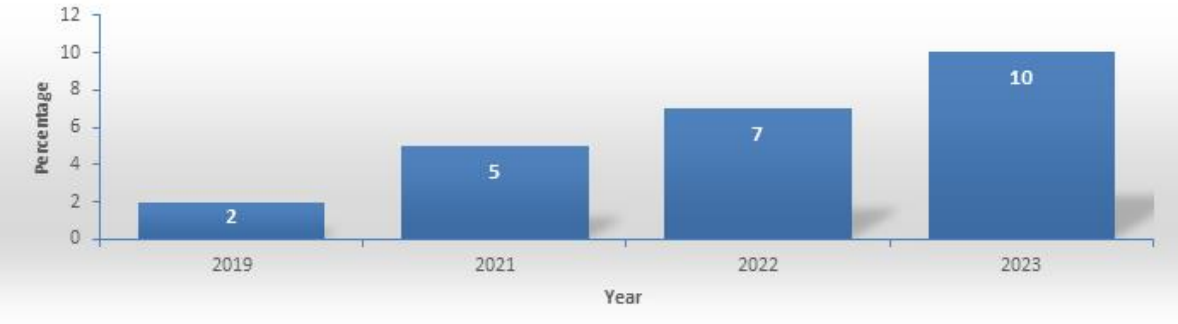


Figure 3.22 The percentage of hazardous waste expected to be treated out of the total waste produced by year

Environmental impact assessment (EIA) studies are required by Palestinian law for new construction projects. However, law enforcement is not well developed for EIAs, although there are few recent studies (Bacenetti et al. 2016; Saleh 2016; Sayara 2016).

There were some improvements in the past few years in terms of controlling random dumping sites and directing them to landfills and other facilities operated by Joint Service Councils. Here are select examples: Ubeidiya random dump site rehabilitated (ARIJ 2016). Under the ministry of local government there is a general directorate of joint services councils. These JSCs work to manage solid waste for groups of population centers (MoLG & JICA, 2015). The actions of JSCs is also described in detail in the Solid Waste Management Strategy (MoLG, 2016).

The EQA worked to control dumping for example in conducting field visits (over 450 annually), challenging violations (dozens brought to court and many others dealt with in other ways) (see annual report https://bit.ly/3uoQSHp).

The basic regulation on the Joint Service Councils of year 1996, and its updates, last in 2006:

- Local government law No. 1 of 1997: Describes the roles and responsibilities of the local authorities within their jurisdiction, the law clearly shows that solid waste management is the responsibility of these local authorities.
- The Investment Promotion Law No.1/1998 and Palestinian Reform and Development Plan of 2008-2010 to regulate investments
- Environmental law of 1999: The law establishes the general legal framework for solid waste management in Palestine. Reduction of the negative effects resulted from the Solid Waste and

providing the legislative related to Sanitary landfills, forbidding waste burning and encouraging reusing and recycling of solid wastes.

- The Palestinian Environmental Impact Assessment Policy of 2000 defines the activities subject to an Environmental Impact Assessment (EIA) which includes all solid waste projects. Palestinian Law (2003) identifies the right to a clean and a balanced environment as a basic right of every Palestinian and that preservation of the Palestinian environment for the sake of both present and future generations is a national duty (article 33).
- Public health law No. 20 of 2004: Describes the regulations concerning solid waste management, roles of hazardous waste management and ensuring health conditions.
- The Medical Waste Management Bylaw 2012
- The National Strategy for Solid Waste Management (NSSWM)(2010 – 2014): aims at setting the development path for the Palestinian solid waste management (SWM) until 2014.

There was significant development of sewage treatment facilities such as in Rafah facilitated by ICRC (PWA 2012; ARIJ 2016) but much more remains to do to deal with increasing volume. 95% of households are connected to solid waste collection services (MoLG & JICA, 2015). While some new landfills were established for example Al-Minya landfill to serve the south West Bank needs, these are inadequate for societal needs and leachate from solid waste dump sites is not adequately addressed (ARIJ 2016; MoLG, 2016). Groups and entities that work on areas of solid and liquid waste management: UNRWA, Government ministries (MoLG, EQA), private sector, civil society organizations, iNGOs and donors. For example, there are relatively new wastewater treatment facility near Nablus (http://wwtp.nablus.org/). Another example is that ARIJ managed to do wastewater treatment like in Wadi Saeer the institute established wastewater treatment unit with a capacity of 1,200 CM per day and preserved an area of 500 dunums of land that used to be flooded by wastewater and the institute had innovative special units for treating the black water form houses to be used for irrigating trees in home gardens and the units targeted the houses that are existing in the areas around spring and they are using cesspits and polluting these spring. This institute managed to convince people to replace these crisps with these wastewater treatment units and by that we save these springs and biodiversity around it.

The objectives of the 2017-2022 Cross-Sectoral Environmental Strategy are: First to maintain the environmental pollution levels at low level and to be controlled. Second, the natural environment and biodiversity shall be maintained and managed in a sustainable manner. Third, measures for climate change adaptation, combat desertification, and dealing with environmental disasters and emergencies shall be adopted and implemented. Fourth, the environmental legal framework shall be updated, activated, and integrated; so that the institutional framework is empowered and efficient, and international cooperation is enhanced. Fifth, the level of environmental awareness, knowledge, and practice shall be increased and enhanced (Unpublished, Palestine Biosafety assessment Report 2021, EQA). A summary of the environmental policies are summarized in the following table.

Table 3.18 Environmental policies in SP

1. Environmental pollution levels are low and controlled	• **Develop and implement procedures for linking diseases and environmental pollution** • **Regulate the usage of pesticides and manures and proper disposal of agricultural waste** • **Support the efforts toward adopting the specifications related to communication devices** • **Other electronic equipment so to reduce electronic waste** • **Proper management of primary materials that are used in housing and government building projects and of building and demolition waste** • **Adoption of regulations and initiatives that promote the usage of clean and renewable energy** • **Adoption of regulations and initiatives that promote the usage of clean and renewable energy in transportation** • **Enhance the control and monitoring over emissions from vehicles exhausts**

	• **Encourage the use of environmental friendly transportation means.** • **Take the necessary measures to limit pollution from shipping.**
2. Natural environment and biodiversity are maintained and managed in a sustainable manner	• Enhance the implementation of sustainable production and consumption in the housing sector, infrastructure, and governmental buildings • Enhance the energy efficiency • Take into consideration the environmental criteria and conditions related to exploring, utilizing, generating, transporting, and disposing of energy sources • Ensure the protection and management of water resources in a sustainable way, manage wastewater in accordance to proper environmental and economic principles. • Encourage the reuse of treated wastewater • Integrated management of water bodies • Develop and enhance the solid waste, and wastewater management systems including the recycling and reuse • Regulate the land uses within the National Spatial Plan in a way that protect environment • Enhance the values and elements of natural heritage • Encourage the preservation of cultural and historical sites inside the Palestinian cities and towns and rehabilitate them in a way that respect environmental criteria • Enhance the implementation of sustainable production and consumption in industrial establishments • Sustainable management of natural resources • Respect the elements and criteria related to green building and sustainable construction in the establishment of industrial cities • Improve the efficiency of water use for agriculture • Increase the use of organic agriculture • implement the measures aimed at regulating fishing and preventing overgrazing to preserve biodiversity • Implement the criteria and measures related to biosafety • Enhance the implementation of sustainable production and consumption in tourism especially environmental tourism
3. Measures for climate change adaptation, combat desertification, and deal with environmental disasters and emergencies are adopted and implemented	• Encourage green building in educational facilities and establishments • Encourage green building in hospitals and health facilities • Combat desertification and enhance the practices of land reclamation in an environmental-friendly way • Enhance the climate change measures related to agricultural activities • Take into consideration the specific environmental measures for controlling radiation broadcast • Respect the requirements and technologies of green building in housing projects and government buildings • Encourage the collection and use of rainwater in the housing projects, government buildings, and infrastructure • Enhance climate change adaptation measures and implement the approved “Climate Change Adaptation Strategy” (UNDP, 2010) • Improve the capabilities to deal with emergencies and catastrophic incidents.

4. The environmental legal framework is updated, activated, and integrated; the institutional framework is empowered and efficient, and the international cooperation is enhanced	• Implement the law as and procedures specific to the management of medical, hazardous, and solid waste, and the regulations related to radiation. • implement the Arabic Health and Environment Strategy. • Implement the laws and regulations related to the licensing of industrial and economical establishments in compliance with environmental criteria and conditions. • Encourage issuance of green certificates for local industries to access international markets. • improve the monitoring of the compliance with environmental and public safety in working sites. • Respect environmental management plans in the housing, infrastructure, and government building sector • Respect environmental management plans in the construction and management of transportation infrastructure • Enforce laws and regulations related to protection of environment; develop and enable institutional framework related to management of environment • contribute in enhancing the environmental principles linked to human rights principles • enhance the representation of Palestine in the international, and regional platforms, bodies, entities, and agreements related to environment • Maximize the benefit of available opportunities in the international platforms to protect the Palestinian environmental rights, and expose the Israeli violations in this area Accomplish the environmental security for Palestine in accordance with the international human rights. • Enhance the monitoring over infrastructure projects in harmony with environmental impact assessment policy. • Integrated and implement environmental criteria in the procedures of physical planning, building licensing, and infrastructure projects. • Take into considerations the environmental criteria in public procurements and purchasing
5. The level of environmental awareness, knowledge, and practice are increased and enhanced	• Encourage and support social, and voluntary initiatives and economic empowerment projects that motivate sustainable environment and encourage green jobs especially for women and youth • Transfer knowledge to behavior that protect the environment, and raise the awareness and knowledge of environmental issues in educational activities • Focus on scientific and practical environmental research • Integrate environment in curriculums of schools and universities in an integrated and organized manner; Enhance the environmental culture in the society; Integrate environmental aspects in cultural activities and initiatives • Promote environmental issues through communication and information technology; -Encourage green jobs in the labor market • Offer financial and taxation incentives to environmental-friendly initiatives and projects • Raise environmental awareness of youth and encourage their participation in environmental initiatives and activities • build and support environmental partnerships with the Arabic and International surroundings • Contribute in empowering women through the participation in environmental activities and initiatives

	• Adopt and support environmental projects and initiatives of women

The situation for sewage management in the occupied Palestinian areas is critical. In Gaza, a significant portion of the sewage flows untreated to the Mediterranean Sea (Ashour et al. 2009). According UNEP (2003), 70% of solid waste in the occupied Palestinian territories is organic waste. This is a very high number and one that gives us an opportunity for significant reduction via composting to generate fertilizers. Sewage can also be treated and other solid waste like metals and plastics and glass can be recycled. Waste water is dumped on some significant supposedly protected areas like Wadi Qana, Wadi Nar, Wadi Far'a (Bathan), and around Salfit (EQA 2015) and into the Mediterranean Sea where it is highly damaging to the environment (Akram and Cheslow 2016). There is a real crisis in logistics and financing for proper solid waste disposal in Palestine (Abu Thaher 2005; Al-Khatib et al. 2007). The majority of solid waste disposed of in Palestinian areas like Nablus is organic which indicates a great potential for resource utilization such as for composting/fertilizer generation (Al-Khatib et al. 2010). But as in many developing countries, management of such solid waste lags behind significantly (Ahmed and Ali 2004).

Conclusion: There has been improvements since the 5th NR in regards to reduction of pollutants, government oversight of dumbing sites, and development of liquid waste treatment facilities. However, much more work needs to be done in areas of solid waste management (including recycling).

9. Invasive Alien Species

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

Alien (non-native) species form an increasing percentage of local fauna and flora species around the world posing threats to biodiversity (Sandlund and Johan 1999). Nearly half a million species have been reported as invasive worldwide (Pimental et al., 2001). The invasiveness threat has increased because both ease of transportation and human habitat destruction opens many opportunities for invasive species to establish themselves around the world (see Figure). In fact, these invasive species are now considered the second most important threat to biodiversity after direct habitat destruction by humans (Kettunen et al., 2009). There is still some debate on the issue of whether increased local biodiversity protects from invasive species or not and how best to deal with this phenomenon (Levine, 2000), including how climate change could be a key factor of increasing invasiveness around the world (Ziska and Dukes, 2014).

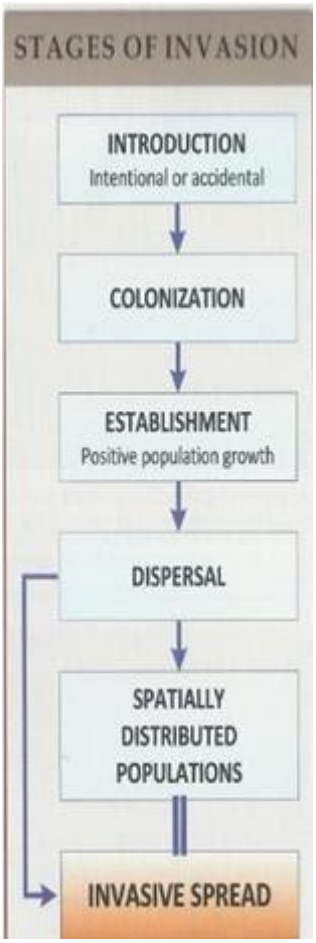


Figure 3.23 Invasive species stages

Flora:

Table 3.19 Invasive plants species in Palestine

Species	Introduction into Palestine	Origin
Acacia cyclops	1920	Southwestern Australia
Acacia karroo Hayne	1927 - 1930	Southern Africa
Acacia paradoxa DC.	1920	Southeastern Australia
Acacia salicina Lindl.	1920	Eastern Australia
Acacia saligna	1920	Southwestern Australia
Acacia victoriae	1948	Australia
Alianthus altissima	1960	China
Ambrosia confertiflora	1990	Southern USA and Mexico
Atriplex holocarpa	1960	Southern Australia
Azolla filiculoides	Unknown (first found 1980)	South America
Carpobrotus edulis	Unknown	South Africa
Conyza bonariensis	1896	South America
Conyza albida	1957	South America
Conyza canadensis	1939	Canada
Cyperus involucratus	Unknown	East Africa
Cyperus odoratus	1980	Tropical regions
Datura stramonium	1920	Tropical south America
Dodonaea viscosa	Unknown	Australia
Eichhornia crassipes	Unknown	Northern Brazil

Eucalyptus camaldulensis	1890	Australia
Ficus benghalensis	1940	India
Ficus microcarpa	Unknown	India, Sri Lanka, southern China, northern Australia
Ficus religiosa	Unknown	India, Pakistan, Bangladesh
Heterotheca subaxillaris	1975	Eastern US
Ipomoea aquatica	2009	Central China
Lantana camara	Unknown	Tropical central America
Myriophyllum aquaticum	Unknown	South America
Nicotiana glauca	1898	Western South America
Oenothera drummondii	1912	North Carolina
Oxalis pes – caprae	1906	South Africa
Parkinsonia aculeata	1922	Southern US
Paspalum distichum	1939	Southern US to Caribbean Islands and tropical South America
Pennisetum clandestinum	1920	East Africa –(Congo, Tansania, Kenya, Rwanda)
Phytolacca americana	1898	US
Pinus brutia	1927	Northeast Greece, southwest Turkey, Cyprus, Lebanon
Pistia stratiotes	Unknown	South America
Prosopis juliflora	1948	Mexico, northern South America
Ricinus communis	1894	Topical Africa
Robinia pseudoacacia	1922	Southeastern US
Salvinia molesta	1970	Southern Brazil
Schinus molle	1919	Chile, northern Argentina
Schinus terebinthifolius	Unknown	Subtropical Brazil
Sesbania sesban	Unknown	East Africa
Solanum elaeagnifolium	1957	Southwestern US, northeastern Mexico
Verbesina encelioides	1970	Southern US, Mexico
Washingtonia robusta	1905	Southwestern US
Xanthium strumarium	1921	Western US

According to the Global Register of Introduced and Invasive Species (http://www.griis.org/about.php), the following plants are considered invasive to the Palestinian Territories (Table 3.20). Invasive plants species includes about 50 species, the species of high invasiveness include *Prosopis juliflora*, *Acacia saligna*, *Agava americana*, *Ailanthus altissim*, *Conyza bonariensis*, *Nicotiana glauca*, *Oxalis pes-caprae*, *Solanum elaeagnifolium*, and *Ambrosia confertiflora*. Other ornamental plants that have become invasive in other parts of Palestine include about 20 species (Dufour-Dro, 2013), and may expand their range into the Palestinian Territories. Within this link there is a list of Adventive plant species http://en.wikipedia.org/wiki/List_of_adventive_wild_plants_in_Israel. Plant Biodiversity in the Palestinian Territories http://archive.thisweekinpalestine.com/details.php?id=2380&ed=150&edid=150

Table 3.20 Plant invasive species in the Palestinian Territories listed by the Global Register of Introduced and Invasive Species (shorturl.at/hqJU0)

Species	Common name
Ambrosia confertiflora DC.	Weakleaf Bur Ragweed
Eichhornia crassipes Solms	Common Water Hyacinth

Erigeron bonariensis L.	South American Horseweed
Nicotiana glauca Graham	Tobacco
Oxalis pes-caprae L.	Sourgrass
Prosopis juliflora (Sw.) DC.	Mesquite
Setaria verticillata (L.) P.Beauv.	Hooked Bristlegrass
Solanum elaeagnifolium Cav.	Silverleaf Nightshade

Table 3.21 Alien Ornamental Plant Species that may expand their range into the Palestinian Territories.

Species	**Common name**
Acacia cyclops	Western Coastal Wattle
Acacia salicina	Willow Wattle
Acacia saligna	Blue-leafed Wattle
Acacia victoriae	Elegant Wattle
Ailanthus altissima	Tree-of-Heaven
Atriplex holocarpa	Pop Saltbush
arpobrotus edulis	Hottentot Fig
Cyperus involucratus	Umbrella Sedge
Eichhornia crassipes	Water Hyacinth
Ficus benghalensis	Indian Banyan
Ficus microcarpa	Chinese Banyan
Ficus religiosa	Sacred Fig
Heterotheca subaxillaris	Camphor weed
Lantana camara	Common Lantana
Parkinsonia aculeata	Jerusalem Thorn
Pennisetum clandestinum	Kikuyu Grass
Phytolacca americana	American Pokeweed
Pistia stratiotes	Water Lettuce
Populus alba	White Poplar
Schinus terebinthifolius	Brazilian Peppertree

Massive changes in landscape in historic Palestine include introduction of non-native species (by the British and then by the Israelis) causing damage to the local fauna and flora. The most extensive was the planting of European trees to cover up the remains (including native trees) of over 500 Palestinian villages and towns depopulated in 1948-1950. Israel undertook a similar process after 1967 with three Palestinian villages creating the "Canada Park" area (NW Jerusalem). Calling this "afforestation" and writing articles that hide its true devastating environmental impact is now commonplace (Ginsberg, 2006). The invasiveness threat increased because of ease of transportation and human habitat destruction that opens many avenues for

invasive species to get established around the world. In fact, these invasive species are now considered the second most important threat to biodiversity after direct habitat destruction by humans (Kettunen et al., 2009).

Birds: Invasive bird species that established themselves in the Palestinian Territories include the Rose-ringed Parakeet, *Pisttacula krameri*, the Common Myna, *Acridotheres tristis*, *Myiopsitta monachus*, and the Indian Silverbill, *Lonchura malabarica* (Awad, 2016). Bird species escape from human captivity and in the case of the myna are highly adaptable and significantly impacted local species and could affect human health (Mori et al., 2018). At present, the Common Myna can be observed in all parts of the Palestinian Territories and expanding at an alarming scale (Handal and Qumsiyeh, 2021).

Mammals: The Coypu or the Nutria, *Myocastor coypus*, is the only mammals introduced to the Jordan River basin. Worldwide, the Nutria (has been introduced from its original habitats in South America to all continents except Australia and Antarctica (Carter & Leonard, 2002), and became a pest species, causing damage to water control structures, crops, and marsh systems and is considered a disease host. The Nutria is the only species of introduced mammals known to occur in the major permanent water bodies of Jordan (Amr, 2012). It was introduced into the area by Jewish fish farmers for fur production in the early 1950's from Chile (Bodenheimer, 1958).

Fishes: There are invasive salt water fish in the Mediterranean Sea off the coast of Gaza (Abu Amra, 2018). A total of 27 species of alien freshwater fishes have been introduced to Palestine (Roll et al., 2007). Of these 10 species within five families have become established in the Jordan River Basin within fishponds or some penetrated to the river (Table).

Table 3.22 Invasive freshwater fishes established in the Jordan Basin (Roll et al., 2007)

Family	Species	Location
Salmonidae	Oncorhynchus mykiss	Jordan Basin
	Salmo trutta	Jordan Basin
Cyprinidae	Hypophthalmichthys molitrix	Jordan Basin
Poecilidae	Gambusia affinis	Jordan Basin
	Poecilia velifera	Jordan Basin
	Xiphophorus hellerii	Jordan Basin
Mugilidae	Liza ramada	Jordan Basin
	Mugil cephalus	Jordan Basin
Cichlidae	Oreochromis aureus	Jordan Basin
	Tilapia zillii	Jordan Basin

Mollusca: About 19 and 33 species of freshwater and terrestrial snails respectively are considered invasive to Palestine, inhabiting various types of habitats. Most of these snails gain entrance through imported seedlings and the aquaria fishes (Roll et al., 2009). *Cornu aspersum, Eobania vermiculata*, and *Rumina decollate* were observed in the West Bank (Handal et al., in preparation).

Arthropods: Handal (2017) and Handal & Qumsiyeh (2019) reported on invasive arthropods to the West Bank (Table). Kehat (1999) and Abd Rabou & Radwan (2017) reported on the Red Palm Weevil in the Gaza Strip and the West Bank. Invasive insects associated with Eucalyptus originating from different countries were studied and constituted about 40% of insects feeding on this tree (Mendel & Protasov, 2019). Invasive species of public health includes the recording of the Asian Tiger Mosquito, *Aedes albopictus*, by Adawi (2012).

Table 3.23 Some invasive arthropods reported from the West Bank and Gaza Strip.

Class	Order	Family	Species
Insecta	Hymenoptera	Formicidae	Paratrechina longicornis
	Hemiptera	Coreidae	Leptoglossus occidentalis
	Heteroptera	Scutelleridae	Deroplax silphoides
	Coleoptera	Curculionidae	Rhynchophorus ferrugineus
	Diptera	Culicidae	Aedes (Stegomyia) albopictus

The EQA issued a tender for invasive alien species (IAS) in January 2021 with the following specifications

- To review current status and distribution of IAS in Palestine using published and unpublished literatures, reports and documents
- To Perform a comprehensive (main invaded Areas) field survey of the IAS. • To determine the pathways of the IAS and their vectors of (as possible).
- To propose an effective national early detection and warning system for monitoring, control and rapid response including enforcement of the IAS
- To develop a national plan of action including the methods and techniques to control, containment, and combat the IAS establishment and their eradication (mechanical, physical, chemical. etc),
- To develop a national capacity building plan on IAS, and the modes of eradication and management. to detect, respond, control and manage IAS impacts in terrestrial, freshwater, and marine systems
- To prepare legislations and by-laws (as possible) for IAS control and management.
- To establish a database and mapping (main invaded areas) of the IAS and their distribution. As a result, the main invasive species and their current distribution within the country should be identified. In combination with an assessment of their various modes of transfer,
- To prioritize the IAS on the basis of their adverse effects and degree of spread and coverage To identify major anthromenic factors responsible to spread the IAS

The invasive species in Palestine are increasing both in the number of species and in the degree to which some of them have proliferated. The main restrictions on the import of species into the country are those of the Ministry of Agriculture but Israel remains the authority in charge of borders (EQA, 2015). But we need better surveys, assessments, and research studies of invasive species and how to control them. The result according to UNEP-WCMC (2015) is an estimated loss of 15% in biodiversity.

The PIBS/PMNH work in the field of fanatic invasive species in the West Bank of Palestine and it had detected several invasive insect species such as *Leptoglossus occidentalis* and *Deroplax silphoides* (Handal, 2017; Handal and Qumsiyeh, 2019). Moreover, several studies in progress to understand the distribution and ecology of some other species and the effect on native species, environment and human, such as invasive bird species (Myna Bird) (Handal and Qumsiyeh, 2021).

Invasive species in historic Palestine varied between groups, and keep increasing (see table) (Roll et al., 2007a, 2007b, 2008, 2009; Dufour-Dror, 2012).

Table: Summary stats for invasive species.

#	Group	# of Invasive	Ref
1	Mollusca	19: freshwater snail, 33 land snail	Roll et al., 2009
2	Insects	Over 200 species (and increased)	Roll et al., 2007a
3	Mammals	2	Roll et al., 2008
4	Birds	18	Roll et al., 2008
5	Reptiles	2	Roll et al., 2008
6	Fish	27	Roll et al., 2007b
7	Flora	50	Dufour-Dror, 2012
8	Marine Bonefish (Gaza)	39	Amra and Abed Rabou, 2018 (Master Thesis)

Conclusions: There are good studies including ongoing ones on the issue of invasive flora and fauna in the State of Palestine. However, very little control measures were developed or implemented. Currently (2021) the EQA with external consultants is developing a strategy for management of invasive species. This will also be incorporated in the new NBSAP (2022).

10. Vulnerable ecosystems

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

Vulnerable ecosystems in Palestine essentially include the whole area of the WB and Gaza. This is because the areas are very small and already heavily populated including the refugees from 1948. The EQA tries to manage the remaining open areas by designating and protecting KBAs and a national system of Protected Areas. Thus to see more details on management of these vulnerable ecosystems please see ABT 11. Gaza is most particularly vulnerable from an environmental standpoint. Baalousha (2006) used GIS and the DRASTIC measures of vulnerability to show that many areas in Gaza Strip are susceptible to significant water pollution damage. The sewage running in Wadi next to areas of population like two refugee camps (Nuseirat and AlBurj) also causes health problems (see e.g. Mourad 2004; Abu Naser et al. 2007) and causes other health risks and diseases (OCHA link). 72% of Gaza's Mediterranean coastline has been designated as highly polluted due to untreated sewage being pumped into the sea (https://www.palestine-studies.org/en/node/232141). Intervention in Gaza to solve this issue in 2018 https://www.worldbank.org/en/news/feature/2018/03/12/north-gaza-communities-will-finally-benefit-from-sewage-treatment-services. There are small-scale desalination projects by reverse osmosis in Gaza but these have their own environmental issues (Assaf, 2001). The situation for sewage management in the occupied Palestinian areas is critical. In Gaza, over 100,000 cm sewage flows untreated to the Mediterranean Sea every day (Ashour et al., 2009; OCHA 2019). Wastewater and other pollutants also heavily impact ecological integrity and socioeconomic issues in this valley (Abu Shaban 2002; Shanban and Saleh, 2002; Rabah 2013; Roskin and Bergman 2013; Saleh et al. 2013; Ubeid et al. 2016).

Another vulnerable ecosystem is the hills surrounding Jerusalem. To the East of Jerusalem is wilderness part of the IBA for migrating birds' routes. To the South of Jerusalem is a critical habitat that includes Wadi Cremisan and Wadi Al Makhrour (UNESCO World Heritage Site). These vulnerable systems are influenced by massive Israeli colonial settlements that ring Jerusalem.

An updated National Action Plan (NAP) for the prevention of pollution of the Mediterranean Sea from land-based sources in Palestine has been formulated by EQA (2006) and the drafting process of the plan was implemented in four stages were NAP legal basis, Midterm baseline assessment (Wastewater, Marine area and solid waste), Identification of Gaps in enforcement of laws, policies and regulations, in addition to NAP Operational Targets.

There were some plans to protect vulnerable ecosystems in Palestine including for example in the Uskar temporary pond at the buffer zone of Wadi Qana NR or in Wadi Quff NR. There efforts are limited by a number of factors including the Israeli occupation (Rotem and Weil 2014; Qumsiyeh and Abusarhan 2021; Qumsiyeh and Albardeya 2021)

Conclusion: The limited size of the area under coverage allows us to say that most of our area is a vulnerable ecosystem. Most vulnerable ecosystems in our area is the Mediterranean sea off the cost of Gaza and the Israeli occupation limits ability to manage this ecosystem as well as Israeli policies that results in additional pollution on the vulnerable areas. Also, the loss of forest cover discussed in ABT 5 has to be addressed in managing this most fragile ecosystem.

11. Protected areas

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

In this section we will cover areas of biodiversity importance including hotspots and protected areas. Palestine (West Bank & Gaza Strip) is very rich in biodiversity including more than 50 sites were identified as a biodiversity hot-spots, these sites were included in the national spatial plan for protection from any change or land use (SP 2014). The investigation of these sites were carried out in 1996, which is now outdated, and needs a new investigation and assessment. EQA signed an agreement with the Belgium

cooperation to re-assess and re-evaluate the situation of the biodiversity hotspots with main objective to re-delineate the borders of these sites and producing new maps to be included into the national spatial plan, for the benefit of the local communities and easing of the pressures they suffer from the spatial plan." This quote from the 5th national report showed the areas which have now been addressed through some actions (2015-2020).

The nature reserves/protected areas in Palestine fall mostly under area C based on the classifications of the Oslo Accords which means direct Israeli military and civilian control. While these arrangements were supposed interim for 5 years they have now gone for over 27 years.

Nineteen protected areas were partially or wholly turned over to the Palestinian National Authority and only 15 of them recognized and seven others were added by the Environmental Quality Authority in 2010 for a total of 22. In 2015, the Palestinian ministerial committee approved a list of 49 protected areas. In the spatial plan the number became 51. Most of these fall in parts of the Occupied Palestinian Territories (OPT) that are under direct control by the occupying power. In effect only eight protected areas totaling less than 15 sq km are under Palestinian effective control making management difficult (see also Garstecki et al. 2010; Qumsiyeh & Amr, 2016).

The Environmental law chapter five article 40 concerns the Protection of Natural, Historical and Archaeological Areas which states that the Ministry of Environment (subsequently EQA) shall coordinate with competent agencies to prescribe bases and standards for the protection of natural reserves and national parks, monitor and declare them, and establish and designate the national parks and supervise them. Moreover, article (44) states that it shall be forbidden for any person to conduct activities or perform any action that may cause damage to the natural reserves, forests, public parks or archaeological sites, or affect the esthetical aspects of such areas.

Garstecki et al. (2010) categorized the evaluated protected areas in the Palestinian Territories according to the IUCN categories for protected areas. Of the 22 evaluated candidate protected areas, one was listed under category V as Protected Landscape, three under category III as natural monuments, four under category I as strict protected areas, and 14 under category IV as managed reserves.

Table 3.24 List of protected areas handed over to the Palestinian Authority under the Oslo agreements (Garstecki et al., 2010). Area is area handed over in dunums and not the total area of the potential protected area.

Protected area	Governorate	Area (Dunum)	Habitat type
Al-Hashmee	Ramallah	200	Pinus halepensis and Arbutus andrachnae woodland
Deir Ammar	Ramallah	120	Pinus halepensis woodland
Ein Darra	Ramallah	250	Quercus calliprinus woodland on limestone
Fahmeh	Jenin	400	Semi-steppe batha
Jabal-Alkabeer	Nablus	9,500	Semi-steppe batha
Jerusalem Wilderness	Hebron and Bethlehem	172500	Steppe vegetation
Sheikh Katrawny	Ramallah	11	Quercus calliprinus woodland on limestone
Sheikh Zeyd	Nablus	52	Quercus calliprinus woodland on limestone
Shoubash	Jenin	5,000	Ceratonia siliqua and Pistacia lentiscus forest
Sirris	Jenin	1,118	Quercus calliprinus woodland on limestone
Tammoun	Tubas	4,300	Semi-steppe batha
Tayyasir	Jenin	1,200	Ceratonia siliqua and Pistacia lentiscus forest
Um-Altutt	Jenin	320	Quercus calliprinus woodland on limestone

Wadi Al-Dilb	Ramallah	800	Quercus calliprinus woodland on limestone
Wadi Zarqa Al-Elwey	Salfeet	2,700	Quercus calliprinus woodland on limestone

The most recent update of the protected areas in Palestine shows 51 protected areas which account for 515 km^2 and the total area of WB and Gaza is 6020 km^2 so that is about 9% of the State of Palestine.

Important Plant Areas: Al Shaikh (2011) identified six Important Plant Areas of the West Bank. These areas host a variety of plant species many are considered endemic to Palestine. In general, the Palestinian IPAs are dominated by maquis vegetation, with trees such as the Palestinian Pistachio (*Pistacia palaestina*), Palestine Buckthorn (*Rhamnus palaestinus*), Palestine Oak (*Quercus calliprinos*) and Boissier Oak (*Q. boisseri*). Much more work is needed on these issues in Palestine (Al-Shaikh and Qumsiyeh 2021).

Important Bird Areas: Four IBA's (Table 3.25) are recognized by Bird-life International (BI) with a total area of about 21,500 ha (http://www.birdlife.org/datazone/country/palestinian-authority-territories/ibas).

Table 3.25 : IBA's of the Palestinian Territories (Source: Birdlife International)

IBA	Area (ha)	Key Species	IBA Criteria
Ein Al-Fashkha	2500	Dead Sea sparrow	A4iv, B1iv, B2, B3
Jericho	3500	Lesser Kestrel, Honey Buzzerd, White Stork, Black Stork, Sand Partridge, Tawny Owl, Lapwing, Barbary Falcon.	A1, A4iv, B1iv, B2, B3
Jerusalem (east)	500	Lesser Kestrel	A1, B2
Jerusalem wilderness	15,000	Sand Partridge, Lanner Falcon, Lesser Spotted Eagle, Griffon Vulture, Egyptian Vulture, Common Crane, Hume's Owl, Arabian Babbler, and Tristram's Starling.	A4i, B1i, B1iv, B2, B3

The world's protected areas have grown in terms of land and designated protected areas but there are many remaining challenges to having them provide a critical safeguard against habitat loss and other human activities that decrease biodiversity (Chape et al. 2008). In this chapter we will review the rich biodiversity areas, including Important Plant Areas (IPAs), Important Bird Areas (IBAs), Wetland, and natural forests and go into the issue of protected areas in the State of Palestine. Details on the existing protected areas and proposed reserves are discussed with areas of potential to be designated as protected areas.

The IUCN did a survey of biodiversity in 2010 for 15 protected areas (Al-Hashmee, Deir Ammar, Ein Darra, Fahmeh, Jabal Alkabeer, Jesrualem Wilderness, Sheikh katrawny, Sheikh zeyd, Shoubash, Sirris, Tammoun, Tayyasir, Um Al Tut, Wadi Al Dilb, Wadi Zarqa Ulwi). This study (Garestecki et al., 2010) will be built on and developed into network of protected areas in 2021.

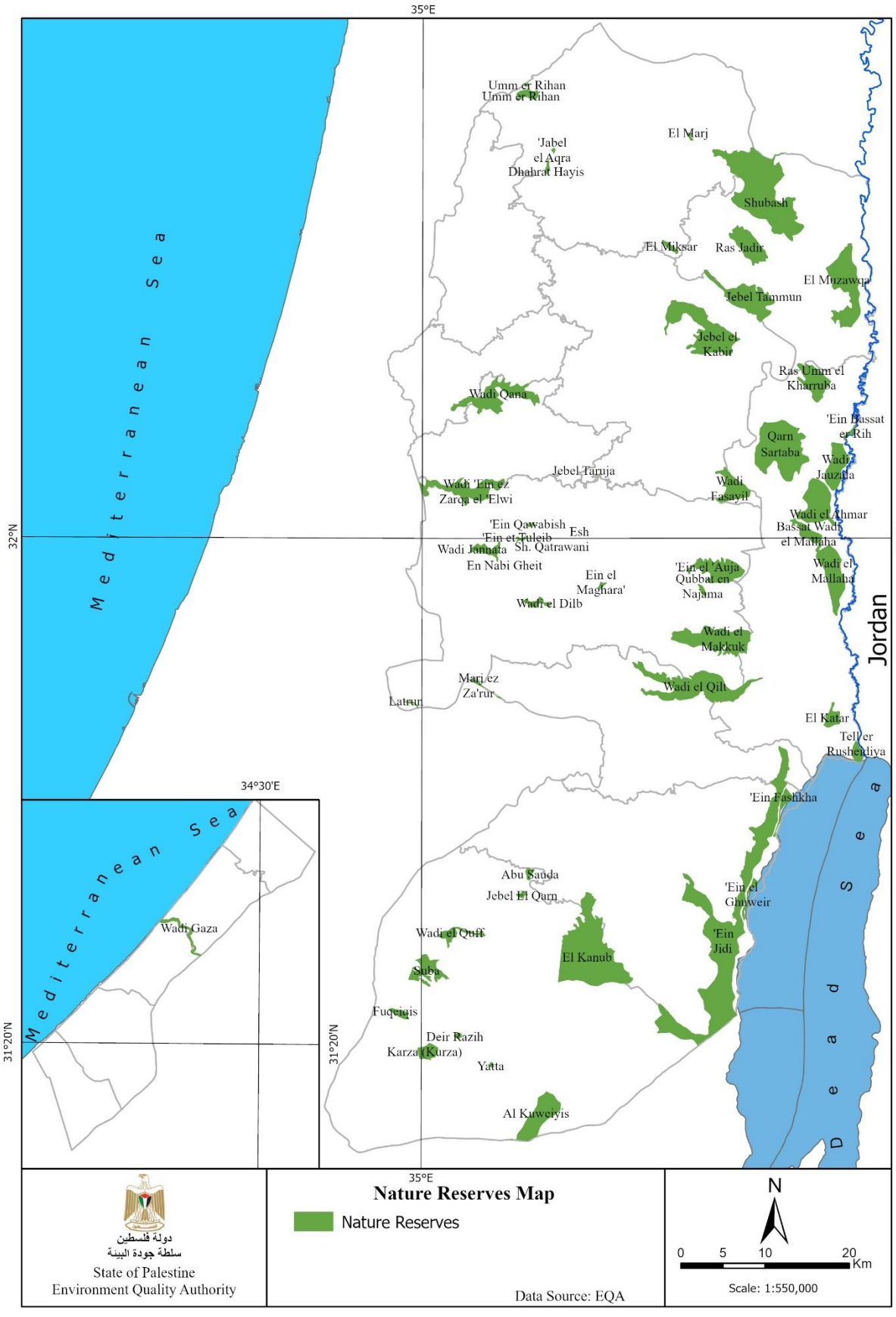


Figure 3.24 Nature Reserves Map (simplified)

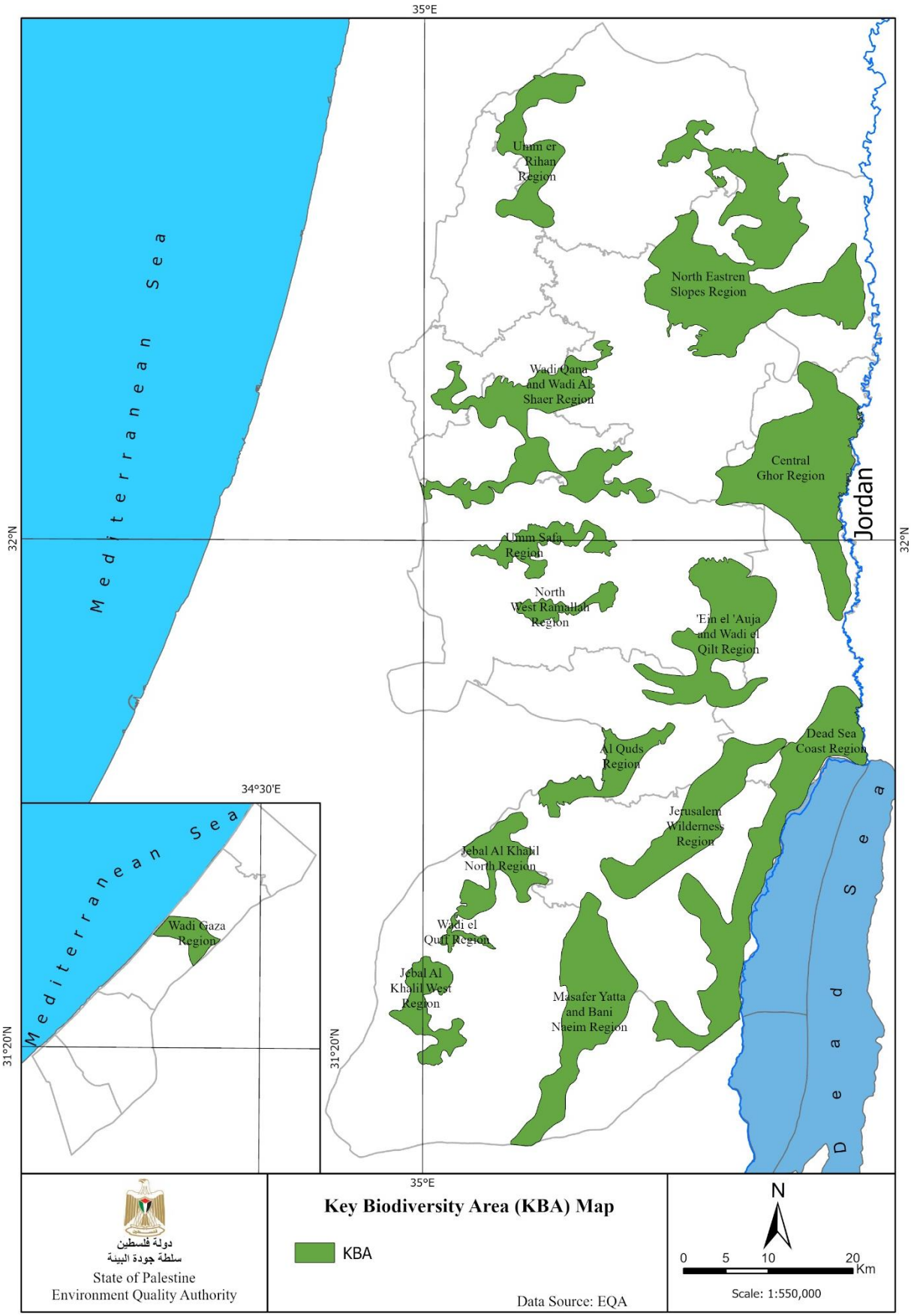


Figure 3.25 Key Biodiversity Areas.

Clearly, protected area coverage from the KBAs is small (Figure 3.25). Spatial overlaps between digital polygons for Protected Areas and KBAs are done per global standards (https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-02.pdf), and https://unstats.un.org/sdgs/metadata/files/Metadata-15-04-01.pdf

Many new studies started appearing regarding biodiversity, environment, and conservation of protected areas in Palestine since the fifth national report in 2015.

Wadi Quff in Hebron Governorate: As a conservation first move in Palestine, a management plan for Wadi Quff was published (EQA, 2014). The area was studied well (Qumsiyeh et al., 2016; Qumsiyeh and Amr, 2016; Khalilieh, 2016; Al-Shaikh and Mahassna, 2016; Qumsiyeh, 2016). Forested area degradation and fires happen frequently (ARIJ 2016).

Wadi Zarka AL Ulwi (on the borders between Ramallah and Salfit): An intensive study for the fauna and flora of this area was done by the Palestine Museum of Natural History and the Palestine Institute for Biodiversity and Sustainability, this study translated in a report send to the EQA and related ministries and stakeholders, an education awareness for local on biodiversity and the important of the area done (PMNH 2018)

Wadi Janata (Al Hashimy): A survey for biodiversity conducted by the PCC under the supervision by Mrs. Roubina Ghattas, provided a management plan that includes fauna, flora, threats, conservation, ecotourism and others (Ghattas et al., 2018).

Jinsafut pond, buffer Zone for Wadi Qana: A study was done on a temporarily rain water pond in Jinsafut village near the Wadi Qana protected area. This area shows a important species of fauna and flora only found in this pond from the West Bank and never recorded before elsewhere. This includes the Pond Water-crowfoot (*Ranunculus peltatus*) and the Syrian spade-foot toad (*Pelobates syriacus*) (PIBS, 2018).

Wadi Al Makhrour: This is part of al Quds Key biodiversity area and not a nature reserve yet. It may be important as a protected area in the future according to the IUCN protocol and as the last green area in Bethlehem District, given that the Valley is part of a UNESCO heritage site with Battier Village. The area was studied intensively by experts in biodiversity who developed some management and protection plans for habitat protection and ecotourism (Ghattas et al. 2019; Handal and Qumsiyeh 2019, 2021; Handal et al. 2018; Pahl and Qumsiyeh 2021; Qumsiyeh and Abusarhan 2020, 2021; Qumsiyeh et al. 2021, Thaler 2020). Battir was also recognized as a World Heritage Site in the year 2014. However, the UNESCO state of conservation report 2017 placed Battir and its landscapes on the list of WHS in Danger, as it is affected by a number of threats including: (1) changes in traditional ways of life and knowledge systems, (2) changes in local population and community identity and social cohesion,(3) invasive/alien terrestrial species and (4) potential construction of a separation wall (http://whc.unesco.org/en/soc/3541). Any efforts that would reduce these threats are highly welcomed by UNESCO. See also Abu Hammad (2016).

Far'a and Jerash: an integrated watershed management plan was developed and partially implemented (EQA + MoENV 2004 and stakeholder feedback)

Wadi Gaza: Located in the Eastern Mediterranean biodiversity hot-spot, it's recognized by the BirdLife International as an IBA and a station point for the migratory bird routes (Skinner and Zalewski 1995; EQA 2002; HSF 2017). This site is on the tentative list of UNESCO world heritage sites (https://whc.unesco.org/en/tentativelists/5722/). Earlier reviews of its validity as a protected area exists (Awadallah 2000). A study was done to fix much of the challenges of Wadi Gaza to opportunities by creating a nature reserve for eco-tourism (AlAgha 2003). The Palestinian Authority established the Wadi Gaza protected area in June 2000 containing 1.25 km2 coastal wetland but is an area of great promise with limited studies (Auda et al., 2009; Rabou et al. 2015). But plans and structures for protection do exist albeit not implemented (MedWetCoast 2003; UGEC 2004; EQA 2015). There is a lot of interest to conserve the natural and cultural heritage of Wadi Gaza (UNDP/SDE 2002; Sadeq 2005). A management plan for the valley was produced (MedWetCoast 2003). A training program/capacity building also existed for the area since 2004 despite that Palestine did not sign the Ramsar Convention (https://medwet.org/2014/01/training-program-on-the-sustainable-development-of-coastal-areas-for-the-mena-region/). It seems there are few regulations or enforcement of conservation measures for example on the use of pesticides in the area (AbdRabou et al 2002) or in general ecological knowledge of inhabitants (AbdRabou et al 2002; AbdRabou et al. 2015a). Of

course some of these studies are old and need to be updated. Some interest in using collections is starting in Gaza (e.g. see AbRabou, 2020). There is also an interest indeed at least among local people in preservation and management (see also Goodson, 1999; Assaf 2001; Atrash 2003 Asfour and Hathat 2016).

There are other plans that are not implemented in other valleys that could impact biodiversity. For example, in Wadi Nar/Kidron master plans https://bit.ly/39vTmN7. There are current plans for a network of protected areas that would be better managed but much of this is dependent on acquiring full sovereignty by the State of Palestine.

Palestine adopted a National Spatial Plan (NSP) which includes protection of natural resources and historic sites as well as protected areas (SP 2014). The Ministerial Cabinet approved the NSP in January 2014 (http://www.nsp.pna.ps/en/) in order to balance intended development with the protection of limited natural resources to ensure sustainability for future generations. The NSP included limits on land use and proposed that there would be high and medium sensitivity areas for agriculture, for open spaces, for forests, for biodiversity and natural conservation areas, for cultural and historical areas, and for archaeological sites. Implementation of the plan began in 2014 but one way to spur implementation is to merge the NSP with the Palestinian National Development Plan whose first key policy priority is: "In line with the two-state solution and on the basis of the 1967 border, establish state sovereignty and assert control over natural resources. Special attention will be paid to area C, particularly the Jordan Valley and Dead Sea Area, as well as to development of East Jerusalem and Gaza" (MOPAD, 2014). In addition, MOPAD, EQA, MOA, and other government agencies must implement the policies they have already agreed to especially in terms of protection of key areas.

The protected riparian areas around the Dead Sea like Ain Fashkha are impacted by the declining level of the Dead Sea (an inland lake) which is in turn due to diversion of the Jordan Valley Basin water to the western areas via the so-called "Israel National Water Carrier" (figure below).

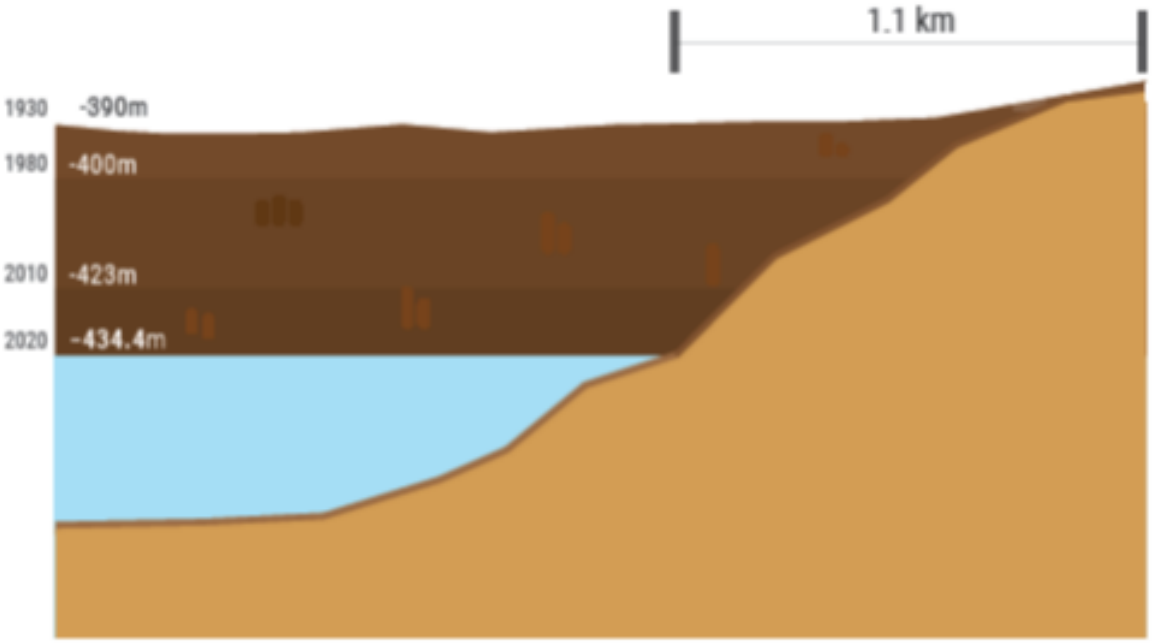


Figure 3.26 Decline in level of Dead Sea and thus decrease in its coastal perimeter (SP 2020b)

The Jordan River basin needs special attention. Significant depletion of its water was done because of mega-projects like the draining of the Hula Wetlands and the diversion of significant amount of water from upstream (Lake Tiberias) (Messerschmidt and Shelby 2015; Figure 3.27).

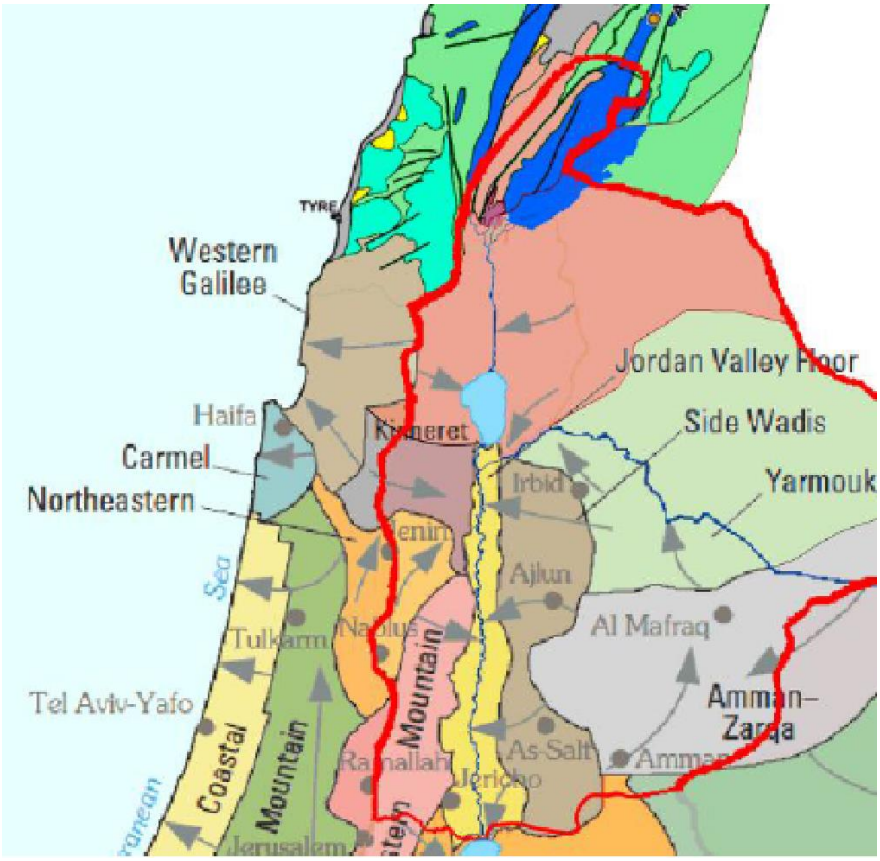


Figure 3.27 Aquifers in our area and their drainage – most of the water is taken by Israel from Palestine, Jordan, Lebanon and Syria (Messerschmidt and Shelby 2015)

This resulted in significand decline in the level of water in the Dead Sea, and in land salty lake at the lowest point on earth (Salameh and El-Naser 2008; see Figure 3.28). The Red Sea – Dead Sea canal and major projects surrounding it is not a good project (see Rosenberg 2011) and will significantly harm biodiversity (Qumsiyeh and Amr, manuscript in preparation).

Conclusion: In brief our protected areas and areas of significant important to them (like the Jordan valley) are very limited in space (only 9% of the land is technically but not really protected). Much more remains to be done on this issue starting with allowing the local people to have sovereignty on their land and natural resources (i.e. ending the Israeli occupation). For more on this subject see Qumsiyeh and Amr (2016) and Qumsiyeh and Albardeya (2021). The State of Palestine is currently engaged in developing a network of protected areas and adjusting management plans to meet the NSP and is also engaged in updating its NBSAP. This will have significant positive effect on protected areas provided the SP is given sovereignty over its land and Sea.

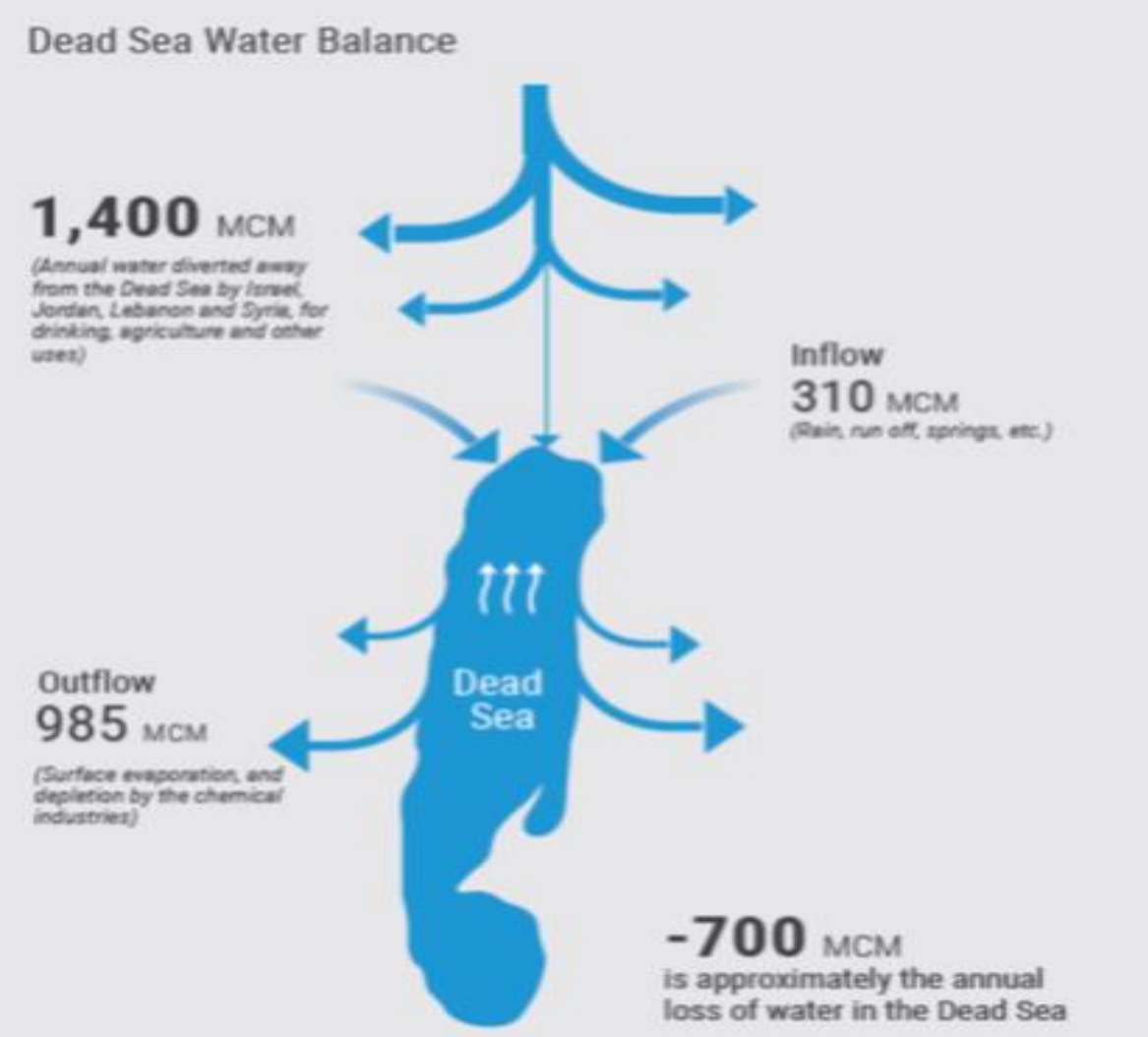


Figure 3.28 Palestinian natural resources like dead sea minerals are exploited for benefit of illegal settlers contrary to international law (Al Haq 2012).

12. Preventing extinctions

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

The 1999 Environmental law's chapter five article 41 concerns the conservation of species and prevents their extinction through prohibiting the hunting, killing, or catching of birds, marine and wild animals, and the fish. Moreover, it is prohibited to possess, transport, walk with, sell or offer them for sale neither dead nor alive, or to damage their nests or the eggs. Article (42) of chapter 5 indicates that the Ministry of Environment (subsequently EQA) in coordination with the competent agencies, shall specify the conditions necessary to guarantee the preservation of biodiversity in Palestine. Article (43) states that the Ministry, in coordination with the competent agencies, shall set the bases and standards that determine the plants, wild and woodland ones which are forbidden by these standards to be, temporarily or permanently, picked up, harvested, damaged or cut off to ensure their endurance and continuation.

Significant but still undetermined proportion of Palestinian flora and fauna are rare, endangered, or threatened. Below is a description of known (limited) data on the matter and some of the issues around this ABT. The IUCN Species Range Rarity Index for Palestine shows that the Eastern Slopes of the West Bank include some rare species higher than other areas (figure below).

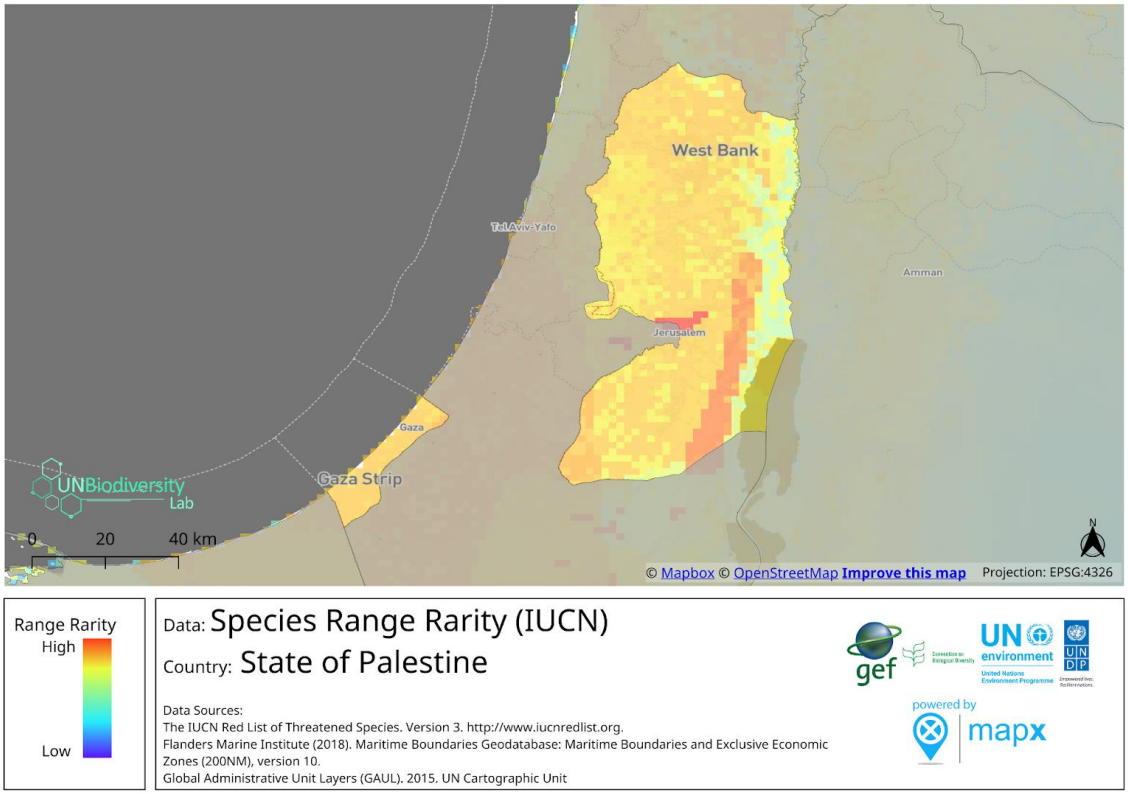


Figure 3.29 Species Range Rarity in Palestine.

The IUCN Threatened Species Richness on the other hand shows that much more work is needed in the northern West Bank (figure below)

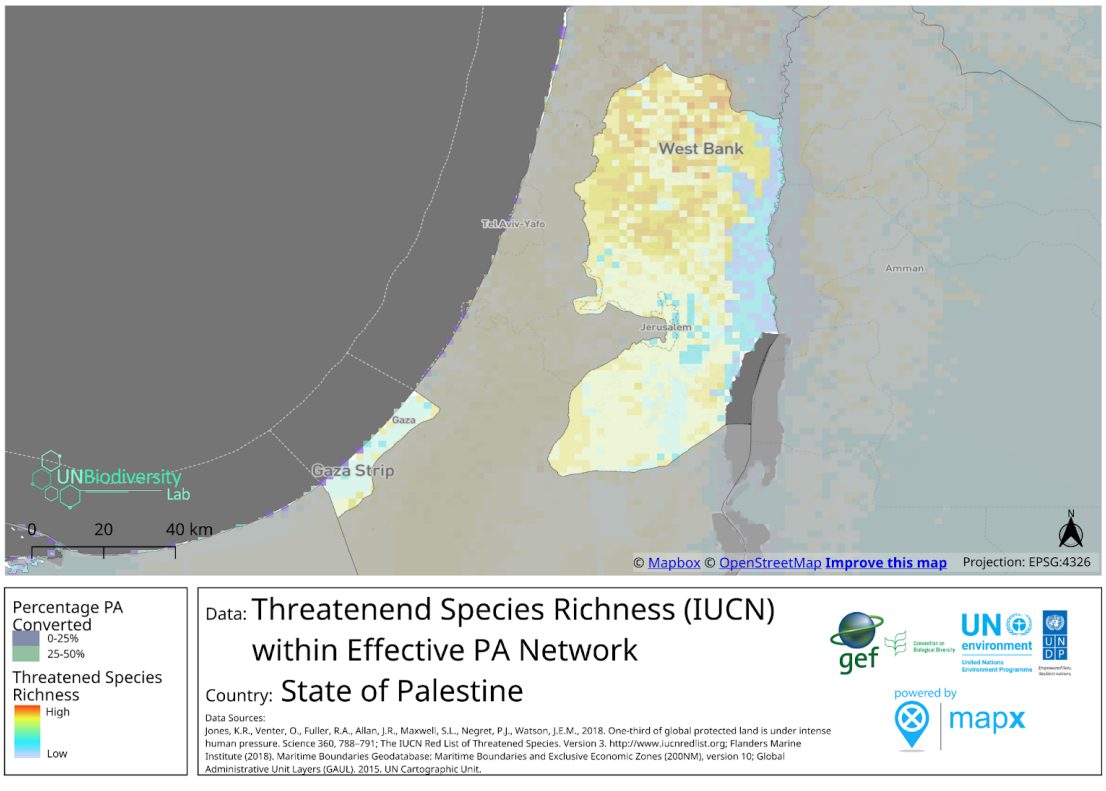


Figure 3.30 Threatened Species Richness within Effective PA Network in Palestine.

Flora

"*There is only national list of threatened species available for Palestinian flora and there is no national list for Palestinian threatened fauna due to lack of comprehensive surveys of fauna species. There are two published lists of threatened plants: one Israeli and one Palestinian. Based on IUCN global guidelines and criteria and Red List publications there are only 24 species listed as globally threatened as published on the official website of IUCN Red List. From these 24 species there are: 10 birds, 4 reptiles, 3 mammals, 2 fishes, 2 molluscs, 1 amphibian, 2 other invertebrates, and there is no plant recorded in the IUCN Red List website although there are two published lists of threatened plants as indicated earlier*" EQA 5th CBD NR (2015).

There is only national list of threatened species available for Palestinian flora and there is no national list for Palestinian threatened fauna due to lack of comprehensive surveys of fauna species. There are two published lists of threatened plants in Palestine (Ali-Shtayeh and Jamous 2018; Al-Shaikh and Qumsiyeh 2021). The latter study consolidated data in meta-analysis and identified 600 species that are of concern in the Israeli occupied West Bank of which 187 are endangered (found in 1-3 sites), 171 very rare species (found in 4-10 sites), 238 rare (found in 11-30 sites), and four already extinct in this area. Plants thus provide the loudest alarm bell for a deteriorating environment in need of protection. Protection is feasible: 1) in situ in the declared protected areas which are just beginning to be studied and managed properly, 2) in situ in special areas of rich biodiversity that would be informally protected, 3) ex situ in botanic gardens such as those at PIBS and BERC. IUCN and the Conservation Measures Partnership (CMP) unified classification of direct threats for SP red plants has shown a high extinction risk to the Palestinian threatened wild flora, with 76.5% of the threatened species were either critically endangered CR or endangered EN; only 23.5% were vulnerable VU. However, several taxa are threatened by numerous factors including human activities, and global climatic change.

Fauna

Based on IUCN global guidelines and criteria and Red List publications there are only 24 vertebrate species listed as globally threatened as published on the official website of IUCN Red List. From these 24 species there are: 10 birds, 4 reptiles, 3 mammals, 2 fishes, 2 molluscs, 1 amphibian, 2 other invertebrates. On one hand, among the 130 mammals almost all of the higher mammals are on the Red Data List labeled as threatened, extinct or rare. It was reported that seven mammalian species have gone extinct since 50 years ago, for instance, the Cheetah *Acynonyx jupatus*, Syrian Brown Bear *Ursus arctos syriacus*, Mesopotamian Fallow Deer *Dama mesopatomica*, and Roe Deer *Capreulus capreulus*. Currently, there are only 200 hyenas inhabiting Palestine. Among reptiles the extinct species is the Nile crocodile. The Gaza Environmental Profile (Gaza Environmental Profile, 1994) had identified the sea turtle species *Caretta caretta* (Loggerhead turtle) and *Chelonia mydas* (Green turtle) as existing in the coastal region of Gaza Strip. (MOPIC, 1996).However, these species and their eggs face extreme danger due to hunting and collecting. It was demonstrated that there are two dolphin species in the Gaza strip; the Bottlenose Dolphin *Tursiops truncatus* and the Common Dolphin *Delphinus delphis*. Moreover, the status of the Monk seals; *Monachus monachus* remains unclear . (Gaza Environmental Profile, 1994). Among the 373 reported bird species in Palestine (West Bank and Gaza Strip 6220 KM²), there are four birds considered extinct species: Ostrich (*Struthio camelus*), Brown Fish Owl (*Bubo zeylonensis)*,while the other two extinct birds are breeders: Lammergeier (*Gypaetus barbatus*) and Lappet-faced Vulture (*Torgos tracheliotus*). It is reported that almost all amphibians in Palestine are endangered due to intensive farming, degradation of wetland habitats in the Dead Sea basin, the Gaza Strip and the degradation of fresh and grey water, rivers and Wadi systems. It was detected that the drying of the main wadis and the exhaustive use of remaining water resources in the Gaza Strip has rendered amphibian life to be in danger. It was found out that execution of wildlife management plans has complex difficulties due to the current Israeli the occupation power in Palestine. Some of the critical obstacles that hinder wildlife conservation and reintroduction are hunting, agricultural expansion and poverty. Furthermore, the weakness in applying wildlife protection laws is obvious and needs to be enhanced.

It was demonstrated that the main focus of biotechnology research activities is restricted to agriculture mainly tissue culture of which some of its applications are related to endangered species, dates, wheat and Barley, Royal Irises, wild species of economic concerns, also biological control of agricultural pests and insects, disease-free grapes, diagnostic studies on the genetic polymorphism of the causes of pests, yeast and enzymes (plant by-products, enzyme production by bacteria, monoclonal antibodies for diagnosis, etc.), genetic engineering and their tests (fingerprinting of dates, GMOs, etc.), veterinary medicine and animal

production (use of hormones, animal feed improvements, in vitro fertilization and embryo transfer, etc., and biofertilizers such as the uses of olive cakes and dairy cattle manures for biogas production, etc. Research work is also going on the application of new technology for animal disease diagnosis.(Unpublished, Palestine Biosafety assessment Report 2021, EQA)

BirdLife International, IUCN and UNEP World Conservation Monitoring Centre (2019) listed IUCN status for species in Palestine (Table). By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained. The unique geography and geology of Palestine results in the likelihood of presence of many more endemic and threatened species than described above. There are significant shortages of data relating especially to Molluscs, arachnids, and insects (dominant groups). For example, it is impossible that we have only one species of endemic land snails and three Mantodea. Below table shows what is currently available but much more work is needed on the flora and fauna of Palestine. 614 species were assessed by this group and 36 of them were found to be threatened, including 26 vertebrates and 6 plants (BirdLife International, IUCN and UNEP World Conservation Monitoring Centre 2019).

In the red list area, Palestine has an index of 0.8 (globally 1 means all species categorized as least concern and 0 means all species are endangered). The figure below shows Red List Index of species survival for this country, weighted by the fraction of each species' distribution occurring within the country. Grey shading shows 95% confidence intervals. The index varies from 1 if the country has contributed the minimum it can to the global RLI (i.e. if all species in the country are classified as Least Concern) to 0 if the country has contributed the maximum it can to the global RLI (i.e., if all species in the country are classified as Extinct or Possibly Extinct). A downward trend indicates declining aggregate survival probability of the country's species. The index is based on all mammals, birds, amphibians, reef-building corals and cycads native to the country (noting that not all countries support species in all these groups). However, such index for Palestine needs to be reexamined with additional data because it is based on very limited/poor quality data.

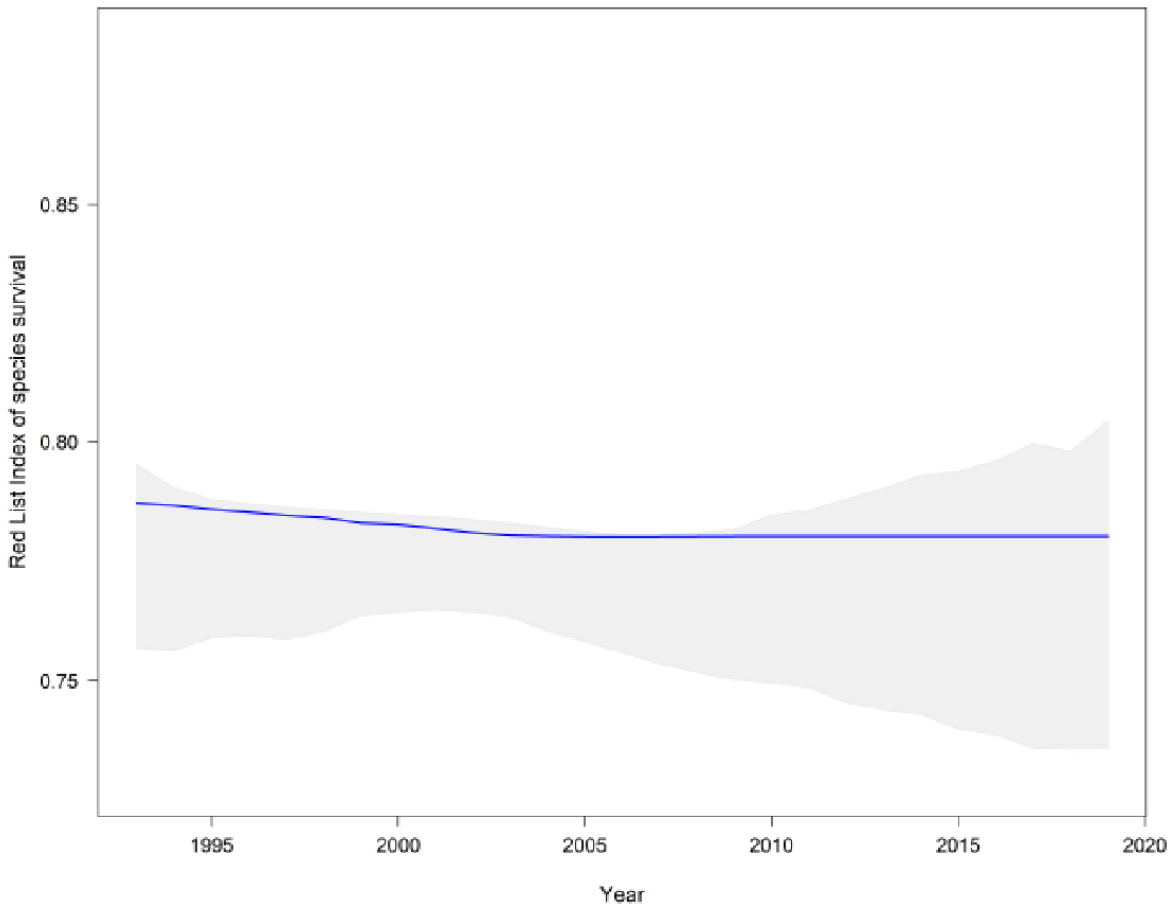


Figure 3.31 Red List Index of species survival in Palestine.

The EQA reports 39 faunal species which are listed in IUCN red list as critically endangered, endangered or vulnerable (SP 2020b; figure below) but the number to be listed locally threatened is much higher.

Additionally, while the number appears lower than nearby countries, when adjusted for sized this difference nearly disappears.

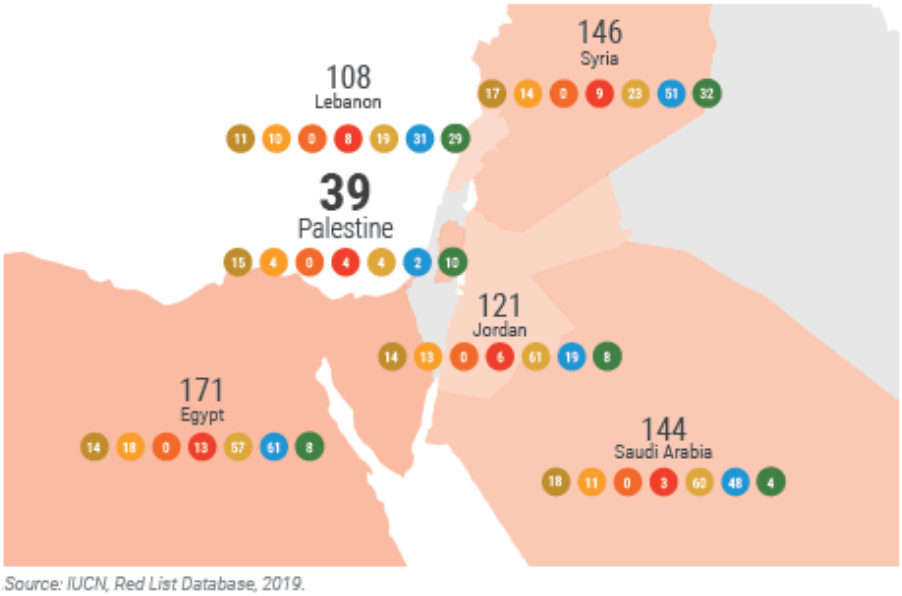


Figure 3.32 Threatened faunal species per global IUCN designations regionally (SP 2020b)

Country	EX	EW	Subtotal	CR	EN	VU	Subtotal	NT	DD	LC	Total
PLANTS											
State of Palestine	0	0	**0**	0	0	0	**0**	0	0	121	**121**
Egypt	0	0	**0**	2	1	0	**3**	0	4	194	**201**
Saudi Arabia	0	0	**0**	0	2	1	**3**	0	0	169	**172**
Syrian Arab Republic	0	0	**0**	1	0	3	**4**	3	1	135	**143**
Lebanon	0	0	**0**	0	2	3	**5**	3	1	162	**171**
Jordan	0	0	**0**	0	0	1	**1**	1	1	91	**94**
ANIMALS											
State of Palestine	0	0	**0**	4	8	12	**24**	16	10	336	**386**
Egypt	1	1	**2**	6	24	108	**138**	135	132	1168	**1577**
Saudi Arabia	1	0	**1**	5	14	97	**116**	145	106	1055	**1425**
Syrian Arab Republic	1	0	**1**	16	34	54	**104**	43	51	678	**877**
Lebanon	0	0	**0**	6	25	33	**64**	32	39	549	**684**
Jordan	0	0	**0**	5	18	78	**101**	121	62	844	**1128**

Note: IUCN Red List Categories: EX- Extinct, EW- Extinct in the Wild, CR- Critically Endangered, EN- Endangered, VU- Vulnerable, NT- Near Threatened (includes LR/nt - Lower Risk/near threatened), DD- Data Deficient, LC- Least Concern (includes LR/lc - Lower Risk, least concern). Red color: Lowest Value, and Green: Highest Value

Figure 3.33 IUCN Red List data for local and regional species (IUCN 2015, World Bank 2019)

There are many threats that causes species to decline to point of potential listing on the red list. In Palestine, the most significant threats are anthropogenic (see figure below).

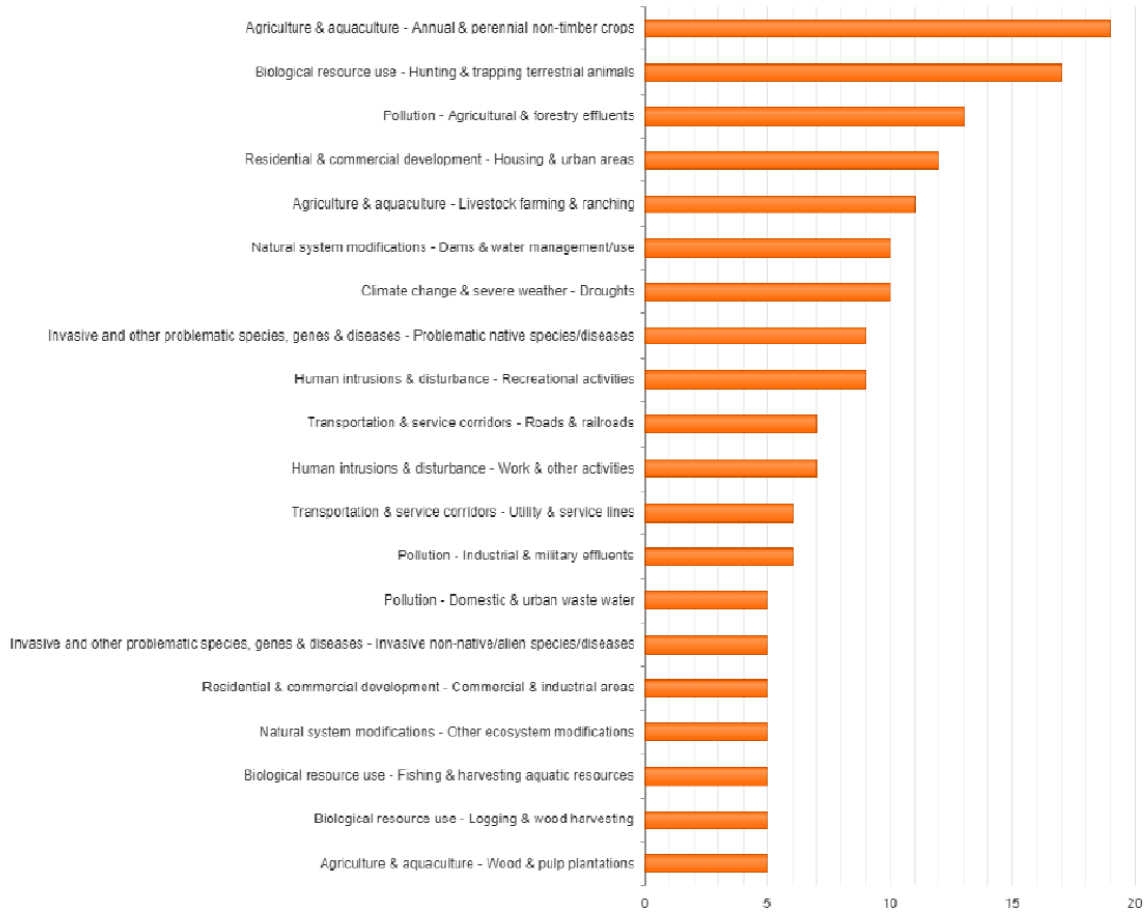


Figure 3.34 Threats to vulnerable species in Palestine (BirdLife International, IUCN and UNEP World Conservation Monitoring Centre 2019)

However, the threats to different taxonomy groups can be different (see figure below).

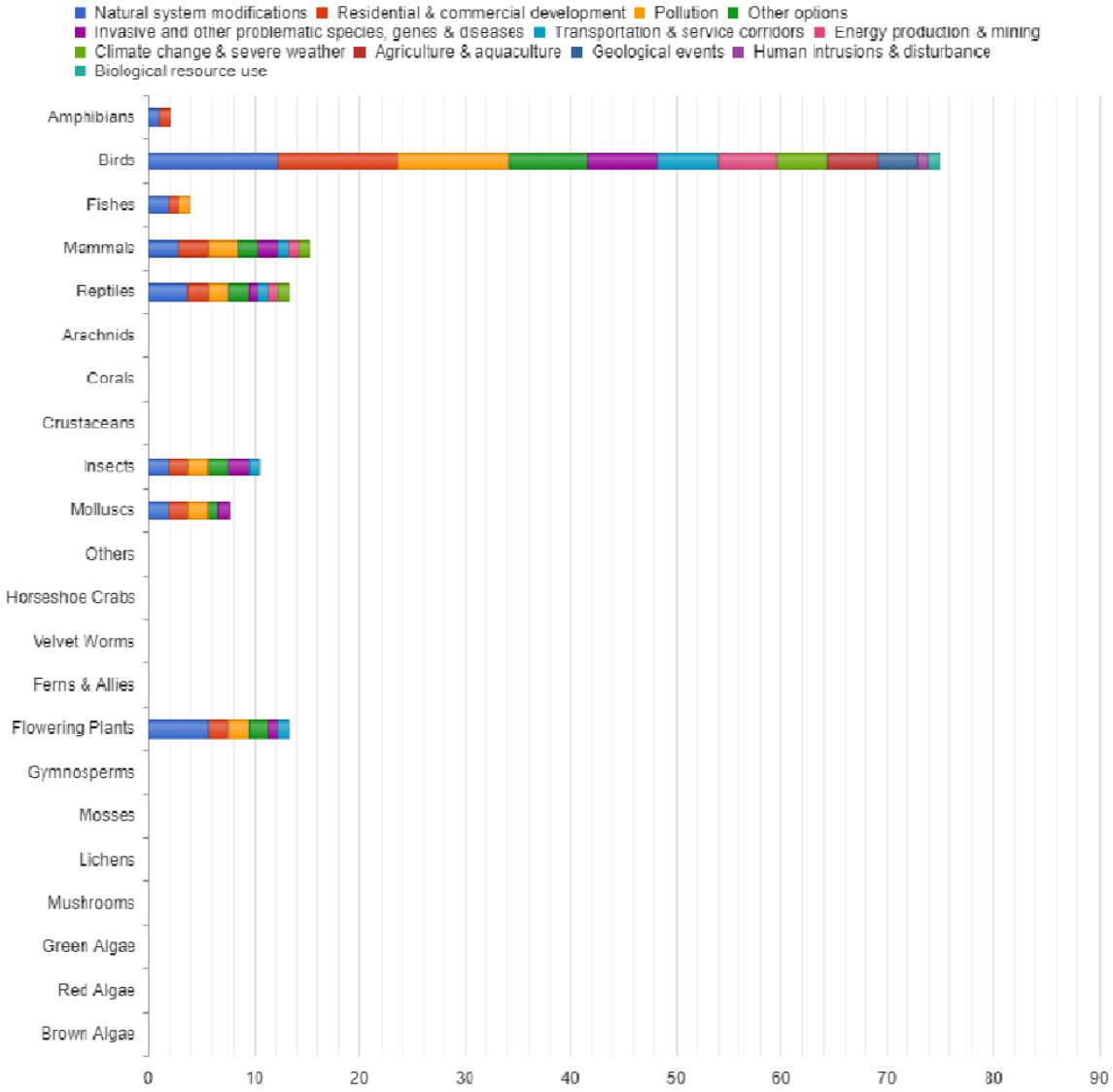


Figure 3.35 Threats affecting different taxonomic groups (BirdLife International, IUCN and UNEP World Conservation Monitoring Centre 2019)

Mitigation and protections

There were many disparate activities relating to protections from extinctions with varying successes. Here we will simply give few examples:

- The Syrian spade-footed toad *Pelobatus syriacus* was noted in one temporary (vernal) pond in the State of Palestines near Jinsafut. PIBS in cooperation with the EQA engaged in a study and local education on the matter to the local communities. The EQA subsequently designated the area (a buffer Zone for Wadi Qana Protected area) as protected. Signs were put up by EQA and PIBS. The actions were timely because the Israeli authorities were slated to build a road intersection in the area.
- The Hanns Seidel Foundation with the EQA developed a project to help Palestinian farmers by promoting the Barn owl populations. This includes installing artificial nesting areas in the Jordan Valley. The results were 35 installed barn owl boxes, 13 owls/chicks are ringed in the boxes; network of farmers maintaining the boxes.
- The Hanns Seidel Foundation with the EQA developed plans to allow nesting of swifts which were damaged due to last restoration in Nativity Church and to raise awareness in the community about the importance of birds in maintaining environmental balance and to promote tourist awareness and observation. 77 nests were installed with speakers system for attracting the birds

and 9 indoor workshops and outdoor birdwatching tours were held for students and scouts of Terra Sancta-Bethlehem.

- Since some 1/3rd of our plant species are vulnerable (rare or very rare or endangered) (AlSheikh and Qumsiyeh 2021), the Critical Ecosystem Partnership Fund supported a number of projects in 2021 for in situ and ex situ conservation of endangered plants and plant ecosystems (see https://www.birdlife.org/middle-east/news/growing-hope-plant-conservation-palestine). Similar projects are needed for animals.

Conclusion: There is still a significant amount of data to be collected on the threatened and endangered species in Palestine. Such baseline data will help produce better management plans for these species. Limited amount of work is done to protects certain areas and certain species.

13. Agricultural biodiversity

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

Palestine is part of the fertile crescent where agriculture was first developed. Palestine's local fauna and flora have several endemic species, thus, the preservation of genetic and agro-biodiversity is crucial. Very few studies and work exist in this area of agro-biodiversity in Palestine but some work has started:

- Tesdel et al. (2020) did some work demonstrating the presence of rich agricultural diversity
- Some work on heirloom seed protection (http://www.facebook.com/palestineheirloomseeds/ and https://viviensansour.com/Palestine-Heirloom).
- Some molecular studies have started and accelerated in the past few years (e.g. Abu Zaitoun et al. 2018; Jamous et al. 2020; Sawalha et al., 2008; Al-Fares and Abu-Qaoud 2012; Basheer-Salimia et al. 2013, 2014; Mujahed and Basheer-Salimia 2019).
- There is increasing interest in preserving local varieties of plants like wheat (e.g. Frankin et al. 2020), watermelon (Alimari et al. 2017) and olives (Abuzayed et al. 2018).
- There is no one central national gene bank in Palestine; however, there are several smaller gene banks dispersed across research centers in the West Bank. Gene banks in Palestine include the ones at the National Agricultural Research Center (NARC), the Biodiversity and Environmental Research Center (BERC), the Palestinian Agricultural Relief center (PARC), and the Union of Agricultural Working Committees (UAWC). The following link reveals the 26 organizations responsible in conserving seeds https://www.ecowatch.com/amp/seed-biodiversity-2646793187.

There has been some work done by the Ministry of Agriculture relevant to agro-biodiversity including development of a strategy (MoA, 2005) and development of guides relating to this (MoA, 2016). The protection of agrobiodiversity in our area of Western Asia is especially important because of the presence of many wild species that are ancestors of the domesticated species in this part of the Fertile Crescent (Al-Atawneh et al. 2008; Mazid et al. 2014, 2018). Some work in this regards is also relevant to local empowerment (Tesdell et al. 2019, 2020) including women empowerment (Abdelali-Martini et al. 2008).

Israel's segregation wall caused strip clearing of land including forest and other natural vegetation clearing, with almost 39,385 dunums of forested area is included in the Western and 1,473 dunums in the Eastern segregation zone, forming 50.7% of its total area (Isaac and Hrimat, 2005). This barrier and other Israeli actions significantly damages agriculture including resiliency of traditional agro-biodiversity (Reynolds 2015).

Agriculture is a one of the important reasons of controlling biodiversity richness and conservation, growing native trees by the ministry of agriculture that help reducing habitat loss and facing desertification, in a way keeps habitat for other biodiversity groups from wild plants, medicinal plants and animals in both vertebrates and invertebrates (Isaac and Gasteyer, 1995).

Some studies show the importance of green agriculture to preserve biodiversity, such as a survey done for avifauna between olive trees and shows a high number of species which is also indicated for other fauna and flora existence in the area (Awad and Attum, 2017).

Each village or district in Palestine is known to be specified for a kind of agriculture product such as Beit Jalla for Apricot, Batter for eggplant, Beit Sahour and Salfit for Snake cucumber, which reflect the diversity of habitat and specialized climate for each product.

Invasive species in both fauna and flora affect agriculture see ABT9, and some of them come by the Ministry of Agriculture that plant some nonnative trees in our habitat and the existence of some invasive invertebrates like land snails in the Ministry of agriculture nursery (Handal et al., 2018)

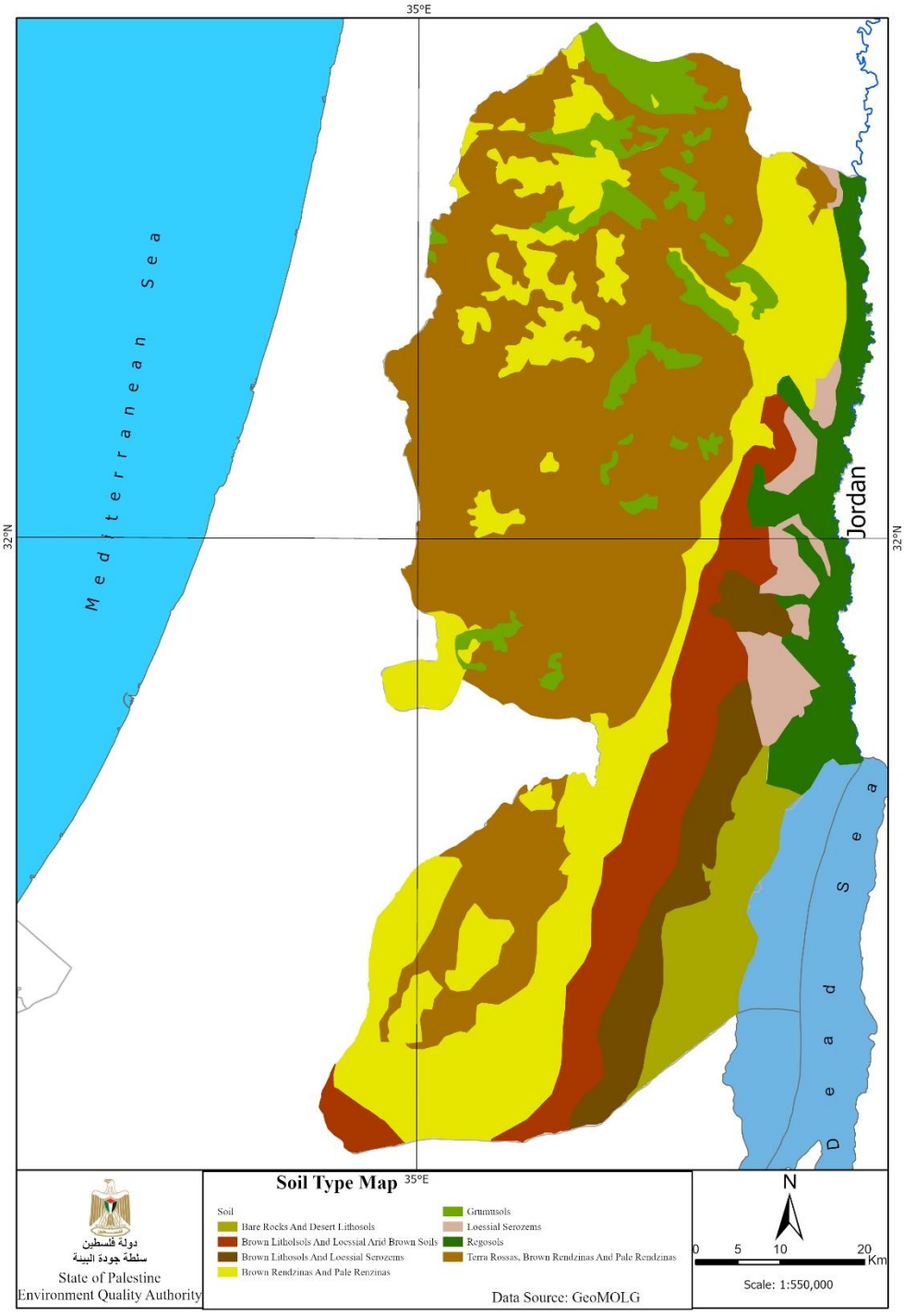


Figure 3.36 Soil Types in West Bank.

Conclusion: This is certainly important but is less developed in our part of the world even as it is a critical part- being the earliest to domesticate plants and animals (Al-Atawneh et al. 2008). There are plans though not implemented related to development of agrobiodiversity in dry areas in our region (ICARDA 2005)

14. Essential Ecosystem Services

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

The people of our country (all Palestinians) are the indigenous people. They are descendent of the Canaanites (first self depiction after invention of writing) who in turn descend from the first human settlements that moved from hunter-gatherer to agricultural and pastoral lifestyles (Qumsiyeh 2004). There has been limited work on the ecosystem services in the SP. Here we review some of the work and suggest potential development which will be taken into account in the NBSAP.

There is also a project related to the Production and consumption implemented through EQA which is the Ecotourism project including the identification of the ecotourism sites of the protected areas and the rich biodiversity sites and identification of the ecotourism trials for ecotourists. In addition the project identifies the national priorities for the consideration of the ecotourism sites and the trials. The project also includes the rehabilitation of 10-sites of ecotourism importance and preparing lifts for the trials in 10-sites also (EQA 2018).

Ecotourism, cultural and landscape tourism could supplement religious and other classic tourism aspects in Palestine (Isaac 2010a, b, c; Tabash 2017). Tourism in Palestine was based on religion, political, and heritage, but in the past 5 years the term ecotourism have popularized among Palestinian, which aims to walk in a specific trail in nature, in protected areas. Thus on one hand the government started to mark the pathways and to study the effects of this tourism on the environment. While on the other hand, introducing the locals and even people from outside Palestine to our environment and biodiversity itself is a kind of environmental awareness (Qumsiyeh and Handal, 2018). Also, Quttaineh (2015) assessed developmental indicators for ecotourism in the West Bank – Palestine via a computational model that facilitates the indicators development and the evaluation of the destinations.

HSF together with the Ministry of Tourism and Antiquities and other Palestinian partners developed a project to mainstream ecotourism into the planning of the local Governmental units (municipalities and village councils) near the nature reserves. The aim is to Strengthening Sustainability in Municipal Politics and contribute to the local economic development of the villages and to the nature reserve's conservation goals. The results included Establishment of "Palestine Ecotourism Society"; 6 workshops where 5 plans were developed by Municipalities; During the years, some municipalities started implementing their plans. HSF worked with Legal Consultant and the Ministry of Tourism for preparation of the legislative document to regulate ecotourism based on the outputs of the policy paper and consultation with the relevant institutions and submitted a list of secondary legislation necessary to implement the proposed tourism Law. 12 of 13 expert/stakeholders in our survey stated that ecotourism need better structuring/organization.

The PCBS reported that unemployment rate in the paslestinian areas is 27% (49% in Gaza). Individual share of GDP averaged $2804/year (down 15% from $3364 in 2019). One billion in tourism revenue was lost. Nearly 50% of students could not participate in remote educational activities.

"Cross-Sectoral National Gender Strategy: Promoting Gender Equality and Equity" is a strategy that was set for the three years of 2011 to 2013 and its main goals was to eliminate discrimination associated with gender, to advocate human rights in Palestine (UN Women 2011). Specifically it says "*The right to control and use resources",* The right to equal opportunities between men and women in accessing, using and controlling resources include:

1. Natural resources: land, water and wells, forests, and livestock.
2. Human resources: skills, experiences, crafts, professions (doctors, teachers, farmers).
3. Financial resources: sources of income and inheritance.
4. Material resources: infrastructure, buildings and material assistance.

Local ecosystem services also include indigenous people traditional use of medicinal and herbal plants from nature. Some of this was covered in the 5th NR (for references see ABT 18). Here we can only add that there is a need for protection of some of the species used because of over harvesting.

Issues of water and use of water include increased pressure on ecosystems exacerbated by population growth and Israeli colonial activities. Rainfall in Palestinian areas (Figure below) indicates an abundance of water but there has been increased pressures on it.

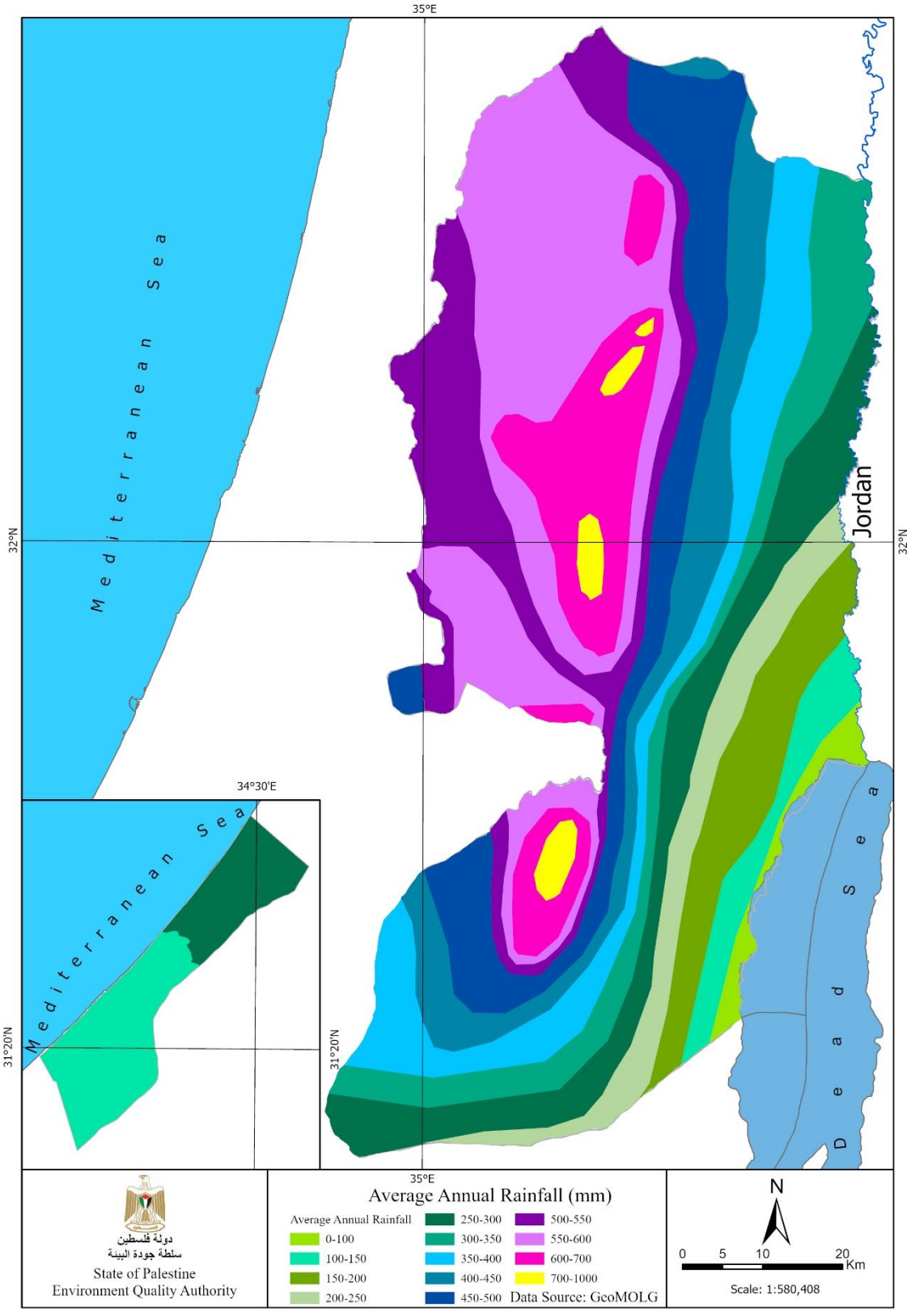


Figure 3.37 Average Annual Rainfall.

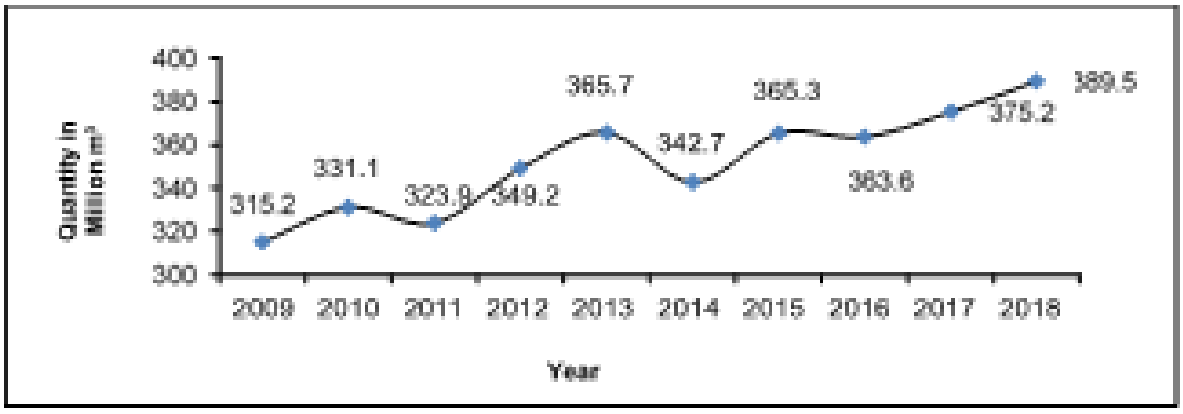


Figure 3.38 Quantity of Water Available Annually in Palestine, 2009-2018 Data excluded Jerusalem annexed by Israel (PCBS 2020)

Table 3.26 Selected Indicators for Water Statistics in Palestine, 2016-2018

Indicator	2016	2017	2018
Quantity of Water Available Annually	363.6	040.1	089.0
Quantity Pumped Annually from Groundwater Wells	251.6	120.0	140.1
Quantity of Spring Water Discharged Annually	29.0	10.0	10.0
Quantity of Water Purchased Annually from Israeli Water Company (Mekorot) for Domestic Use	49.8	80.1	80.4
Quantity of Annual Water Supply for Domestic Sector	183.1	180.1	180.3

*Data excluded those parts of Jerusalem which were annexed by Israeli Occupation in 1967.

Table 3.27 Recharge of aquifers estimate (ARIJ 2016)

Aquifer	Average rainfall 2011/2012 (mm)	Recharge volume 2011/2012 (MCM)	Long-term average recharge (MCM)
Western aquifer	581	359	318 – 430
North-eastern aquifer	517	152	135 – 187
Eastern aquifer	483	210	125 – 197
Total West Bank	519	721	578 – 814
Gaza Coastal aquifer	372	64	55 – 60

The main watershed areas (Figure below) are the primary ecosystems for much of the diversity of wildlife. All of these are threatened.

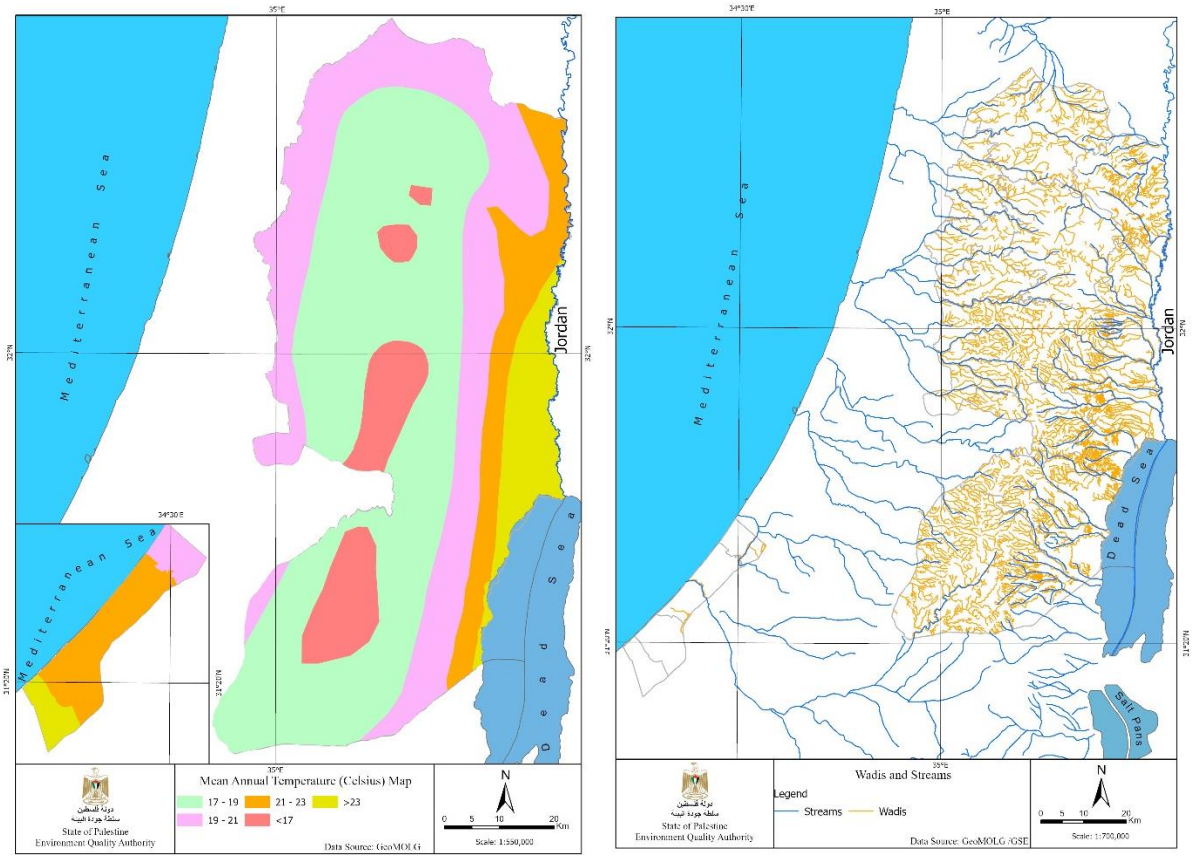


Figure 3.39 Mean annual temperature (left) and Main watershed areas (right) in Palestine

Conclusion: Based on the limited information summarized above, we conclude that Palestine has developed ecosystem services minimally and much more work needs to be done in this area which should be made a priority in the new NBSAP being worked on now.

15. Ecosystem Resilience

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

Climate change will have a drastic impact on biodiversity and human well-being and sustainability (Harvell et al., 2002, Rinawati et al., 2013). Because ecosystems play a significant role in human well-being, human beings must address the challenge, especially that which threatens life on earth as we know it: climate change (UNDP, 2007). While the world is now fully aware of the potentially devastating impact of anthropogenic pressures on global biodiversity mostly via habitat alterations, there is a challenge of how to perform these studies and introduce the solutions (Rinawati et al., 2013). The effect of global warming will not be even around the world. The developing countries will suffer the most; the World Science Academies stated that "Developing nations that lack the infrastructure or resources to respond to the impacts of climate change will be particularly affected. It is clear that many of the world's poorest people are likely to suffer the most from climate change. Long-term global efforts to create a more healthy, prosperous and sustainable world may be severely hindered by changes in the climate."

There are models that foresee more direful consequences in the Mediterranean zone (Sala et al., 2000). The World Bank issued a report showing that the Arab world is already severely suffering from climate change. The report shows an increase in annual average temperature in the last 20 years (Verner, 2012) and predicts a rise by 4 to 5 degrees in the next two to three decades as well as a decrease in annual rainfall by nearly 25% that would cause more frequent and severe droughts. Simulated models attempt to integrate species' own responses (ecologically, genetically, etc.) in predicting changes in species distribution following climate change and its impact on the habitat (Lavergne et al., 2010). But preliminary data in Palestine in at least one

study shows decline in vertebrate biodiversity as desertification spreads into the Bethlehem District (Qumsiyeh et al., 2014b). In our areas temperatures are expected to rise 2 C by 2050 and by up to 4.5 C by 2090 with concomitant decrease in annual rainfall by 20-25% at a minimum especially in the southern governorates (Morice et al., 2012, SP 2020b). Climate change effects on food security and biodiversity is negative around the world including in Palestine (Salem 2010).

On the 17th of March 2016, the State of Palestine officially became the 197th party to the United Nations Framework Convention on The Climate Change (UNFCCC 1992). It also signed and ratified the Paris Agreement on the 22nd of April, 2016. Since this happened after the last (5th) NR to CBD, we articulate here the significant progress made since 2016. The objective of UNFCCC is to achieve stabilization of greenhouse gas emissions in the atmosphere to a level that would cease devastating anthropogenic interference with the climate system. Such a level should be reached within a reasonable time frame to enable ecosystems to respond naturally to climate change, to guarantee that food production is not threatened and to enable economic development to proceed in a sustainable manner. Parties, including developing and developed countries, shall be guided by the following: 1) parties should protect the ecosystem for the present and future generation of humankind through taking precautionary measures to anticipate towards reducing the causes of climate change and mitigate its adverse effects, 2) developing countries parties should be given full consideration in light of the disproportionate burden that these parties would bear under the conviction, 3) parties should promote sustainable development and integrate to national development programs that would enact policies and measures to protect the climate system against anthropic change, and 4) also parties should cooperate to develop open and supportive international economy that would empower and sustain the economic growth and development, specially developing parties.

The National Strategy, Action Programme & Integrated Financing Strategy to Combat Desertification in the Occupied Palestinian Territory identified four strategic objectives (EQA 2012):

1. To upgrade institutional, legal and human capacities and frameworks and to create the enabling policy environment
2. To improve awareness and attitude of the stakeholders and to seek maximum participation and partnership of the affected people and the private sector
3. Conservation and sustainable use of natural resources
4. To improve mobilization, efficiency and effectiveness of financial and technical resources

Each of the above-mentioned objectives was accompanied with a set of interventions that resulted in five projects with a proposed budget of USD 4.15 million.

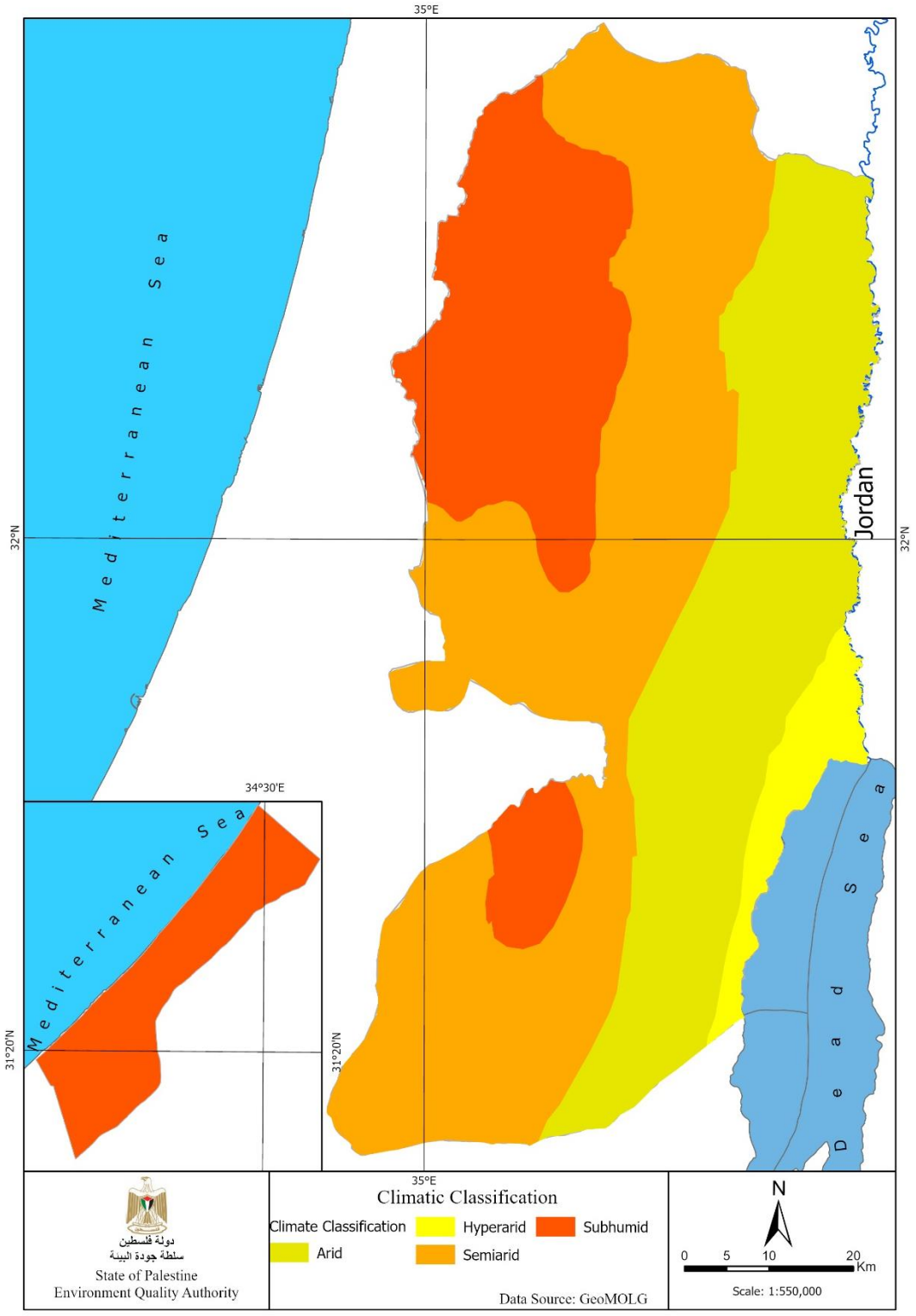


Figure 3.40 Climate Classification of the West Bank.

The Ministry of Agriculture (MOA) developed The National Agricultural Sector Strategy (2017-2022) entitled by "Resilience and sustainable development" with a vision for "Sustainable agriculture; capable of competing locally and globally; and effectively contributes to strengthening food security, the bond between Palestinians and their land as well as their sovereignty over resources, towards building an Independent Palestinian State". The main national Guiding Pivots for agricultural development are: First by intensifying efforts to work in Area (C) and Jerusalem. Second by addressing the impact of Israeli occupation policies and measures. Third by facilitating access to agricultural land, water and natural resources, as well as markets. Fourth by promoting investment in the agriculture sector, and strengthening public-private

partnerships for this purpose and promoting innovation and adaptive solutions that mitigate the effects of climate change. Fifth by strengthening and supporting farmers' organization and small-scale farmers-oriented agricultural organizations, particularly those with clear mandates and commitment to enhance the role and position of women and youth in agriculture. Sixth by the empowerment of the sector by MoA leadership which requires common consensus and partnership amongst all on the vision and sector priorities. Seventh by bringing the agriculture sector to the forefront of development priorities of both government and the donor community and providing the proper budgets and support and the strengthening contribution to and linkages with the Sustainable Development Goals, (SDGs) 2030. Lastly by joining the membership of international organizations, and ratifying international treaties and conventions (Unpublished, Palestine Biosafety assessment Report 2021, EQA)

Table 3.28 The agricultural policies in SP

Pillar	Strategic objective	Policy priorities
Resilience and protection	First Strategic Objective: Female and male farmers' resilience and steadfastness on their lands enhanced	1. Mobilize international support to restrain Israeli violations impeding agricultural developing, particularly restriction on access, and use of natural resources, borders, infrastructure demolition and uprooting of trees. 2. Institutionalize and develop technical and financial resources dedicated to the Risk Prevention and Agricultural Insurance Fund. 3. Provide suitable environment for agricultural production and development of youth and farmers in Area C, border areas and Jerusalem through continuous coordination with all parties to provide infrastructure services to farmers and producers in marginalized areas, as well as agricultural programs and projects for the poor, marginalized and women entrepreneurs. 4. Agricultural control on border crossings and the establishment of national reference laboratories. 5. Empowering farmers and producers to access different courts to get to their rights.
Natural resources	Second strategic objective: Natural and agricultural resources sustainably managed and better adapted to climate change	1. Establish large water facilities in arable irrigated areas through the transfer of water or water collection or wastewater treatment and increase the efficiency of the available water. 2. Provide the necessary support for land reclamation and agricultural road construction that link all agricultural land or lands that could be cultivated. 3. Take measures and arrangements to adapt with or avoid the negative impact of climate change and natural disasters, particularly high temperatures and fluctuating precipitation or declining rain water. 4. Intensify efforts of research and official institutions, local authorities and centers to protect the forests and natural reserves, as well as organize and develop pastures, protect agricultural biodiversity in all environmental areas in Palestine. 5. Continue the greening of Palestine as a responsibility of all institutions, local authorities, schools and universities. 6. Protect agricultural lands from urban expansion, especially in plain areas and high value agricultural lands.
Production and productivity	Third strategic objective: Increased agricultural production, productivity, and competitiveness in local and international market,	1. Guiding and supporting farmers' initiatives towards intensive and semi-intensive production systems, as well as the application of modern systems of

	along with their contribution in gross domestic product and	agricultural production in line with the requirements of sustainable development 2. Strengthening the role of applied research in official research centers and universities in developing extension services for both plant and livestock agriculture. 3. Improving communication between agricultural extension

The state of Palestine took some measures to start monitoring its CO2 and other greenhouse emissions after the 2006 Intergovernmental Panel on Climate Change including establishing Guidelines for National Greenhouse Gas Inventories. The state of Palestine projected 18.1Mt CO2eq in 2040 under independence scenario and 9.1 Mt CO2eq in 2040 under status quo (political scenario). The SP committed to reduce its CO2 emissions 24.4% by 2040 (vs status quo 12.8% relative to business as usual) conditional on receiving finances and technical support (SP 2020c).

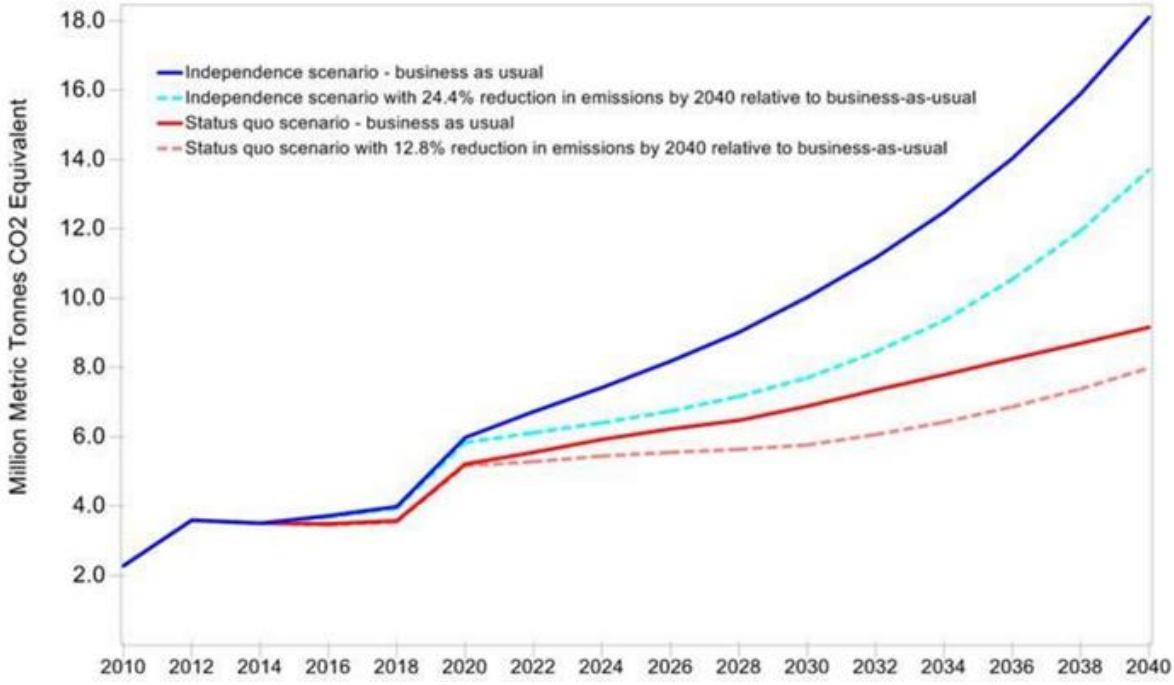


Figure 3.41 State of Palestine conditional mitigation contribution (SP 2020c)

Table 3.29 National Greenhouse Gas Inventory in Palestine, 2018 (PCBS http://www.pcbs.gov.ps/site/lang__en/745/default.aspx)*

Categories	CO2 (Gg)	CH4 (Gg)	N2O (Gg)	Emissions (Thousand ton of CO2 eq)
Total National Emissions and Removals	2967.97	47.94	1.78	4527.67
1 - Energy	2999.56	1.56	0.13	3072.75
1.A - Fuel Combustion Activities	2999.56	1.56	0.13	3072.75
1.A.1 - Energy Industries	241.52	0.03	0.01	243.8
1.A.2 - Manufacturing Industries and Construction	83.07	0.01	0	83.58
1.A.3 - Transport	2167.52	0.39	0.1	2209.6
1.A.4 - Other Sectors	507.45	1.13	0.02	535.77
2 - Industrial Processes and Product Use	NE	NE	NE	0
3 - Agriculture Forestry and Other Land Use	-31.59	10.98	1.05	523.03
3.A - Livestock	0	10.98	0	230.55
3.A.1 - Enteric Fermentation	NO	8.99	NO	188.72
3.A.2 - Manure Management	NO	1.99	0	41.83
3.B - Land	-31.59	0	0	-31.59

3.B.1 - Forest land	-31.59	NO	NO	-31.59
3.C - Aggregate sources and non-CO2 emissions sources on land	0	0	1.05	324.07
3.C.4 - Direct N2O Emissions from managed soils	0	0	0.93	287.8
3.C.6 - Indirect N2O Emissions from manure management	0	0	0.12	36.27
4 - Waste	0	35.4	0.61	931.89
4.A - Solid Waste Disposal	0	17.36	0	364.7
4.D - Wastewater Treatment and Discharge	0	18.04	0.61	567.19

Gg: Giga gram which equals 1000 ton,
CO2: Carbon dioxide,
CH4: Methane (1 ton of CH4 equivallent to 21 ton of CO2),
N2O: Nitrous oxide (1 ton of N2O equivallent to 310 ton of CO2),
NO: Not Occurring,
NE: Not Estimated
*: For more details about the methodology, data quality and calculations, please refer to "Emissions to Air 2014" report on the following link: http://www.pcbs.gov.ps/Downloads/book2205.pdf
*The data excludes those parts of Jerusalem governorate which were annexed by Israel in 1967.

Table 3.30 Greenhouse Gas Inventory by Sector and Emittent in Palestine (Thousand ton of CO2 eq.), 2018 (PCBS http://www.pcbs.gov.ps/site/lang__en/745/default.aspx)*

Sector/ Emittant	GHG inventory (Thousand ton of CO2 eq)	Share of sectors in GHG inventory, %
Sector		
Energy	3,072.75	67.9
Agriculture	523.03	11.6
Waste	931.89	20.5
Total	4,527.67	200
Emittant		
CO2	2,967.97	65.6
CH4**	1,006.79	22.2
N2O***	552.91	12.2
Total	4,527.67	200

****: 1 ton of CH4 equivalent to 21 ton of CO2**
*****: 1 ton of N2O equivalent to 310 ton of CO2**

Table: Per Capita Emissions of CO2 in Palestine and Selected Countries (PCBS http://www.pcbs.gov.ps/site/lang__en/745/default.aspx)

Country	Emissions per capita CO2 eq.	Year	Emissions Share of the World, %
Palestine *	0.93	2018	..
	0.96	2016	..
Egypt	2.32	2016	0.61
Syria	2.18	2016	0.11
Lebanon	3.26	2016	0.06
Jordan	2.38	2016	0.06
Israel	8.04	2016	0.18
United States of America (USA)	15.52	2016	14.02
China	7.38	2016	29.18
Qatar	37.29	2016	0.28
World	774,	1023	..

* Data exclude those parts of Jerusalem which were annexed by Israeli Occupation in 1967.

Table 3.31 Overall GHG Emissions in Palestine by Year (1000 ton CO2 eq.), 2006- 2018 (PCBS http://www.pcbs.gov.ps/site/lang__en/745/default.aspx)*

Year	Overall GHG emissions (1000 ton)			Overall GHG emissions (1000 ton CO2 eq.)
	Emission from Carbon Dioxide CO2	Emission from Methane CH4	Emission from Nitrous oxide N2O	
2006	1,510.6	33.4	1.7	2,739.9
2007	1,479.6	33.6	1.7	2,710.7
2008	1,374.4	33.9	1.7	2,620.3
2009	1,779.2	34.0	1.7	3,026.6
2010	2,049.7	35.7	1.5	3,276.5
2011	1,900.2	38.2	1.7	3,226.3
2012	2,059.3	38.5	1.7	3,380.6
2013	2,294.7	38.5	1.6	3,612.0
2014	3,180.3	40.5	1.9	4,614.9
2015	3,013.4	42.8	1.9	4,496.1
2016	3,254.5	44.2	1.5	4,645.5
2017	3,284.3	44.2	1.8	4,777.2
2018	2,968.0	47.9	1.8	4,527.7

* Data exclude those parts of Jerusalem which were annexed by Israeli Occupation in 1967.

Table 3.32 Selected Indicators for Water Statistics in Palestine, 2016-2018 (PCBS http://www.pcbs.gov.ps/site/lang__en/745/default.aspx)

Indicator	2016	2017	2018
Quantity of Water Available Annually	363.6	040.1	089.0
Quantity Pumped Annually from Groundwater Wells	251.6	120.0	140.1
Quantity of Spring Water Discharged Annually	29.0	10.0	10.0
Quantity of Water Purchased Annually from Israeli Water Company (Mekorot) for Domestic Use	49.8	80.1	80.4
Quantity of Annual Water Supply for Domestic Sector	183.1	180.1	180.3

*Data excluded those parts of Jerusalem which were annexed by Israeli Occupation in 1967.
Quantity in Million m3/Year

The State of Palestine recently completed its Initial National Communication Report1(INCR) and submitted it to the UNFCCC on November 11th, 2016 highlighting its commitment to being an active player in tackling and responding to climate change (EQA 2016b). National Adaptation Plan (NAP) to Climate Change (EQA 2016c) lays out important ideas and programs.

Table 3.33 State of Palestine mitigation measures proposed conditional on support (EQA, 2017b; SP 2020c)

Mitigation action	Brief description of the action
Solar photovoltaic	Generation of 20%-33% of electricity using solar PV. Energy Service Companies (ESCOS) could be used to overcome financial barriers.
Energy efficiency in buildings	Buildings standards on thermal efficiency, developing on existing regulations.
Use of waste for cement production	Municipal solid waste used as a substitution of 20% of coal in cement production. Acquired through contract tender to private organisations.
Use of waste for electricity generation	Deployment of a 1 MW (50 tonnes per day of waste) waste incineration unit.
Reduction of methane from landfill	The capture of 14,000 tonnes of landfill gases per annum for use in power generation.
Energy efficient lighting	Annual increase as part of buildings standards. Increase of 1% per annum using energy efficient lightbulbs.
Hybrid electric vehicles	Promotional campaigns and maintenance/increases to tax credits for qualifying vehicles
Compressed natural gas powered vehicles	Development of compressed natural gas refuelling infrastructure and amendment to the Traffic Act regarding licence fees. Assumes that 20% of trucks and buses could use compressed natural gas by 2040.
Modal shift programmes	Numerous measures including standard public service contracts, simplified fare systems, improved passenger information and better vehicles and maintenance. Envisions a 25% shift from private vehicle to public bus by 2030.
Afforestation	Annual increase of 200 hectares of forested land per annum, building on existing forested land.

Table 3.34 State of Palestine mitigation measures implemented or ongoing (EQA, 2017b; SP 2020c)

Mitigation action	Brief description of action	Timescale for implementation
Sustainable Urban Demonstration Projects [5]	Installation of six net-metering photovoltaic systems on 6 main public buildings in the Tubas Municipality: • Municipality Building • Public Information Centre • Cafeteria Building - Public Transportation • Dynamo-meter Building • Youth Centre Building • Storage Building.	2015-2017
Sustainable Urban Demonstration Projects	Installation of a small-scale wastewater treatment plant powered by solarenergy in Za'atara, Palestine, and evaluation of the feasibility of upscaling this technology in Central Asia	2015-2017
Afforestation Project	Afforestation through: • reclamation of approximately 1200 dunums[6] of unused agricultural lands • development of approximately 1000 dunums of grazing lands. The introduction of new areas for planting new trees will provide increased carbon sequestration.	2015-2017
Greening Palestine	Increasing green cover to provide increased carbon sequestration.	Ongoing
Rangeland development, improvement and rehabilitation.	New forage plants (shrubs and trees) will provide increased carbon sequestration.	2014 – 2017

Table 3.35 Issues ranked as highly vulnerable to climate change (EQA, 2017b; SP 2020c)

Theme/sector	Highly vulnerable issue West Bank	Highly vulnerable issue Gaza Strip
Agriculture	Olive production; Grape production; Stone fruits; Rain-fed vegetables; Field crops; Irrigated vegetables; Grazing area and soil erosion; Irrigation water; Livestock production	Livestock production; Cost of agricultural production; Employment; Vegetable production; Olive production, Citrus; Irrigation water
Coastal and marine	N/A	Fishing/fisheries; Coastal agriculture; Condition of beaches
Energy	Domestic/local energy production; Energy imports; Condition of infrastructure	Domestic energy production; Energy imports; Condition of infrastructure
Food	Domestic food prices; Imported food prices	Domestic food prices; Imported food prices
Gender	Major diseases related to water and sanitation	Employment and gender; Major diseases related to water and sanitation; Food security and gender
Health	Major diseases related to water, sanitation, and food	Major diseases related to water, sanitation, and food
Industry	Value of raw materials imported; Infrastructure; Energy supply; Energy demand	Value of industrial products exported; Value of raw materials exported; Employment; Energy supply; Energy demand
Terrestrial ecosystems	Habitat connectivity	Wadi Gaza – Habitat connectivity
Tourism	Condition of cultural heritage	N/A due to Israel's occupation and blockade of the Gaza Strip
Urban and infrastructure	Urbanisation	Building conditions; Urban drainage
Waste and wastewater	Waste management	Waste management
Water	Ground water supply; Flood management; Condition of infrastructure	Groundwater supply; Groundwater quality; Flood management

Table 3.36 Issues related to climate change being worked on/implemented (EQA, 2017b; SP 2020c)

Adaptation action	Brief description of action	Timescale for implementation
Enhancing food security (Jenin, Tubas, Ramallah)	• Implemented by MOA	Ongoing
Land, water and human resources development in marginalised areas (Hebron, Bethlehem)	• Increase water availability by constructing cistern and earthy dams, and improved irrigationby installingwater tanks.	Ongoing
Rehabilitation of agricultural land (Salfit, Bethlehem, Hebron, Jenin)	• Implemented by MOA	Ongoing
Land development and water resources project (Jenin, Nablus, Qalqylia, Tulkarem,Hebron)	• Increase water availability by constructing a 2,000 m3 capacity earthy pond • Improved irrigation scheduling byinstalling 10 water tanks • Minimise water leakages by installing new water conveyance systems.	Ongoing
Integrated rural development project (Marj Sanour)	• Increase water availability by: - constructing 50 earthy ponds (5,000- 10,000m^{3}each) - constructing 15-170 cisterns(70m^{3}capacity each) - rehabilitating 500 dunums[10] of sloped terrain to minimise soil erosion	Ongoing
Water harvesting project - 2 dams and pond (Hebron district, Jenin)	• Increase water availability in the agricultural sector by constructing 3 large scale earthy ponds with a total capacity of 300,000 m3	Ongoing
Adaptation to climate change project (Tulkarem,Jenin,Jericho, Ramallah, Dora)	• Improve farmers' and agricultural engineers' adaptive capacity through improved irrigation management, treated wastewater reuse, introducing new fodder seeds and minimising soil erosion through minimum tillage	Ongoing
Water harvesting and soil conservation project to adaptation to climate change (Jenin, Ramallah,Dora)	• Soil water harvesting to improve water availability and soil quality, and build adaptation capacity in the agricultural sector with respect to soil water harvesting	Ongoing
Water harvesting project - rainwater collecting wells (Hebron)	• Increase water availability in the agriculture sector (animal and crops) by constructing 50 cisterns (approximately 70-100M^3)	Ongoing
Water management project (Jordan Valley, Nablus)	• Improve water management and increase available water by rehabilitating 6 wells and 10 km of conveyance infrastructure	Ongoing
Enhancing food security (Jenin)	• Improve food security by planting 200 dunum of alfalfa	Ongoing
Enhancing food security (Jenin, Nablus)	• Increase food security by cultivating 100 dunum in Jenin and 100 dunum in Nablus with food crops and reusing treated wastewater	Ongoing

Table 3.37 Types of support needed for Climate Change action (EQA, 2017b; SP 2020c)

Mitigation action	Brief description of the action	Type of support needed
Solar photovoltaic	33% of generation to come from solar PV	Finance, technology
Energy efficiency of buildings	Increased energy efficiency through buildings standards	Finance, capacity-building
Energy efficient lighting	Increased efficiency of lightbulbs through standards	Finance, capacity-building
Use of waste for cement production	Use of waste in cement production	Finance
Use of waste for electricity generation	Capture and utilisation of landfill gases	Finance, technology,capacity-building
Reduction of methane from landfill	Capture landfill gases for use in power generation.	Finance, technology, capacity-building
Compressed natural gas powered vehicles	Conversion of 1,000 taxis to CNG-powered vehicles	Finance
Plug-in electric-hybrid vehicles	Conversion of 1,000 vehicle to electric vehicles	Finance, technology
Modal shift programmes	Creation and maintenance of bus rapid transit lanes	Finance
Afforestation	Planting additional hectares of forestland	Finance

Table 3.38 Additional conditional mitigation actions needed for Climate Change action (EQA, 2016b, 2017b; SP 2020c)

Sector	Action
Agriculture	Adoption of climate-smart production practices and more resource efficient post-harvest processing practices in agricultural value chains (including fruit trees, vegetables, field crops and livestock) that reduce greenhouse gas emissions and increase carbon sequestration in plant biomass and soil organic matter. The objective is for at least 50% of farms in the State of Palestine to apply climate-smart agriculture by 2040.
Agriculture	In addition to afforestation, increase carbon stock in plant biomass and soil organic matter through agroforestry and rangeland development, to support an annual 2% increase in green areas within the State of Palestine.
Energy	Implementation of State of Palestine's Renewable Energy Strategy, which aims to generate 5% of the total electric energy consumed by utilising renewable energy technologies by the year 2020.
Energy	Implementation of the State of Palestine's National Energy Efficiency Action Plan, whichaims to achieve 5% savings in overall electricity demand by 2020 (or annual energy savings of 384GWh).
Energy	Promote increase use of solar thermal energy including solar water heaters, solar heating, solar fruit driers
Transport	Encourage the use of public transport, in addition to bus rapid transport.
Transport	Improve the efficiency of the road vehicles by updating the vehicle fleet, disposing of old vehicles, and promoting and encouraging the use of efficient vehicles
Transport	Reduce traffic jams.
Transport	Use multi-modal transport patterns.
Transport	Control the technical condition of vehicles and periodic maintenance (MOT)

According to Palestinian Central Bureau of Statistics (PCBS, 2014), the quantity of carbon dioxide (CO2) emissions in 2018 estimated to be about 4,527.67 million tons, divided as 3.07 million tons resulted from the energy sector, 532 thousand tons from the agriculture sector, and 931 thousand tons from the waste sector. The emissions quantity increased from 1.644.188 ton\year in 2001 to 4,527.67 ton\year in 2018.

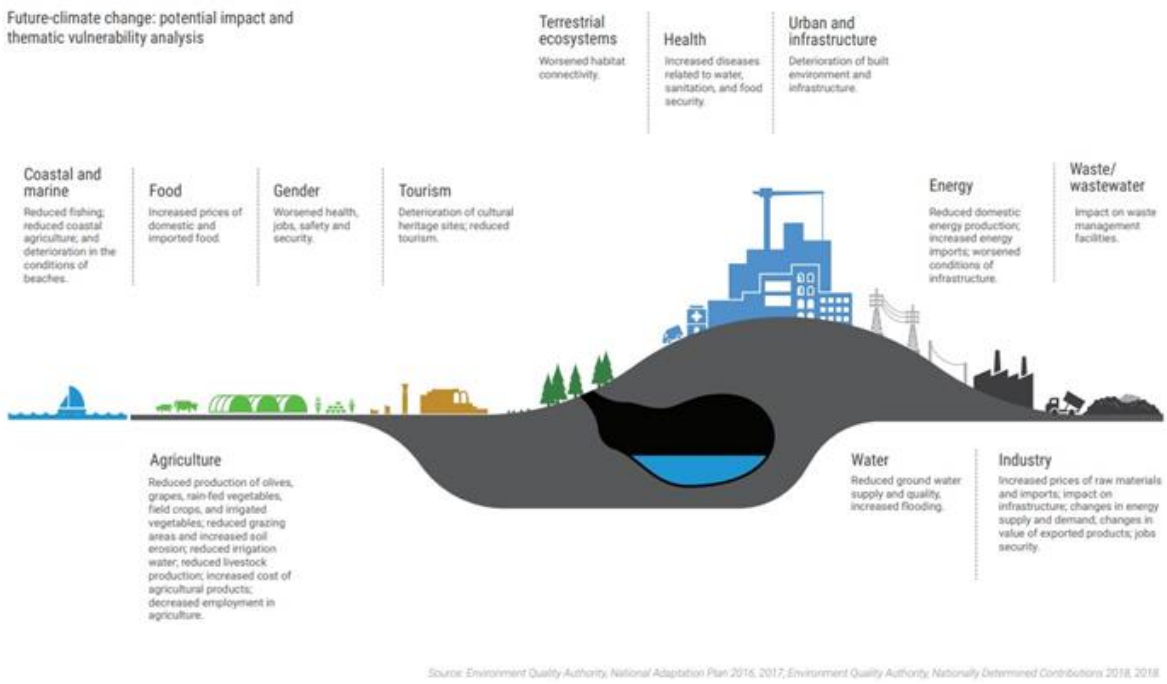


Figure 3.42 Climate change aspects in Palestine (SP 2020b)

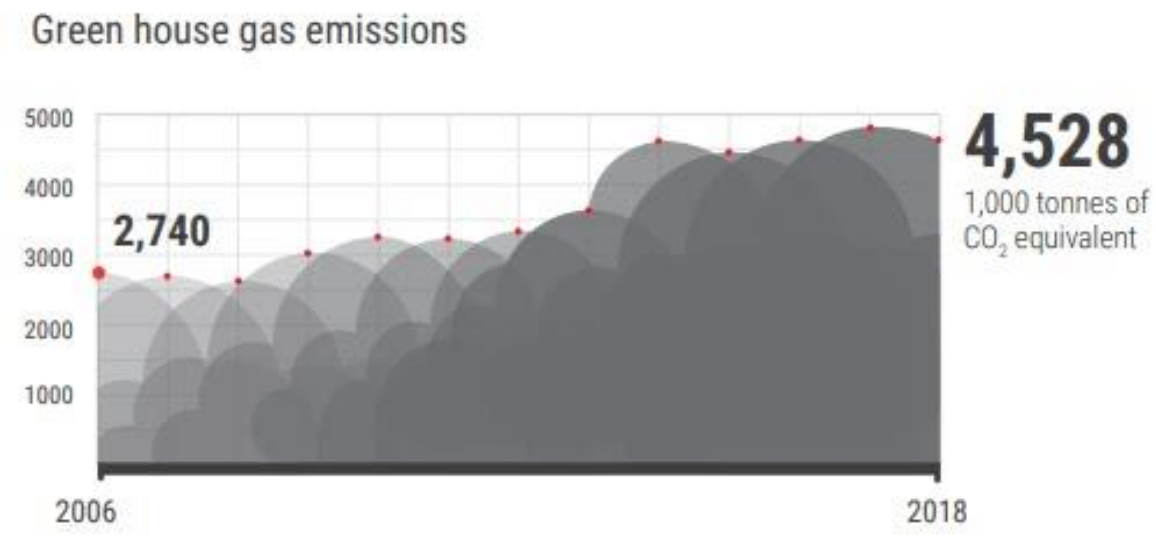


Figure 3.43 Greenhouse gas emissions in Palestine (SP 2020b)

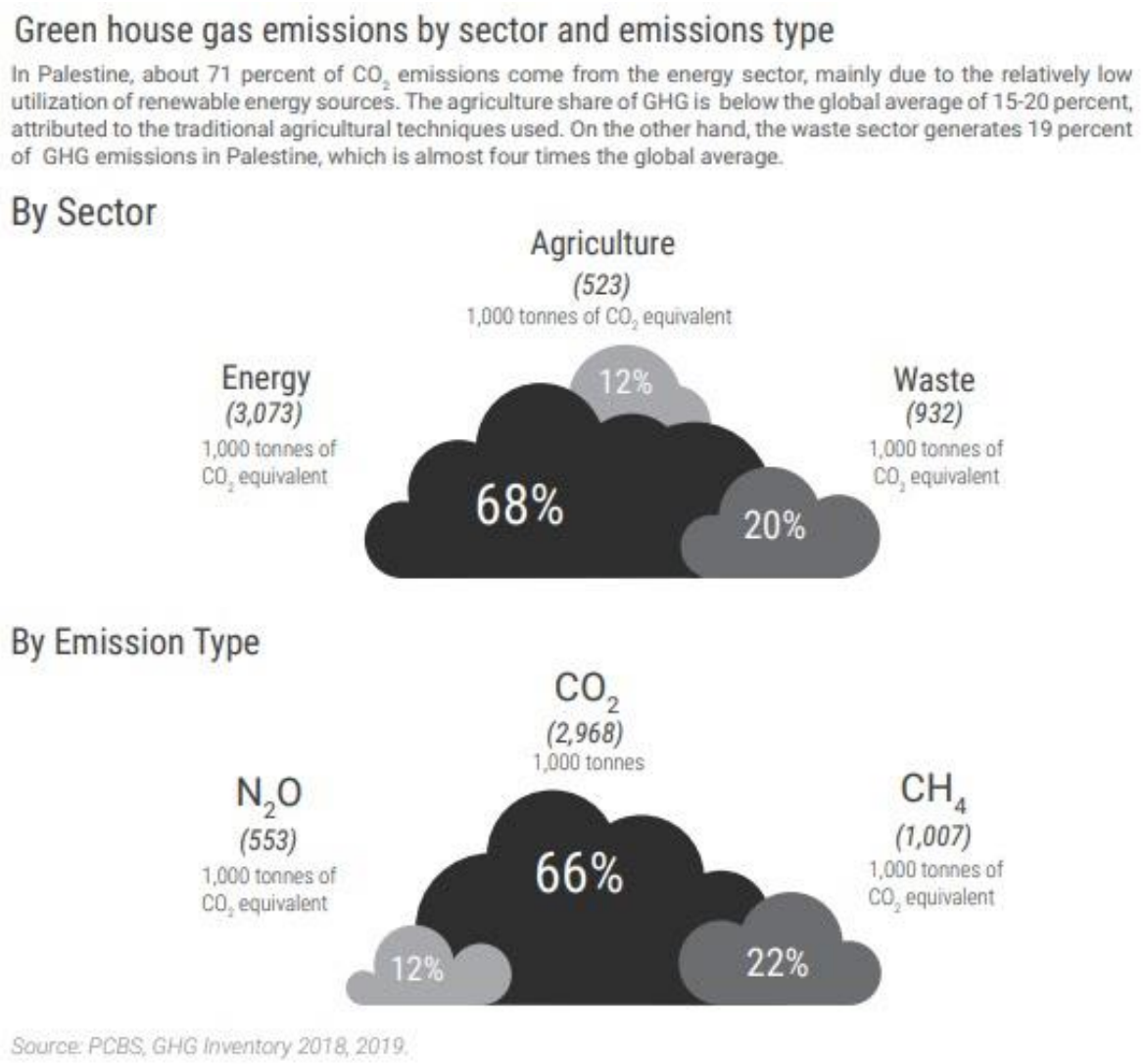


Figure 3.44 Sources of greenhouse gas emissions in Palestine (SP 2020b)

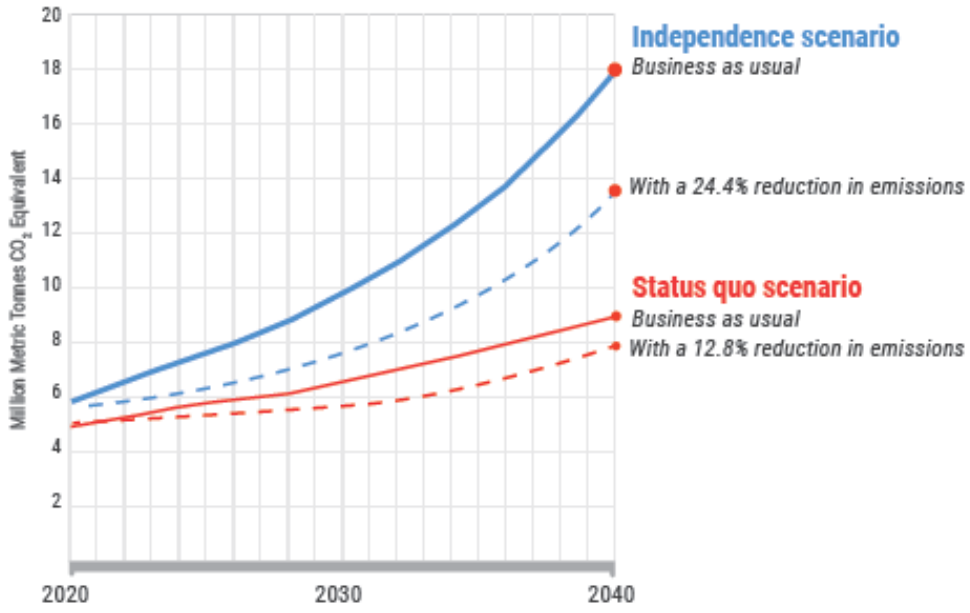


Figure 3.45 Projection for CO2 equivalent emissions in Palestine (SP 2020b)

The State of Palestine began to address climate change impact in the State of Palestine in the last decade and accelerated efforts in the second half of the decade. The EQA and many other non-governmental organizations have integrated climate change mitigation and adaptation strategies, and invested in accumulating knowledge on the pattern of biodiversity loss due to global warming, among other factors.

The EQA has issued two important documents on climate change and correlating challenges at the Palestinian level.

The Climate Change Adaptation Strategy (UNDP, 2010) and the Climate Change National Determined Contributions (NDC) concluded that Palestine will be vulnerable to outcomes and implications of climate change: an increase in annual average temperature between 2.2 and 5.1 degrees, a 20% drop in annual rainfall by 2050, land degradation, and desertification. A report on the National Capacity Development Program (CDP) for climate change mainstreaming related to the Palestinian Authority, this project aims at enhancing capacities of institutions of the Palestinian to mainstream and address the challenges and threats of climate change in several areas of reporting, mitigation and adaptation.

National Adaptation Plan to Climate Change (EQA 2016): This document included

- a review of historic trends in climate in relation to the State of Palestine
- Identification and prioritization of vulnerable hotspots regions
- Future climate-scenarios for the SP and future developments required for the State of Palestine's institutions to be able to participate in climate-modelling research
- Identification and prioritization of adaptation options, including costings
- An outline of the process for future monitoring and evaluation

Palestine's Initial National Communication Report to the United Nations Framework Convention on Climate Change (UNFCCC): The Climate Change Adaptation Strategy and Program of Action for the Palestinian Authority has identified water and food security as the most vulnerable issues in the State of Palestine (UNDP, 2010). Under difficult circumstances that the state of Palestine including political occupation, the Palestinian Authority needs to empower its expertise and capacity at the institutional level in order to address all of the issues that are linked to climate change adaptation and mitigation. It currently suffers from limited capacity, expertise, and a general limited ability to respond to these challenges. The Nationally Determined Contributions (NDC) to UNFCCC were finalized in 2017 (see EQA, 2017b and SP 2020c) The delivery of the climate actions described in this NDC will help achieve a number of national development and policy objectives as well reflects the country's vision for climate action and address the political commitment to climate change at a global level. These include improvements in the State's energy security, with a reduced dependence on imported electricity from Israel and increased energy reserves through development and exploitation of the Gaza Strip's gas field. Improvements in the Palestinian people's living conditions, health and environment, through better air quality, less unmanaged waste, increased food production and increased water resources are also important co-benefits. These actions will also support the implementation of sustainable development goals (SDGs).

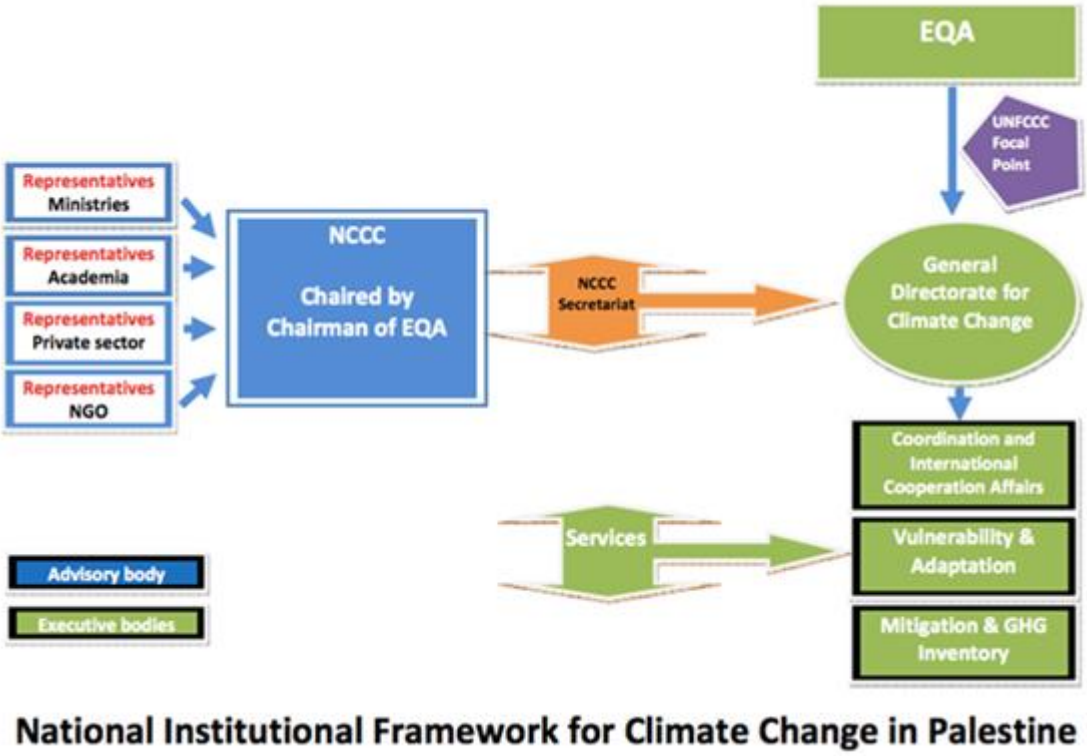


Figure 3.46 National Institutional Framework for Climate Change in Palestine

Eco-friendly practices that contribute to the mitigation to climate change locally include (MA'AN Development Center, 2012) Several reports are issued by UNDP such as Report on National Climate change capacity development program- 2015. The report addresses the National Capacity Development program on climate change (CDB). The CDP contains a competency development program, the accompanying tools and instruments, and the near-, medium- and long-term planning horizon. It also addresses the proposed actions to increase and develop capacities.

The Initial National Communication Report to the United Nations Framework Convention on Climate Change (UNFCCC) Executive Summary 2016 presents the State of Palestine's national circumstances and human-induced emissions by sources, and removals by sinks, of all greenhouse gas (GHG) not controlled by the Montreal Protocol. The state of Palestine is establishing an institutional arrangement for creating and reporting its GHG inventory (GHGI), and the EQA is the assigned entity for GHGI development and Palestinian PCBS to be the GHGI agency. Also, it presents different means and measures to achieve reduction of GHG emissions.

The National Adaptation Plan (INCR 2016). This contains the assessment of historic trends in climate, defining the vulnerabilities, the future climate-scenarios for the State of Palestine, and prioritizing adaptation options. It also includes the future developments required to be able to participate and list future monitoring and evaluation. The plan deals with vulnerability regions. It uses climate-trend analysis to identify multi-year trends in climate parameters, distinguish between natural variability, and show long-term trends resulting from human influence

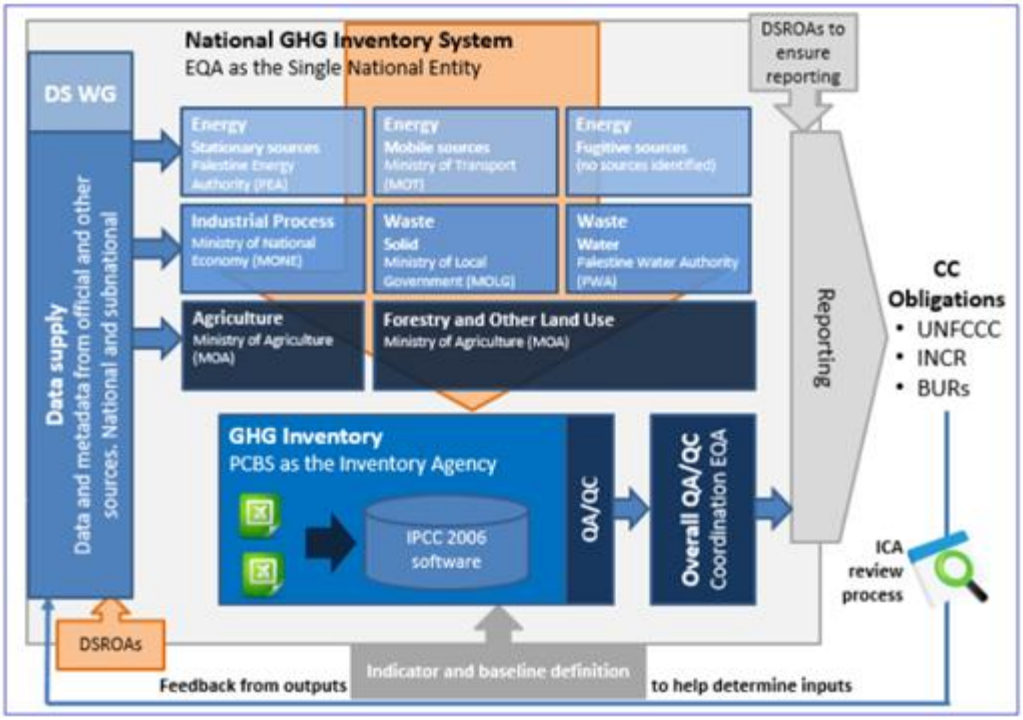


Figure 3.47 Institutional arrangements for the GHGI (UNFCCC, 2016)

The legal and regulatory framework for climate change in Palestine (UNDP): This examines the integration of climate change issues in PA legislation. It has assessed the current environmental laws (energy, water, etc.) and proposed appropriate amendments to the legislation instruments and measurement to the existing legal framework and regulation.

Key challenges:

Given that SP's share of worldwide greenhouse gas emissions is small, the level of economic growth is low, and it is very vulnerable to climate change impacts, the PA is committed to making a fair contribution to global efforts to reduce emissions consistent with UNFCCC's objectives. NDC aims to make a quantified contribution to the reduction of emissions despite the country's challenging political situation. The construction and overcontrol of land and natural resources by the Israeli occupation pose challenges in predicting the effect of climate change on ecosystems and hinder the ability to implement adaptation and mitigation strategies (UNDP, 2010). Also, it has made networking at a national level and sharing information very difficult, affecting the PA's ability to address climate change challenges.

The PA's plans to reduce its CO2 emissions are dependent on international support in the form of finance, capacity building and technology transfer. The NDC report states that mitigation contribution is conditional upon the state independence, and, until then, there are two scenarios:

- Independence scenario–by ending the Israeli occupation, the Government of the State of Palestine achieves independence and is able to exercise full control over its resources.
- Status quo scenario–reflecting a continuation of the Israeli occupation of the State of Palestine. This does not mean that this is an acceptable situation.

The Intergovernmental Panel on Climate Change (IPCC) AR5 have developed three future-climate scenarios for the SP that presents all projections considering identification and prioritization of adaptation.

Table 3.39 Future-climate scenarios for the State of Palestine (Initial National Communication Report - UNFCCC, 2016)

Scenario 1	
Temperature	Increases by ~1°C by 2025, by ~1.5°C by 2055, by ~2°C by 2090.
Temperature-related	Reduced cold periods and warmer periods, both becoming more prominent in time.
Rainfall	Does not change, or perhaps increases slightly in the period to about 2035.
Rainfall-related	A slight possibility of more flooding. A small possibility of increased periods of drought but, in general, limited change overall to rainfall characteristics.
Scenario 2	
Temperature	Increases by ~1°C by 2025, by ~2°C by 2055, by ~3°C by 2090.
Temperature-related	Reduced cold periods and warmer periods, both becoming more prominent in time; more so than under Scenario 1.
Rainfall	Decreases by ~10% by 2025, by ~15% by 2055, by ~20% by 2090.
Rainfall-related	Little, probably no, possibility of increased flooding risk. High likelihood of more frequent droughts. Perhaps overall less rainfall per day of rain on average.
Scenario 3	
Temperature	Increases by ~1.5°C by 2025, by ~2.5°C by 2055, by ~4.5°C by 2090.
Temperature-related	Reduced cold periods and warmer periods, both becoming more prominent in time; perhaps moderated slightly in the Gaza Strip.
Rainfall	Decreases by ~20% throughout until 2055, and to ~30% by 2090.
Rainfall-related	In general, a pattern of reductions in average daily rainfall and in contributions to total rainfall by heavier rainfall days, extended dry periods and reduced wet periods; thus an increase in drought risk throughout. However, an indication that the rare wettest days might become more frequent, especially in the West Bank, thus, raising a possibility of an increased flood risk.

Conclusions: The status of environment including biodiversity in Palestinian areas in the West Bank is precarious and the local efforts merely stem loss and degradation in some areas. Restoration activities are extremely limited. There will also be future complications of climate change on biodiversity. Measures that can be implemented to meet ABT 15 will be included in the new (2022) NBSAP and include: a) protect and restore native vegetation on vulnerable areas and determine sites for native vegetation, b) prioritize highly degraded ecosystems that provide essential ecosystem services and are critical to ecological connectivity, c) empower sustainable land use by indigenous and local communities, d) enact market instruments that discourage exploitation of ecosystems, e) consider income generation along with restoration activities to make restoration economically viable, g) develop landscape management approaches with stakeholders that encourage large-scale restoration while considering the socioeconomic needs of local communities, h) identify and geospatially map opportunities for restoration, k) identify investments and insurance opportunities for restoration, and l) emphasize restoration efforts in forests that are becoming carbon sources. Climate change adaptation planning has been supported and endorsed by the EQA via a National Adaptation Plan (NAP) which identifies 12 priority thematic areas (EQA 2016). But reviewing actual accomplishments on the ground suggest that Palestine was able to mitigate some decline in habitats but has not engaged in any habitat restoration activities with very few marginal exceptions (e.g. planting wild trees by the MoA in protected areas to cover denuded areas). There is a new project to build protected area network which includes ecosystem resilience and strengthen ecosystem services (2021-2022).

16. Nagoya Protocol on ABS

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Palestine didn't sign the Nagoya Protocol (2010) but is considering signing. However, there are individual and local initiatives to establish genetic banks for local crops and varieties including of fig, grape, olives and others. The current Palestinian laws don't include any article related to Nagoya protocol on access and benefit sharing of the genetic resources. However, there are currently two related consultancies being done for the EQA: the first one is one biosafety, and the second is to review the environmental law in Palestine. One of the outputs of the latter is the recommendation to ratify the Nagoya Protocol. The results of two consultancies will be included in the next NBSAP to be done in June 2022.

Decree-Law No. (14) of 2018 regarding the amendment of the Agriculture for Palestine Law No. (2) of 2003, as amended: Chapter II agricultural genetic resources which states in Article (27) that agricultural genetic resources shall be deemed to be a property of the state and shall be subject of the principle of national sovereignty. The state shall also respect the individual property rights in the common local strains. Furthermore in Article (28) it signifies that in coordination with other competent authorities, the Ministry shall conserve the agricultural biodiversity and use it in conformity with the public policy in the following manner: first by listing the local genetic strains and origins. Second by preserving and protecting genes and genetic origins. Third by the adoption of particular sources and mechanisms to reproduce genetic origins and strains.

Also in Article (29) of the same law which states that in coordination with other competent authorities, the Ministry shall define the components of agricultural biodiversity which require urgent protection measures. In this regard, the Minister shall issue forth decisions that regulate the following issues: 1. The mechanism of preserving and regulating the database. 2. Define methods and conditions of the taking of data. 3. Define the appropriate technologies. 4. Define the processes and activities which involve or may lead to negative effects on the conservation of agricultural biodiversity as well as its permanent use. Moreover, according to Article (30) it states that the launching of living beings which are modified through biotechnologies and which pose a danger to the health of humans or animals or bear a negative impact on the environment or which may threaten the agricultural biodiversity, shall be prohibited. further, according to Article (31) which signifies that any material of a vegetative, animal or germinal origin or other origins which contains genetic origins may not be circulated, sold, exported or disposed of without a license from the Ministry. According to Article (32) any agricultural material, components and goods which are modified through biotechnologies may not be imported, exported, held or circulated except by a license from the Ministry. At last in Article (35) which states that the Minister shall issue forth instructions on the regulation of the management of agricultural biological resources in order to preserve, protect and use them in sustainable development; the conditions on obtaining licenses for the importing and transportation of genetic resources and bio-technologies; and the form of the license and payable fees. The Minister shall also be entitled to define the types, varieties and strains which are threatened of extinction.(Unpublished, Palestine Biosafety assessment Report 2021, EQA)

Reduce its endangerment and increase people awareness about it, protect it, there is no valuation studies for the benefit of certain endangered species how much they benefit us and how much they increase the national income

Conclusions: There is very limited work being done in this area at the state level. More will be incorporated in the new (2022) NBSAP. Ending the Israeli occupation could also help in better management and sharing of resources.

17. NBSAPs

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

The first and only NBSAP was drafted in 1999; we are currently working on a new strategy which will be published in 2022. The main instrument for implementing the CBD, the new NBSAPs will follow COP

decisions, pertaining to thematic areas, cross-cutting issues and stakeholder processes, indicating those areas that Parties have suggested should be included in NBSAPs. The main COP decisions that provide direct guidance for NBSAPs are decision IX/8 and decision X/2. Parties are encouraged to review these decisions for consolidated guidance on the NBSAP process, substance components, support systems, and monitoring and review systems. Palestine was not listed at CBD as having NBSAP (https://www.cbd.int/nbsap/about/latest/) because the NBSAP was developed in 1999 before accession to the treaty. Even though it has been 21 years since NBSAP (1999), the EQA included biodiversity planning in the environmental sector strategies. Since NBSAP (1999) much has changed including new threats to biodiversity, new opportunities, and new and updated methodologies and data that could make for a far more effective NBSAP. The new NBSAP should be revised to be aligned Aichi Targets and With CBD's post 2020 biodiversity framework, Ramsar Convention, World Heritage Convention, CITES, CMS, and Global Assessment of Biodiversity carried out by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). Thus, the national strategy serves the state of Palestine taking into account local needs, international legal (convention) obligations, and actual changes in the past three decades is essential.

Table 3.40 Priority Initiatives (Projects) for NBSAPP 1999 and accomplishment summary 2000-2020

Name of Project	Accomplishments 2000-2020
Project 1 Development and Management of a Palestinian Protected Areas System	Good development in this area, protected area designation to 51 areas and studies done (see Qumsiyeh and Amr 2017 and ABT 11)
Project 2 Development of Management Plans/Structures in Designated Protected Areas Based on Biodiversity Surveys and Inventories	Fairly good development (Qumsiyeh and Amr 2017; Qumsiyeh and Albaradeiya 2021; see ABT 11)
Project 3 Protecting and Using Traditional Indigenous Knowledge and Property Rights for Biological Diversity	Before 2000, there was hardly any development in this area. Now there is some work (e.g. turathna.palestinenature.org and https://www.myheritage.ps/ar)
Project 4 Implementation of Biosafety Measures on Biotechnology in Palestine	Not done. Being developed in 2021
Project 5 Habitat Restoration (including rangelands, forests, wetlands, sacred groves and integrated agro-ecosystems)	Limited work in this area (there was some planting of wild trees in some protected areas forest lands)
Project 6 Collaborative Management of Biodiversity	Good progress on this. The EQA works with academia and NGOs and other government entities to ensure good collaborative planning. More will be elaborated on in the 2022 NBSAP
Project 7 Combating Desertification and Coping with the Adverse Effects of Climate Change	Some work done on this area like planting trees (both wild and domestic fruiting trees) and land reclamation projects. The Ministry of Agriculture developed projects aiming at combating desertification including the Greening Palestine Project, One Million Tree Project, Land Reclamation Project, Reclamation of the Eastern Slopes of the West Bank (Water Harvesting), and Researches and pilot projects (see Nofal and Barakat 2001). In the latter category PIBS did some research involving degradable cocoons that potentially could accelerate forestation
Project 8 Elaborating and Enforcing a National Legislation/Legal Frameworks on Biodiversity	The national Environment law 1999 is being reconsidered (2021-2022). Also there was the establishment of Environment Police.
Project 9 Establishing a Biodiversity Information and Social Education Centre	The EQA does some of this but also delegated to others (e.g. NGOs like EEC, other ministries, and PIBS)

Project 10 Promotion of Eco-tourism/Economical Aspects of Biodiversity	Significant development in this area in cooperation between Ministry of Tourism and Antiquities, EQA and NGOs. Diplomas in eco-friendly tourism guiding are now given in at least three colleges and universities in the Bethlehem Region. A big player in this is also Masar Falastin https://phtrail.org/
Project 11 Coastal Zone Management in Gaza and the Dead Sea	Little done in this area due to lack of sovereignty and access under Israeli occupation
Project 12 Establishment of a Gene Bank in Palestine	Not done yet

Table 3.41 NBSAPP 1999 objectives, selected agenda items, and adding achievements 2000-2020

NBSAP Objectives	Selected Agenda Actions	Achievements 2000-2020
Objective 1: Conservation of Palestine's biodiversity	-*In situ* conservation areas are set aside to conserve endemic, threatened and endangered biodiversity of global significance. -Protect and rehabilitate degraded habitats and ecosystems of especial importance for rangeland and forest biological diversity -Develop national policies, regulatory measures, and other legal frameworks addressing biodiversity conservation and sustainable use -Identify and legally establish a representative system of protected areas/nature reserves (including wetland protected areas) addressing globally significant biodiversity, and facilitating information exchange.	Protected areas established and adopted into law as in situ conservation areas (see ABT11) Few areas rehabilitated. Planting wild trees and land reclamation Legal frameworks were addressed in several ABTs and here we can mention the upcoming potential revision of the environmental laws (2021) See ABT11 but this is being revised in 2021.
Objective 2: Sustainable use of Palestine's biodiversity	Sustainable Tourism and ecotourism programs. Biodiversity friendly agriculture Supervised/Controlled forms of hunting and plant collections Proper Management of grazing and controlled access to rangelands Forest management and production Biodiversity friendly pastoral production Management of fisheries, land and water resources, and integrated pest management	See ABT4. Good progress in this objective
Objective 3: Enhancement of local knowledge, skills and improvement of people's attitudes and practices for the conservation and the sustainable use of biodiversity	Survey, understand and strengthen traditional resource management institutions. Information and training on indigenous threatened species and their uses Awareness campaigns: Formal and informal education programs Biodiversity awareness campaigns, Social communication activities	See ABT2

	Artists, elders, religious leaders and teachers / values of biodiversity into the popular culture. -School clubs for the protection of nature.	
Objective 4: Equitable sharing of biodiversity benefits within Palestine	Participatory action research on benefits and costs of conservation of biodiversity Strengthen local capacity for maintaining and benefiting from crop and various wildlife diversity. Support traditional systems of resource management to obtain larger market share for domesticated products harvested sustainably. Equitable licensing/use arrangements for marine fishing, grazing and other uses of common biodiversity resources, balancing commercial and subsistence use. National Trust Fund for biodiversity conservation and sustainable use established to benefit local Palestinian communities	See ABT4
Objective 5: Development of Palestinian institutional and human resource capacity in the field of biodiversity	Training courses in natural resource management, focussing on plants and wildlife of major importance in Palestine and on participatory action research and collaborative management methods (protected areas management; field-based, problem-based learning). -Systems of collaborative management of natural resources (stakeholders negotiate their own benefits). -Revise university curricula and establish courses and workshops to train local specialists, in the conservation and management of biodiversity. include indigenous knowledge and practice -Develop training programs in eco-tourism.	See ABT20

The NBSAP was immediately followed with the Palestinian Environmental Strategy (MoEA 2000). After articulating the local situation (environmental status, political, socioeconomic, legal and institutional frameworks, driving forces, and resources). It articulated these targets but without specifics relating to implementation:

1. To achieve a balanced situation in which the Palestinian water rights are effectuated and the total Palestinian water demand is met under the condition that annually the total abstractions (Palestinian and Israeli) from the water resources system do not exceed the natural and artificial recharge of the water resource system.
2. To protect the quality of the water resources in order to be suitable for the desired or designated uses of water. The sustainability is expressed as maximum allowable concentrations of various substances or groups of substances for particular uses of water resources.
3. Utilization of the natural resources is done in a way that is not conflicting with the environmental values that are associated with these resources. The exploitation process itself does not harm the environment or the public health.
4. Abandoned sites are rehabilitated in a sound way from the viewpoint of the environment and landscape.

5. The environmental impacts of socio-economic activities and related land use may not exceed the natural 'carrying capacity' of the land and soil.
6. Ambient noise levels should not exceed those levels that are associated with nuisance for the society or the natural environment. These levels are expressed as maximum allowable noise levels and exposure periods for different categories of receptors."
7. To reverse and prevent pollution, or risk for pollution of the shoreline and the coastal marine environmental to protect the marine ecosystems and public health and to enable a sustainable economic, recreational and touristic development of the area.
8. The sound use and conservation of nature and biodiversity, within the context of a sustainable socio-economic development of the Palestinian areas.
9. To protect and rehabilitate the landscape and aesthetic values of the living and natural environment.
10. To raise public awareness of landscape value and the importance to maintain and protect it for the future generations of Palestinians.
11. To preserve the rich cultural heritage and historic monuments for the current and future generations and to exploit this heritage for recreational purposes and tourism in a sustainable manner

EQA has published Environment Sector Strategy in 2010 that included a SWOT analysis and identified six national priorities (EQA 2010). There were 48 specific recommendations for interventions listed by order priority for the EQA and 19 ones to be implemented at the general environment sector level (EQA 2010).

Table 3.42 SOWT analysis (EQA 2010):

Strengths	Weaknesses
• An environment law regulating the work in this sector as a whole • An official institution on environment with clear organizational structure established by an official decision to address environmental issues • A number of qualified and specialized personnel in the field of environment • A number of NGOs and civil society organizations active in the field of environment • High education rate and a good level of awareness and knowledge of environmental issues among citizens and different social groups • Several environmental studies addressing various topics in the environment sector • Several environmental awareness programs for different social groups • Inclusion of environment into educational curricula • A number of Palestinian governmental and non-governmental academic and research institutions concerned with environment affairs • A number of periodic environment surveys conducted by PCBS	• Incomplete development of executive regulations and instructions ensuing from the environment law • Inadequate enforcement of the environment law and other related laws • Lack of an executive body to enforce the environment law and monitor transgressions against the environment, such as an environment police • Failure to consider the environment at the same level as other issues before courts and in the judiciary • Lack of adequate environmental information in the form of a comprehensive, clear, accurate and up -to -date database. • Clearly inadequate governmental system in daily monitoring of issues of environmental violations and transgressions • Lack of adequate experience in managing environmental emergencies and crisis situations • Small number of technical staff in environment establishments • Lack of harmony and accord between the different national institutions in terms of planning, implementation and other aspects. • Conflict and contradiction between applicable Palestinian laws, leading to conflict of powers and competition on roles • Failure to offer environment the due attention by successive Palestinian governments • Lack of a control and monitoring system for the different environmental elements and for pollution resulting from various sources • Failure to consider the environment as a basic element when working on the different development plans, reflecting lack of commitment to the environment by the different development sectors

	• Inadequate coverage of infrastructure services (solid waste, liquid waste, water networks) • Lack of specialized data in some environmental issues, such as hazardous waste • Poor allocation of financial resources for environment sector development • -Inadequate environmental awareness and knowledge among various social groups
Opportunities	**Threats**
• A general trend by the PNA to regulate the different sectors and endorsement of environment as an active sector, which would allow institutional, financial and legal support to EQA • Potentials to involve the private sector in environment affairs • Global and international interest in environment and allocation of much of the financial support to this sector • Potentials for cooperation, integration and harmonization with governmental and non-governmental academic and research institutions • Several environmental conventions endorsed at the global level to ensure the rights of states and nations under occupation and their role in environment protection	• Transgressions, violations and destruction practiced by the Israeli occupation against the Palestinian environment • Obstacles created by the Israeli occupation hindering Palestinian development in all fields • Lack of control over various natural and environmental resources that form the basis for environmental action • Global environmental problems, such as climate change and the associated effects, including desertification, scarcity of water resources, decline of green area, etc • International financial challenges and increased poverty and unemployment, which divert attention away from environment • The current political situation in the Palestinian territories and the divergence between the two parts of the country

Expert evaluation of the challenges narrowed down 100 questions of importance to conservation of Biological diversity (Sutherland et al., 2009). We can classify these questions under the following categories: Ecosystem function and services, climate change, technological change, protected areas, ecosystem management and restoration, terrestrial ecosystems, marine ecosystems, freshwater ecosystems, species management, organizational systems and processes, societal context and change, and impact of conservation measures.

The most recent report (EQA, 2015) from the state of Palestine in compliance with CBD had the same priorities as the NBSAP (1999):

1. Basic faunal and floral studies at specialized centers to understand exactly what exists and where and how best to manage these natural resources.
2. Development and Management of a Palestinian Protected Areas System.
3. Development of Management Plans/Structures in Designated Protected Areas Based on Biodiversity Surveys and Inventories.
4. Protecting and Using Traditional Indigenous Knowledge and Property Rights for Biological Diversity.
5. Implementation of Biosafety Measures on Biotechnology in SP.
6. Habitat Restoration (including rangelands, forests, wetlands, sacred groves and integrated agro-ecosystems).
7. Collaborative Management of Biodiversity.
8. Combating Desertification and Coping with the Adverse Effects of Climate Change.
9. Elaborating and Enforcing National Legislation/Legal Frameworks on Biodiversity.
10. Establishing a Biodiversity Information and Social Education Centre (Available as the Palestine Museum of Natural History).
11. Promotion of Eco-tourism/Economical Aspects of Biodiversity.
12. Coastal Zone Management in the Gaza Strip and the Dead Sea.
13. Establishment of a Gene Bank in SP

Conclusions: While there was significant progress in implementing some strategies and action plans related to many ABTs including this one (e.g. on ecotourism development and environmental awareness and

research on biodiversity), there are many areas that are still deficient (e.g. gene bank, equitable sharing of resources, etc.). Some of this would be better managed if Palestine as a state has sovereignty (ending the Israeli occupation). A new NBSAP is being prepared now (2021) and will address shortcomings.

18. Traditional knowledge

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

Palestine is a key part of the Fertile Crescent where humans first developed agriculture. Traditional agriculture was sustainable as Palestinian ancestors (Canaanites) managed to cultivate an enormous variety of plants from wheat, barley, lentils, chickpeas, hawthorn, carobs, pistacia, and olives depending mostly on rainfall (Ba'al agriculture). But they also developed terracing and irrigation systems that were amazingly resilient with some functioning terraces and dykes used for the past 5000 years. Associated with all these were cultural heritage that is remarkable and unique. Since Palestinians are the indigenous people of Palestine our work is what we do as the local people. The activities of the local people are here highlighted through examples from GOs (e.g. EQA https://www.facebook.com/EQA2019/), NGOs, and academia over the past five years. Studies are limited in this area but some documentations are found about medicinal plants as cultural heritage (Canaan 1928; Crowfoot and Baldensperger. 1932; Ali-Shtayeh et al. 1998, 2008; Ali-Shtayeh et al. 2015; Ali-Shtayeh et al. 2016; Jamous et al. 2018; Mourad Hanna et al., 2021). Yet, what we can say is that the traditional knowledge has been increasingly used to protect nature in Palestine also out of a sense of pride in this heritage. At PIBS for example, a project funded by the British Council worked to protect both tangible and intangible cultural heritage related to agriculture and nature (see website turathna.palestinenature.org). Tangible assets include tools, implements, traditional bee hives, farming equipment, native seeds, farmer's cloths, old books and ledgers, heirloom seeds of plant varieties, artistic objects made from plants and animal products among others. Intangible assets include knowledge and practices connected to the land, stories, anecdotes, proverbs, and life practices relating to land, nature and agriculture. Both tangible and intangible cultural heritage of this type is under threat. Threats are similar to those for other indigenous communities under colonial occupation (e.g. see Conservation of Natural and Cultural Heritage in Kenya, 2016, UCL Press). Specific threats in our case:

1. Land and dispossession: The physical manifestation of the conflict are refugees, occupation, apartheid and loss of sovereignty. Over 7 million Palestinians are refugees or displaced people and the remaining natives have access to ~8.3% of their historic land. This means a discontinuation of cultural heritage practices related to land (agriculture and nature).
2. Environmental degradation: There are ongoing practices of chemical and sewage dumping by Israeli settlements and factories in the occupied West Bank, which has dramatically degraded the natural environment. This unique type of violence against nature not only threatens the health of Palestinians (e.g. Hammad and Qumsiyeh 2013) but inhibits the growth and continuation of historic agricultural practices.
3. Water: Israel controls >90% of the West Bank's groundwater and prioritizes the illegal settlements over the indigenous population in this area and prevents them from utilizing and developing their own water resources and systems. This disconnects Palestinians from the natural resources of their land and threatens cultural heritage related to water and agriculture.
4. Loss of knowledge: Palestinians today are squeezed into refugee camps or in urbanized centers like Bethlehem face the risk of never learning the centuries-old traditions tying to the land and the ancient ways of life can disappear. See also Qumsiyeh, 2017.

Conclusions: While we don't have a national action plan to protect and preserve traditional practices and knowledge related to nature, there is a new cultural heritage law adopted 2018 which regulates and protects both tangible and intangible cultural heritage inline with article 8j of the convention. There is strong support in the local population to protect their identity and their natural and cultural heritage and this has a strong advantage in protecting biodiversity. For example there are projects at the intersection of traditional knowledge and nature conservation such as turathna.palestinenature.org . Today, the population is struggling to uphold this indispensable heritage due to the ongoing occupation activities such as removal from the land,

increased refugee population, gentrification, and deterioration of the natural environment. The new NBSAP being worked on now (the last one was in 1999) will highlight this area and develop action plans related to use of traditional knowledge.

19. Biodiversity Knowledge

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

Knowledge of biodiversity in the state of Palestine improved significantly from 2010 to 2020 thanks to work by groups in governments (like the EQA), academia (like biodiversity centers at Universities and environmental clubs at schools), Media, and NGOs. Below is a brief overview of some activities in this area. We did a survey of 12 key stakeholders (split almost evenly between academia, NGOs and two government affiliated entities). The 12 respondents thought the knowledge of environment in Palestinian society is average to good (but can be improved). NGOs and Academia both report training many people in environmental work. For example Land Research Center (an NGO) reported training 2,800 between 2015-2020 and PIBS-Bethlehem University (academic center) reported training over 7,000 in 2015-2020 period. The responding institutes reported anywhere from 2-30 trainings sessions for their own staff in the period 2015-2020. The number of student beneficiaries for environmental awareness ranges from a few to thousands depending on the institution. But based on those who filled out our questionnaire and projecting to all institution we estimate >70,000 benefited from extracurricular environmental education 2015-2020.

EQA	**Hundreds to thousands**
Islamic University in Gaza	Tens of students
Biodiversity & Environmental Research Center-BERC	Hundreds
Bethlehem University (PIBS)	>7,000
Hanns Seidel Foundation	3,966
Land Research Center	2,855
The Applied Research Institute - Jerusalem (ARIJ)	2,450
Union of Agricultural Work Committees	2,067
Al-Quds University	500
Palestine Wildlife Society	500
Ahmad Omari	400
Prof. Khaled Sawalha	100

NGOs: Many NGOs reported working on environmental, agriculture, water resources and conservation issues. 12 NGOs deal with conservation, education, ecotourism, training and research related to biodiversity and environmental issues. Table 3.6 summarizes activities of these key NGOs in Palestine. Missions of these NGOs vary from public awareness and education to tasks related to biodiversity and conservation. The EQA signed a number of MOUs with local authorities to enhance cooperation and development of networking between the different players with the goal of promoting nature conservation including responsible consumption and production (Table)

Table 3.43 Example MOU's signed by EQA and local agencies and authorities.

Authority	**Year**	**Objectives**
Palestinian Central Bureau of Statistics	2013	· Enhance and consolidate the cooperation and exchange data and information. · Implement specialized environmental surveys. · Build central administrative records. · Update, develop and computerize common interest statistics.

Custom Police	2014	· Enhance cooperation in controlling solid and hazardous waste smuggling.
Political and Moral Guidance Commission	2014	· Enhance cooperation in environmental awareness of the youth. · Conduct studies, reports, and reinforce the concepts of environmental protection.
Ministry of Women Affairs	2013	· Ensure mainstreaming of gender in environment issues (Focusing on water and solid waste management).
Bethlehem University, Birzeit University, An-Najah University, and other universities	various	To enhance academic participation in environmental conservation, research, and education
General Directorate of Civil Police	2018	Includes establishment of environmental police

Table 3.44 Key governmental entities concerned with nature protection.

Ministry or Authority	**Role relevant to environmental issues**
Environment Quality Authority	Planning and policies for environmental protections; approval of projects that could impact environment after a EIA study
Ministry of Agriculture	Some participation in ranger duties and planting
Ministry of Finance and Planning	Seeking funds from potential donors; overall planning of Palestinian Development. Initiated National Development Strategy which includes environmental issues (MOPAD, 2014)
Ministry of Local Government	Coordinates involvement of local communities with projects and initiatives related to protected areas; control of feral dogs and cats; local projects
Ministry of Health (through Department of Environmental Health)	Address and monitor environmental issues related to human health.
Ministry of Tourism and Antiquities	Encouragement and marketing ecotourism locally and internationally; management of areas with archeological value
Ministry of Education	Education for awareness on environmental issues in schools (curricular and extracurricular)
Ministry of Culture	Promote protection in the local communities and integrate protected areas in the network of cultural areas; may also be involved in museums and educational initiatives considering cultural and natural heritage
Ministry of National Economy	Provide funds to execute activities and projects related to protected areas and biodiversity.
Ministry of Interior	Law enforcement of environmental and agricultural laws.

Academia and research:

Below is a brief summary relating to progress of knowledge in areas of biodiversity.

Flora: Al-Sheikh (2019) included 1,612 species in 117 families for the West Bank. Some 2,076 plant species inhabit the West Bank and Gaza Strip alone (75.5% of species in Mandate Palestine). A more limited study in Wadi Gaza identified 70 species (Abd Rabou et al. 2015b) but the number there is likely at least 10 times

more. Typical species in Wadi Gaza include *Tamarix nilotica*, *Arundo donax*, *Cynodon dactylon* and the more common *Alhagi graecorum* and *Silybum marianum* (Auda et al. 2009). Salinity tolerant species were observed in Al-Bahr the coastal location of the valley system and there are more needed floral studies in the areas close to the sea (Madi 2018). Many plants in the valley are also used for medicinal purposes (AbouAuda, 2012). Palestine with its location, where its located between Asia, Europe and Africa had a variety of phytogeographic zones (the Mediterranean, Irano-Turanian, Sudanian and Saharo-Arabian) that intermingle in an area of varying climates, soil types and minerals (Euroconsult and IWACO, 1994; ARIJ, 2002; Ali-Shtayeh and Jamous, 2003; Whyte, 1950; Zohary, 1947). Based on plant species numbers mentioned by several publications (PIALES 1996; Boulos 1997; AliShtayeh & Jamous 2002; Danin 2004; Sawalha 2005; ARIJ 2006; Görlach et al. 2011), it has been concluded that the records of Palestinian flora reach over than 2000 plant species and endemic flora species recorded as 54 species in state of Palestine, Ali-Shtayeh & Jamous (2018) and Al-Shaikh (2019) checklists of plants include over 150 endemic and near-endemics, a number below the average for Mediterranean countries. Dufour-Dror (2012) recorded 50 invasive plant species from Historic Palestine. No exact studies show invasive plant species in the West Bank and Gaza.

Mammals: Much has transpired in mammal research since the seminal works of Atallah and Qumsiyeh cited in the 5th NR (EQA 2015) A major two studies show up in the past year (2020) related to mammal conservation (on Hyena) and behavior led to change habitat (Hyrax) (Handal et al., 2020; Salah et al., 2020), were many areas discussed related to habitat and species conservation and focusing on environment awareness for local in a way explain the important of these species. Two of the mammals species that exist in the West Bank are invasive, the Coypu, *Myocastor coypus* that found in a huge number in Jenin District, and the brown rat *Rattus norvegicus*. A third option used to be the black rat, *Rattus rattus* but now it is considered native to our area and part of the food chain and diet of the Eagle owl (Meiri et al., 2019; Roll et al. 2008; Amr et al., 2016). According to Meiri et al., (2019) many species of mammals consider endangered and near threatened under the local status and even globally, as an example: Arabian Gazelle, Mountain Gazelle, the Arabian wolf, the Striped Hyena and many other species which reach over 50% of our mammals comes under the categories of Vu, En, Cr, RE according to the IUCN categories.

Birds: Palestine's location as a bottleneck between Eurasia and Africa makes it an important root migration for over 500 million birds in the migration season. Over 370 bird species were identified from the Palestinian territories which represent 22 Orders, 64 Families, 30 subfamilies and 186 genera (Awad et al., 2015), Data were collected by Palestinian ornithologist experts (Dr. Anton Khalilieh, Dr. Walid Al Basha, Mr. Imad Atrash, Mr. Mahd Khair, Mr. Simon Awad, Mr. Michel Farhoud, Mr. Riad Abu Sada, Mr. Saed Al Shomali, and from Gaza Dr. Abdel Fattah Abd Rabou) and using literature that been published over the years (Tristram, 1886; Bodenheimer, 1935; Paz, 1987; Shirihai, 1996). Four invasive alien bird species were detected from the West Bank, Rose-ringed Parakeet (*Psittacula krameri*), Monk Parakeet (*Myiopsitta monachus*), Common Myna (*Acridotheres tristis*) and Indian Silverbill (*Lonchura malabarica*), these species need focus studies to understand their effect on other parts of the biodiversity including their role on bird native species, a study is done on the Common Myna to understate the distribution and its status in the West Bank (Handal and Qumsiyeh, 2021).

Reptiles: Herpetological studies in Palestine started in the 19th century by having a taxonomical survey in the Holy Land (Boettger, 1879; Tristram, 1884; Hart, 1891; Peracca, 1894; Werner, 1898). In Palestine region we find both endemic and non-endemic elements belonging to various biogeographic zones: Ethiopian, Mediterranean, Saharo-Arabian, and Irano-Turanian that makes our area unique and rich with high number of reptile species (Werner, 1988; Amr and Disi, 2011). Over 97 species of reptiles were recorded from Historic Palestine (Meiri et al., 2019; Werner, 2016). Handal et al., (2016) recorded 36 species of reptiles belonging to 13 families from the West Bank, and with unpublished data from the PIBS\PMNH this number will reach 40 species of reptiles. A two publications on the reptiles of the Gaza Strip were published by Abd Rabou including 18 species of reptiles indicated in 2007 and in Abd Rabou (2019) a 20 species were recorded from Gaza Strip. The Most recent description for a new endemic species of reptiles from the Historic Palestine were published in 2016 for a new species of snake (*Rhynchocalamus dayanae*) from the Naqab (Tamar et al., 2016), and according to Jamison et al., (2020) that studied the genus *Micrelaps* shows that both the morphological and molecular results conclude that *Micrelaps tchernovi* is morph of *M. muelleri* in the Historic Palestine. There are three invasive species of reptiles were detected in the Historic Palestine in the past few years: two geckos (*Cyrtopodion scabrum* and *Tarentola*

annularis) and a turtle (*Trachemys scripta*) (Roll et all., 2008; Jamison et al., 2017; and Meiri et al., 2019). For our knowledge none of the geckos were recoded from the Palestinian territories (West Bank and Gaza), in the other hand, the *Trachemys scripta* were recorded by the PIBS\PMNH team and detected from one location in 2018 (and updated data on Herpetofauna of the West Bank will be published soon).

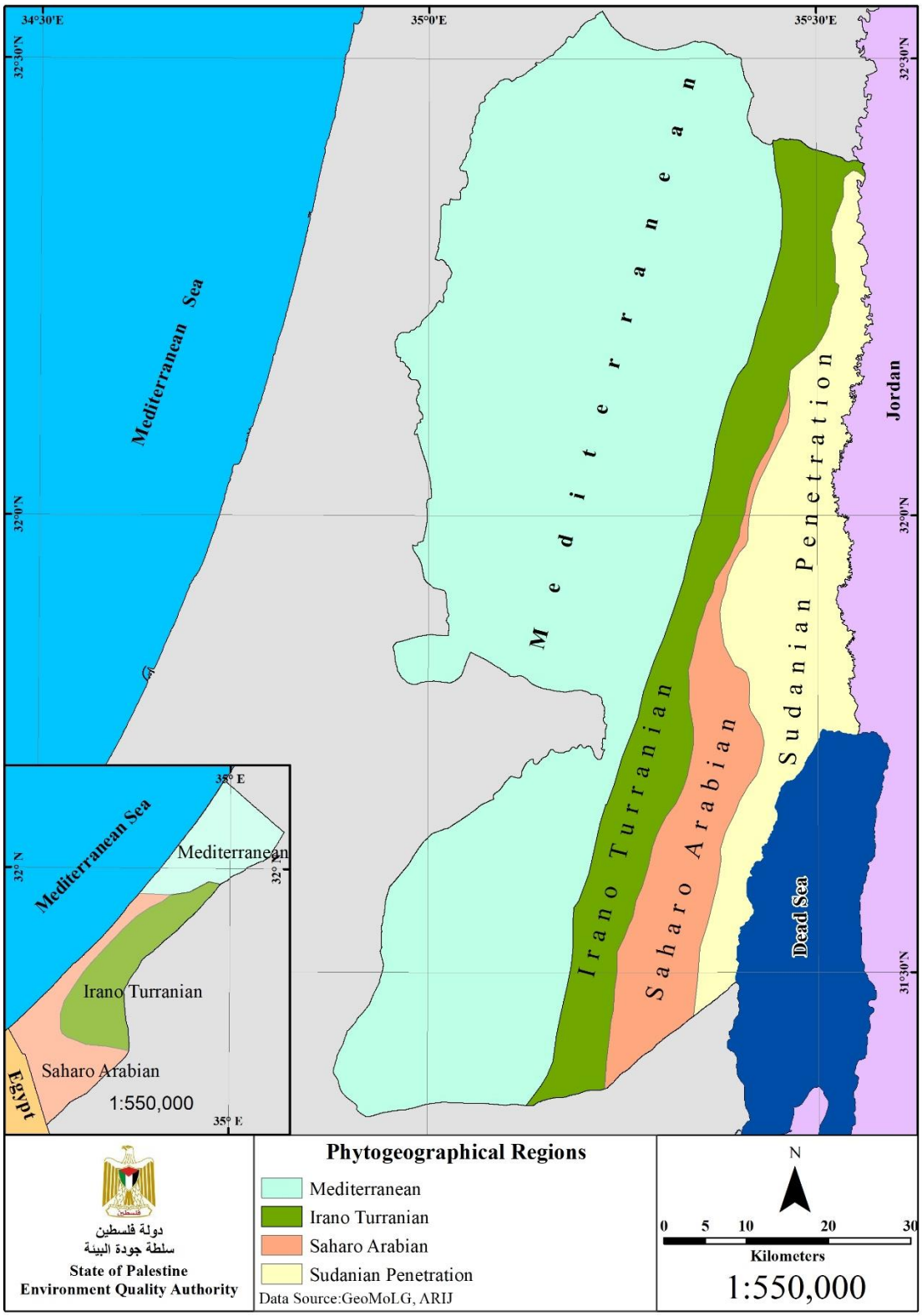


Figure 3.48 Phytogeographical zones in Palestine

Amphibians: In the Historic Palestine there are only eight species of amphibians reported (Meiri et al., 2019) and in the occupied Palestinian territories we have four species of amphibians belong to the group of frogs and toads (Salman et al., 2014). The Amphibians in our area belong to two orders with six families: Salamandridae, Bufonidae, Hylidae, Ranidae, Discorglossidae, and Pelobatidae. Almost all amphibians in Palestine are endangered due to habitat destruction (specially the water sources), intensive farming (changing soil contents and using chemical fertilizers), degradation of wetland habitats in the Dead Sea basin, Gaza Strip and fresh and grey water, rivers, Wadi systems, closing water springs due to conservation from pollution, and Climate Change. In the West Bank we recorded 4 species of amphibians (A: Pelophylax bedriagae – Levant Green Frog, B: Hyla savignyi – Middle East Tree Frog, C: *Pelobates syriacus* – Eastern Spadefoot Toad, D: Bufotes variabilis – European Green Toad.) these species belong to four different families (Bufonidae, Pelobatidae, Hylidae, and Ranidae). The *Pelobates syriacus* – Eastern Spadefoot Toad is the rarest species of amphibians in the West Bank where it is only found in the temporally pond in Jinsafout which its extinct from Jordan, the Palestine Institute for Biodiversity and Sustainability (PIBS) at Bethlehem University study this species intensively and publish a detailed report for how to conserve this species and working together with the EQA this pond become a protected areas as part of Wadi Qana protected area in Salfit District (PIBS 2018). In Gaza; Abd Rabou et al, (2015) and Abd Rabou (2019) recorded three species of amphibians (*Pelophylax bedriagae*, *Hyla savignyi*, and *Bufotes variabilis*) belonging to three different families.

Invertebrates: There are few systematic studies of the diversity of invertebrates in the occupied State of Palestine, more research published on invertebrates in the past 5 years by the Palestine Institute for Biodiversity and Sustainability (PIBS) after establishment on a medical Zoology lab and Biodiversity center. Two papers were published on scorpions (Qumsiyeh et al., 2013, 2014a). One paper was completed on butterflies showing 55 species (Abusarhan et al., 2016), a paper on Dragonflies shows diversity of 13 species belong to 3 families (Adawi et al., 2017), A paper on Mantodea, Praying Mantis with discovery of 17 species 3 of them were first recorded in the Historic Palestine (Handal et al., 2018), Study on Grasshopper identify 40 species from the West Bank (Abusarhan et al., 2017), A study on the Flower Chafers (Coleoptera: Scarabaeidae: Cetoniinae) with 9 species (Handal and Amr, 2018), Mosquitoes from Salfit district with 6 species one of them is invasive by (Adawi and Qasem, 2018) more literature studies shows that we have over 15 species, A study shows the existence of 35 species of Lady Beetle in the area of southern the West Bank (Najajreh et al., 2019), Moreover; a study on the sandflies from the West Bank shows the existence 22 species from northern West Bank (Sawalha et al., 2017). Two new records of invasive true bug species from the West Bank of Palestine belong to the Heteroptera group, Leptoglossus occidentalis and Deroplax silphoides (Handal, 2017; Handal and Qumsiyeh, 2019). Two major studies on the systematics of freshwater snails and land snails done, freshwater snail with 10 species (Handal et al., 2015) and a master thesis on Land snails shows a diversity of 41 species, 3 of them are invasive to Palestine (Handal et al., 2018 master thesis at Birzeit University), moreover a survey shows the ecology and distribution of land snails (Amr et al., 2018). Other studies on progress at the Biodiversity center in the Palestine Institute for Biodiversity and Sustainability (PIBS) – Bethlehem University on several groups of invertebrates (like: Pseudoscorpions, collembola, solifugae, weevils, and other groups of Diptera).

There are fewer actual studies of fauna of Gaza but mostly anecdotal and perfunctory (examples Abd Rabou 2005, 2009; Abd Rabou et al 2015). Thus a more intensive and scientific study is needed and this is recognized by the Palestinian government (e.g. see EQA 2015). We can here however refer to what is known especially focusing on threatened or endangered species. Abd Rabou et al (2007b) reported 18 species of reptiles (2 turtles, 8 lizards, 8 snakes and 3 species of amphibians in Wadi Gaza. The birds of Gaza Strip were studied on several occasions. Abu Shammalah and Baha El-Din (1999) gave an account of the birds of Gaza. Al-Safadi (1997) presented a comprehensive study on the breeding cycle of the Spur-winged Plover, Hoplopterus spinosus, in the sewage lagoon of Beit Lahia, Gaza Strip. So far, 373 bird species belonging to 23 Orders, 69 families, 21 Subfamilies, and 172 genera have been recorded from Palestinian areas (Khalilieh, 2016; Awad et al., 2016). Abd Rabou et al., (2015a) recorded 118 bird species belonging to 38 families were recorded in the targeted area many of them are very rare or even endangered (e.g. imperial and golden eagles). Abd Rabou (2007c, 2011) reported 17 mammalian species at the zoological garden of Gaza belonging to 12 families and 5 orders including the Grey Wolf, Jungle Cat, Egyptian Mongoose, Common Badger, Striped Hyena, Indian Crested Porcupine and others. AbdRabou (2009) also reported on some of the carnivores (threatened). But still the most comprehensive data available on the mammals of historic Palestine including Gaza (Qumsiyeh 1996; Yom Tov and Mendelssohn 1999 and personal observations/updates on mammals) shows 42 terrestrial species and 10 marine species as likely found in the

Wadi Gaza area (including in the coastal areas): *Erinaceus concolor, Hemiechinus auritus , Paraechinus aethiopicus , Rousettus aegyptiacus, Eptesicus bottae, Hypsugo ariel. Hypsugo savii, Pipistrellus kuhlii, Pipistrellus rueppelli, Plecotus austriacus, Tadarida teniotis, Taphozous nudiventris, Nycteris thebaica, Otonycteris hemprchi, Rhinolophus clivosus, Rhinolophus hipposideros. Asellia tridens, Canis aureus, Canis lkupus, Vulpes vupes, Caracal caracal, Felis chaus, F. silvestris, Herpestes ichneumon, Hyaen hyaena, Mellivora capensis, Meles meles, Vormela peregusna, Sus scrofa, Gazella gazella, G. dorcas, Hystrix Indica, Jaculus orientalis, Jaculus jaculus, Gerbillus gerbillus, G. andersoni, G. pyamidum, Meriones sacramenti, M tristrami, Mus macedonicus, Rattus norvegicus, R. rattus, Lepus capensis.* The Mediterranean sea contains interesting species (though many unconfirmed in coastal waters of Gaza): *Balaenoptera physalu, Physeter macrocephalus, Ziphius cavirostris, Tursiops truncatus , Steno bredanensis, Stenella coeruleoalba, Delphinus delphis , Grampus griseus ,Orcinus orca, Pseudorca crassidens.* Similarly, very few studies (and much of it unsubstantiated and anecdotal) exists for the invertebrate fauna of Gaza. Dardona et al. (2015) recorded 25 species of butterflies and 11 species of moths. For butterflies that is actually high diversity for the area.

While species richness declines north to south and its is higher on the western than the eastern (drier) mountainous areas, there are gaps of knowledge especially in the West Bank and Gaza that explains the uneven data of species richness data for Palestine (Levin & Shmida, 2007).

There are also many publications produced that expand knowledge of nature and environmental conservation. For example, HSF (a German NGO working locally produced these publications): First Trails Guidebook in Palestine; Birding Journal; Swifts brochure; Our nature enjoy and explore (about Palestinian nature reserves); Beitillu reserve Master plan; Um-Tut reserve Master plan; Environmental Conservation and Protected Areas in Palestine: Challenges and opportunities; Biodiversity Study for Ajja. Here are also examples of publications produced by the Palestine Institute for Biodiversity and Sustainability (Bethlehem University) that help raise awareness in the public:

- "Land Of Olives and Vines Cultural Landscape Of Southern Jerusalem, Battir, Palestine World Heritage Site Biodiversity Conservation Plan, Link 2019
- Role of museums and botanical gardens in ecosystem services in developing countries: case study and outlook , Link 2017
- Qumsiyeh, MB and ZS Amr. 2020. Protection of endangered ecosystems via establishing museum research and education facilities: Experience from Palestine and proposal for the Arabian Gulf. Museums in the Middle East Journal (UAE), 1: 29-32 , Link 2020
- Status and Conservation of the Striped Hyena (Hyaena hyaena) in the Occupied Palestinian Territories (West Bank), Link 2020
- Environmental Justice. Popular struggle and Community Devt , Link 2015
- Environmental justice and sustainability in Palestine: Challenges and opportunities under colonization, Link 2016
- A comparative survey of environmental education goals between the UNESCO framework and 10th grade Palestine Curriculum, Link 2016
- Nature and Resistance in Palestine, Link 2018
- Biodiversity Conservation of Wadi Al-Quff Protected area (Central Palestine): Challenges and Opportunities, Link 2016
- Five-day training workshop on environmental leadership for 27 students from seven schools in the towns of Bethlehem and Ramallah, Link 2019
- Enhancing Palestinian Environmental Awareness and improving public participation in Environmental Governance (Palestinian authority). Gaza: Ma'an Development Center. http://www.secheresse.info/spip.php?article38654

Other activities: Citizen science and database entries is growing. Mahmiyat.ps was established as the first web presence for the Palestinian nature reserves in 2016. The Hanns Seidel Foundation together with Palestinian partners implemented the website. It aims at raising environmental awareness among the Palestinian Society about the nature reserves in the West bank and Gaza strip by providing information about the reserves and nearby historical and cultural sites as well as nearby services such as guesthouses and points of sale for local products. In addition, it provides simple and user-friendly databases of the Palestinian flora and fauna that made the website an online educational tool serving different sectors of the society.

Palestinians entered records for biodiversity in GBIF. As of 2021, there are 203,102 occurrences and 279 datasets about Palestine (https://www.gbif.org/country/PS/summary) but most of these are not by local actors and are mostly museum or other older records. Currently and with support of HSF, some observations and photos are being collected and added to the website http://Observation.org. This portal was established in 2005 with 11 observations that year that expanded rapidly to have 3.1 million observations entered in 2020 alone. It has been used as an organizing tool for some national biodiversity data gathering efforts. Statistical data shows 24,451 observations entered under the state of Palestine until 14 June 2021 with the majority being birds. This is also similar to all observations recorded on that portal where 73% of them are birds. Israel had 316,728 observations recorded (13 times as many observations as Palestine). On iNaturalist platform (https://www.inaturalist.org/), Palestine has 5,503 records while Israel has 85,654 records. Palestine did develop its databases and research and mapping of biodiversity (fauna and flora). Increasing public awareness and training nature lovers (future observers) is focused on key areas rather than a national attempt at collecting observations by the very few interested individuals. At a much later stage when the situation becomes like European countries in awareness and bird watching levels, such portals become useful. For example, at present we have a handful of people interested in watching birds and only part of them are willing to enter observations on the web portal. In a small European country, there may be hundreds or thousands of bird watchers. The focus here is to think of a strategy to spread awareness and nurture a new generation of bird watchers for the next few years. There are separate databases for biodiversity maintained by ARIJ and also by PIBS. PIBS published research articles on insects, scorpions, amphibians, reptiles, birds, and mammals. Extensive data associated with verified records (specimens, photos, etc.) are maintained. PMNH has the ambitious goal of mapping biodiversity based on original research in all accessible areas of Palestine. More and more areas are becoming less accessible (due to occupation and mobility issues) so there is a race against time to map at least the key and potential protected areas in area C.

Conclusions: Biodiversity knowledge in Palestine advanced significantly since the 5th NR as shown above. However, we need more comprehensive surveys of the fauna and flora and to place all available data in accessible database management system available online to be used for conservation purposes.

20. Resource mobilization

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description

There is an issue with mobilizing global financial resources for biodiversity conservation in Palestine because of political considerations. For example, despite the fact that Palestine is eligible for funding based on being party for numerous conventions we have failed to receive funding because it was blocked by the donor via GEF. The state of Palestine nevertheless has attempted to mobilize other resources outside of the traditional channels for biodiversity conservation. The biggest challenge is capacity building in areas related to biodiversity. Currently, capacity building is done through formal education at universities such as programs in environmental sciences and biology in general (covered in ABT 1). Informal and extracurricular capacity building happens at governmental, non-governmental and academic institutions.

At NGOs, there are informal programs and workshops that relate to capacity building in areas of biodiversity. For example, a delegation of 8 representatives from Municipalities, Ministries and the Energy Sector in Palestine visited Bavaria sponsored by HSF. The goal was to gain information and share experiences with German representatives in the field of Zero waste management and sustainable Ecotourism. Through their meetings, the participants learnt about best practices, discussed current environmental trends, and gained the Bavarian expertise in theory and practice. A further aspect of the visit was for the participants to learn how to develop the environmental education and awareness strategies in Palestine. For this reason, the delegation also visited the Environmental Education Center at "Haus der Berge", as well as an award-winning environmentally friendly mountain hotel "Berghotel Rehlegg". HSF did some other capacity buildings for example when they took 6 individuals from Ajja Municipality to Jordan with RSCN about protected areas management and how to engage local communities.

All the expenditures on biodiversity research, education and conservation efforts before 1994 (Oslo and creation of the Palestinian Authority) were done via NGOs and Academic Institutions (i.e. nongovernmental). Some of the material on this issue are presented in the 5th National report (EQA 2015). Here we highlight other previously unavailable information for CBD usage.

After the Oslo process, the Ministry of Education and Higher Education was created. In 2002, an accreditation and quality assurance committee was established to accredit programs and new institutions. The Scientific Research Council was established in 2002 and was restructured in 2013 with an annual budget of $5.5 million to support research in the State of Palestine.

Total expenditure on research in 2013 (last year available) per PCBS was 61.4 million (a miniscule amount compared to GDP). In 2014 the MoEHE decided to support centers of excellence spending more and three of those seven centers are related to this report.

Table 3.45 Centers of Excellence designated by MoEHE (Isaac et al. 2020)

#	Center of Excellence	University	First Payment ($)	Second Payment ($)
1	CE in Marine Sciences	Islamic University	$ 500,000	500,000
2	CE in Water Studies	BZU BirZeit University	1,000,000	1,000,000
3	CE in Nanotechnology	An-Najah University	950,000	950,000
4	CE in Health and Medical Research	Al Quds University	892,500	892,500
5	CE in Environmental Research	Hebron University	800,000	800,000
6	CE in IT	Polytechnic University	400,000	400,000
7	CE in eE-learning	Al Quds Open Universi	49,000	49,000

Table 3.46 Expenditures on SDG 15.a.1 Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems (PCBS)

Year	Expense in millions of USD
2002	2.37
2003	1.39
2004	0.43
2005	0.60
2006	10.78
2007	1.25
2008	4.16
2009	7.01
2010	7.71
2011	2.90
2012	14.85
2013	20.29
2014	10.35
2015	21.04
2016	15.87

2017	16.90

Funding agencies and groups that supported environmental conservation in Palestine are many. From the discussion and meetings with stakeholders, there was clearly a huge amount of money poured into the conservation efforts. Below is just a glimpse of this (taken from websites of indicated entities).

- Birdlife International (http://www.birdlife.org/) funded a number of projects given to PWLS (sometimes also jointly to Israeli groups) dealing with bird issues. For example eleven BirdLife Partners including Palestine are working together on a UNDP/GEF funded Migrating Soaring Birds (MSB) project to tackle threats to soaring birds
- The Global Environment Facility (http://www.thegef.org) had 125 projects in Palestine totaling $3.9 million between 1996 and 2013 (see GEF 2013).
- The Government of Brazil funded the MOA in projects related to protected areas including issuing brochures for forests and for management.
- The Church of Sweden has pumped significant aid to the EEC
- Heinrich-Böll-Stiftung has funded several projects including the study by Majdalani Azzeh (2012) to map environmental NGOs and a book on ethical consumerism (Dajani and Isma'il, 2014).
- In 2005, Belgian Cooperation funded two studies via EQA that went on bid 1) EcoTech Jordan for a study of biodiversity rich areas in the State of Palestine and 2) Gishori Industrial Settlement environmental impact study
- Global Environment Facility/Small Grant Program (GEF, 2012, 2013). The United Nations Development Programme/Programme of Assistance to the Palestinian People (UNDP/ PAPP) has supported Palestinian local communities in addressing the linked challenges of environment and development, and increasing resilience in these areas through its small-grant mechanism. Since 1999, the total grant amounts were 4.7 million with 44% going to Biodiversity and 28% to climate change (figure below).

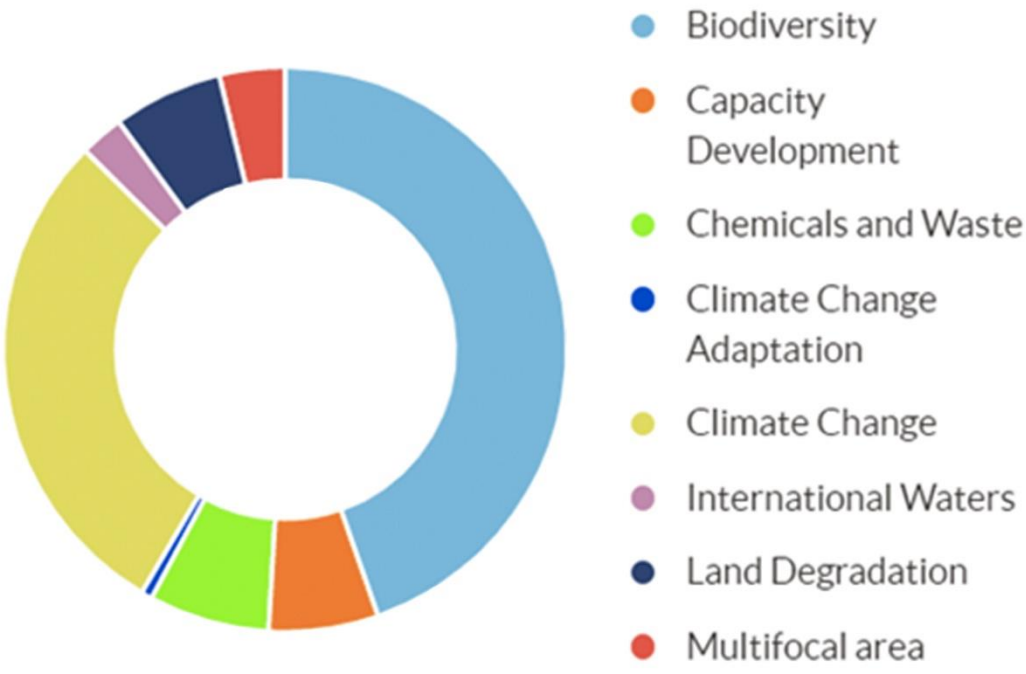


Figure 3.49 Funding allocation by activity.

- Nationally Determined Contributions (SP 2020c) identifies financial needs sought from funding agencies to address the Climate Change issues relevant to Palestine. The Green Climate Fund (GCF) works through accredited agencies to support climate change mitigation and adaptation

measures (https://www.greenclimate.fund/about/partners/ae). GCF allocated $28.1 million to Palestine with the main project being implemented via AFD in December 2019 for water project and agricultural adaptation in Northern Gaza (https://www.greenclimate.fund/countries/state-palestine). The country program (SP 2020d) also identified financial and technical needs which if met will allow Palestine to deal with the urgent climate issues (in mitigation and adaptation).

In a survey of institutions, most respondents (10/13 institutions) said they did receive funding for biodiversity conservation in the past 5 years. The largest institutions expending money for biodiversity conservation in Palestine include: EQA ($5M), PIBS ($3M), ARIJ ($1.5M), AQU ($1M), BERC ($483K), UAWC ($200K), LRC ($200K), PLWS ($150K). **Since we estimate 25-30 active institutions dealing with biodiversity conservation in the State of Palestine, we estimate total resources expended for biodiversity conservation to be over $20 million in the years 2015-2020. This is clearly not adequate funding for biodiversity work.**

The EU funded programs related to environment as part of their peace initiative (Source: https://eeas.europa.eu/sites/default/files/20160216_eupi-eupfp_programme_at_a_glance_2016_en.pdf). (Table below).

Table 3.47 Funded projects by PfP

Project Title	Grant Beneficiary	Partner/s	Dates	Total cost/EU contribution	Notes
Solutions for Electronic Waste Disposal Affecting Palestinians and Israelis	Green Land Society	AJEECNISPED Association	01/01/2015 31/12/2017	586,180 468,944	aims to ameliorate health and environmental risks and address economic dependency of the Palestinian economy in southern Hebron on the Israeli transport of e-waste"
Addressing Israeli Actions and its Land Policies in the State of Palestine	Applied Research Institute Jerusalem (PS)	Land Research Center (PS) Kerem Navot (IL)	04/06/2014 03/12/2016	621,300 497,040	The project monitors, analyses and documents all Israel's actions and land policies in Palestine, with the aim to disseminate the collected information to key stakeholders
Promoting Israeli Palestinian cross border cooperation in nature conservation and eco-tourism	Hanns-SeidelStiftung (DE)	Palestinian Wildlife Society (PS) Society for the Protection of Nature in Israel (IL)	02/01/2014 01/01/2017	563,654 450,923	aims to raise institutional and professional capacity of Palestinian organizations and individuals for the conservation and sustainable management of natural assets, as a contribution to the viability of a Two States Solution
Raptor pest control as a sustainable resource management model in the Jordan Valley in support of the Middle East peace process	Palestine Wildlife Society (PA) Society for the Protection of Nature in Israel (IL)	Amman Center for Peace and Development (JO)		459,644 367,715	Involved installing "nest boxes" for owls.

But beyond the issue of money, perhaps an even more challenging aspect is capacity building. Examples of capacity building projects that worked in Palestine:

- Capacities for Biodiversity and Sustainable Development http://cebios.naturalsciences.be/
- Global Development And Environment Institute Tufts University http://ase.tufts.edu/gdae/
- Belgian biodiversity/cooperation https://www.glo-be.be/en/quick-articles/biodiversity-indispensable-development
- A Cross-Sectoral Environmental Strategy 2017-2022 was developed and shared with key stakeholders (EQA 2017a). The strategy aligns with the Palestinian National Policy Agenda (NPA) 2017-2021 and other relevant policies and plans including the EQA Budget Program. A key vision of the strategy is "protected clean, and sustainable environment," and it outlines five objectives that encompass broader issues under the environment. The objectives are
    1. Reduce and control environmental pollution
    2. Protect and manage natural environment and biodiversity sustainably
    3. Develop and implement procedures to adapt to climate change, desertification, environmental emergencies and disasters
    4. Implement procedures to update legislation, strengthen institutional structures, and enhance international cooperation (related to the environment)
    5. Enhance and mainstream environmental knowledge and awareness

And thanks to technology, there is much to learn from others and to use existing resources. Examples:

- A Pan-European Species directories Infrastructure (PESI) http://www.eu-nomen.eu/pesi/
- Majd Mashharawi founded Green Cake to make building bricks from building rubble in bombed Gaza. She won 1st prize and received funds and training opportunities from the Japan Gaza Innovation Challenge.
- Others will be collected from stakeholders

Conclusion: There are minimal financial resources and there is also a need for capacity building programs relating to biodiversity in Palestine. While there was improvement in this area since the 5th NR, much more is still needed. We look to CBD and other agencies to remove any political blocks on funding which would allow Palestine to better preserve and protect its rich biodiversity. Such finding is also inline with the obligations and benefits that supposed to accrue to state parties to conventions such as CBD. This in turn is critical for global biodiversity because of the geographic position of the State of Palestine.

Chapter 4. Updated biodiversity country profile

Info! Please review and update your country's biodiversity profile currently displayed on the clearing house mechanism. Biodiversity country profiles provide an overview of information relevant to your country's implementation of the Convention.
If the text of your biodiversity profile does not appear below, it can be retrieved on the CHM at: https://www.cbd.int/countries/profile/default.shtml?country=ps

Please review and update your country's biodiversity profile currently displayed on the clearing house mechanism. Biodiversity country profiles provide an overview of information relevant to your country's implementation of the Convention. Biodiversity facts : Status and trends of biodiversity, including benefits from biodiversity and ecosystem services and functions:

Historic Palestine is some 27,000 km2. When Israel was created in 1948/1949, two areas of Palestine remained unoccupied (West Bank of Jordan and the Gaza Strip). These were subsequently occupied in 1967. Geographically Palestine is at the intersection of Eurasia and Africa and hence was the path of Human migrations out of Africa. Due to this geography, it is also a country where hundreds of millions of birds come through on annual migration between the continents. Geologically, Palestine sits at a fault zone between the African and Arabian Tectonic plates which resulted in high mountains to the West of the Great Rift Valley which separates the Palestinian mountains from the Jordanian mountains. Within the areas of the West Bank and Gaza, there are the central highlands running north (Nablus mountains) to the South (Hebron Hills). The Gaza strip includes at least three phytogeographic and habitat areas: Coastal Mediterranean, Sand dunes, and Saharo-Arabian element (Soto-Berelov et al 2015). Despite its relatively semi-arid overall climate, this allows it rich biodiversity (flora and fauna, see below). But these habitats are fragile and threatened with a number of factors (also see relevant section below). Topographically the area slopes east to west towards the Mediterranean and the northern part of it receives more rain than the southern part. Wadi Gaza intersects Gaza and is a key geography and geologic feature.

The climate in Palestine is mild Mediterranean climate in most of the country with elements of Arid regions in Southeastern parts of the country and in the lower Jordan valley. The central mountain ranges are at elevations up to 1200 meters. The eastern parts of these mountains thus receive less rain and include Irano Turanian Habitats as well as Saharo Arabian Habitats. The hill tops and Western slopes have typical Mediterranean woodland and shrubland which then slope further to coastal habitats. The coastal regions usually have high humidity hot and dry in summer but not too cold in winter. The Jordan valley itself gets rainfall from 200 mm (in the north) to <100 mm (in the south around the Dead Sea). Temperatures have already increased and are projected to increase even further and rainfall is expected to decline in the next two to three decades due to global human-induced climate change (UNESCWA et al., 2017)

Palestine due to geography and geologic history is rich in biodiversity compared to countries of the same latitude. In Historical Palestine, there are about 51,000 living species (and increasing each year), (Meiri et al., 2019; ARIJ calculations based on Heywood and Watson, 1995). The state of Palestine also hosts over than 2,000 species of plants including some endemic species.

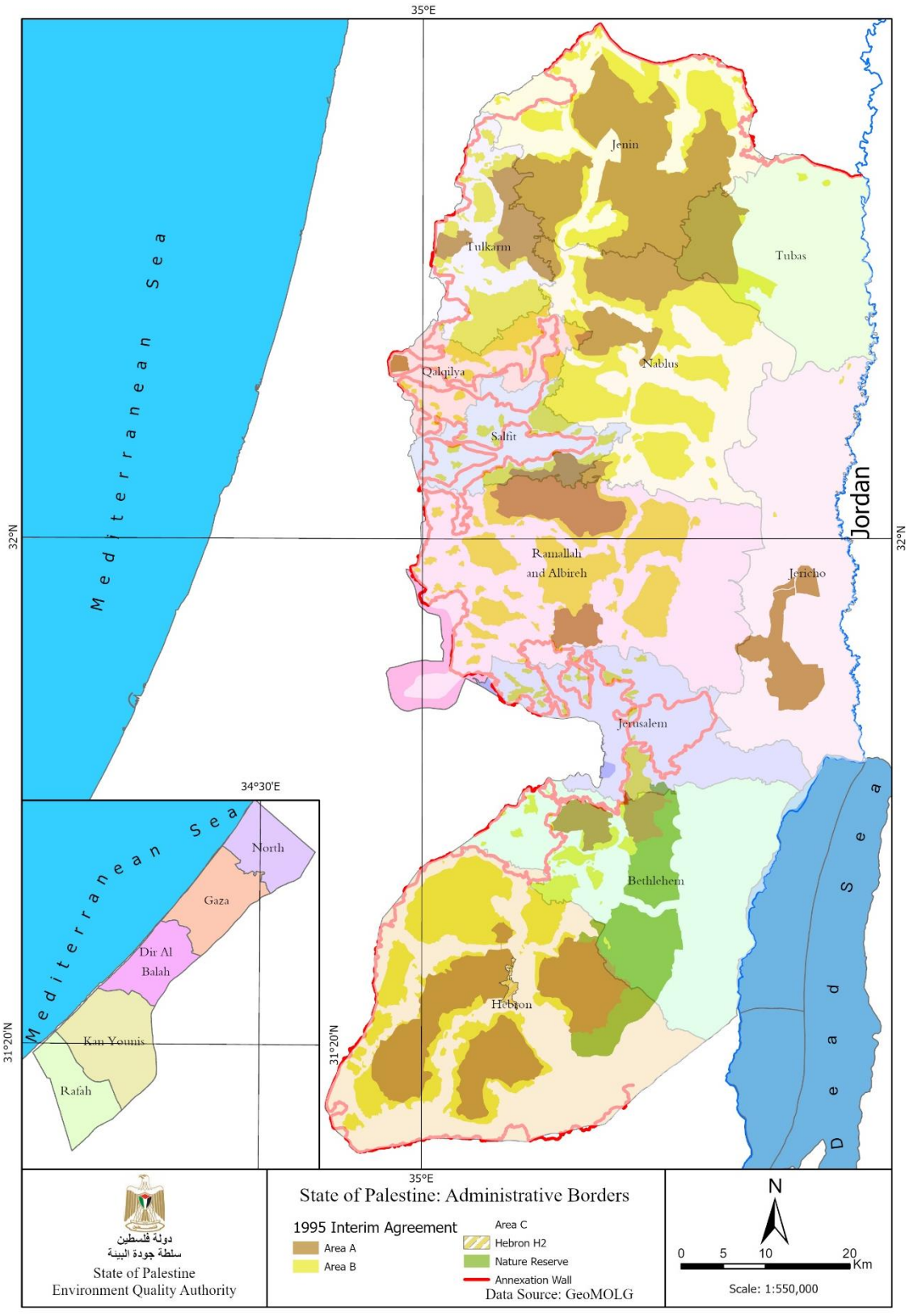


Figure 4.1 State of Palestine: Administrative Map.

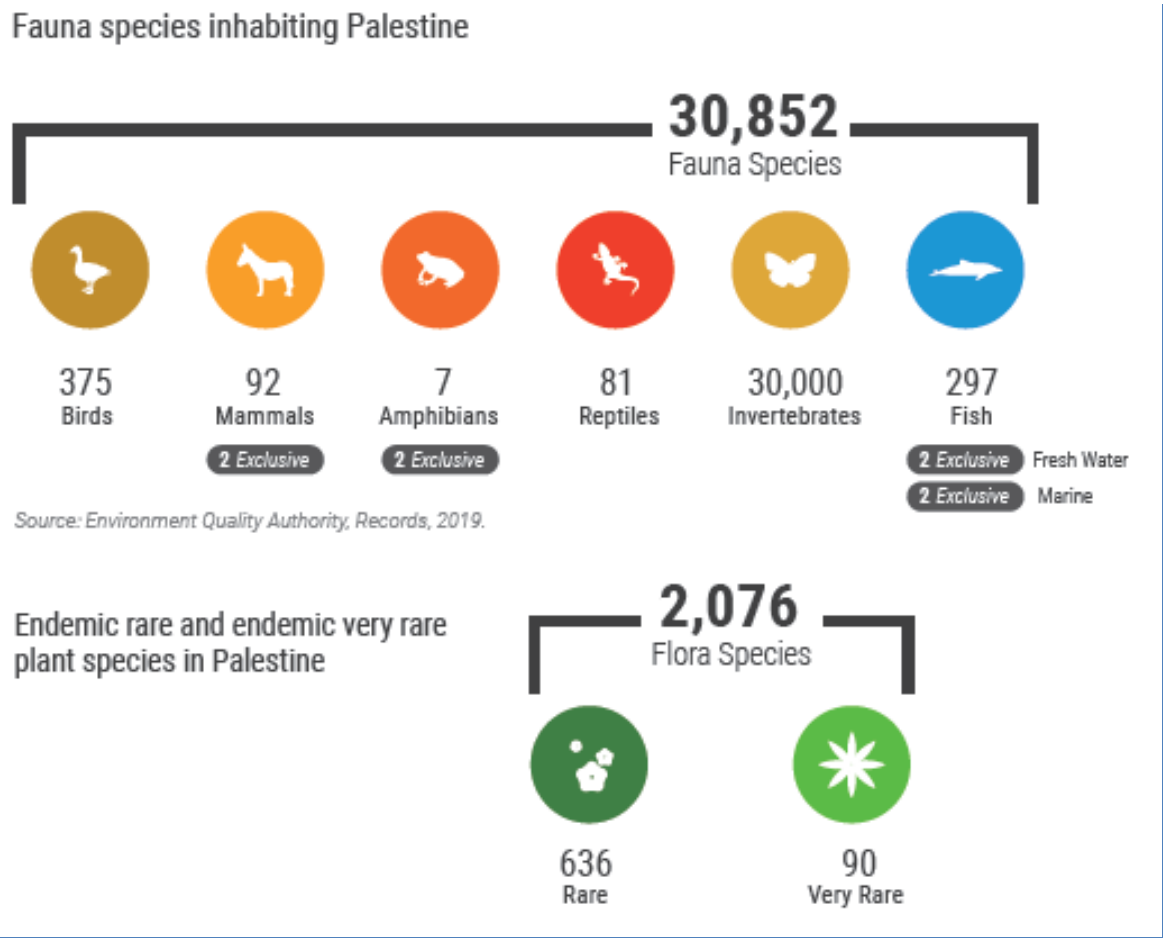


Figure 4.2 Fauna species inhabiting Palestine

Main pressures on and drivers of change to biodiversity (direct and indirect)

Please review the text currently displayed in your Biodiversity Country Profile on the Convention's Clearing House Mechanism and update it as necessary.

Baalousha (2006) used GIS and the DRASTIC measures of vulnerability to show that many areas in Gaza Strip are susceptible to significant water pollution damage (see ABT 8). There are small scale desalination projects by reverse osmosis in Gaza but these have their own environmental issues, (Assaf, 2001). The situation for sewage management in the occupied Palestinian areas is critical Approximately 24 million gallons of raw or partially treated sewage exits those pipes into the Mediterranean Sea each day (Marlowe, 2015; Ashour et al., 2009). The sewage running in the valley next to areas of population like two refugee camps also causes health problems (see e.g. Abu Mourad 2004; Abu Naser et al. 2007). Wastewater and other pollutants also heavily impact ecological integrity and socioeconomic issues in this valley (Abu Shaban 2002; Shanban and Saleh, 2002; Rabah 2013; Roskin and Bergman 2013; Saleh et al. 2013; Ubeid et al. 2016). Pesticide use on limited land (see Abu Middain, 1994) and nitrates seem to affect the health of people in Gaza (Abu Naser et al., 2007, Al-Absi, 2008). Wars on this area as an environmental hazard (Safi 2015). Other activities include quarrying, stone cutting, and other industries (olive mills, food processing, tanneries, slaughter houses, etc.,) which generate significant pollution. Quarrying and stone cutting in particular constitute one the largest industrial activity, contributing about 25% of the industrial sector (ARIJ 2015).

We already see significant **growth of population** in Palestine with total population jumping from less than one million in 1916 to over 13 million in 2016. Some of this is attributable to natural population increase but nearly half of it is new Jewish immigration. This is creating pressures on the environment evidenced in decline in biodiversity, e.g.(Qumsiyeh et al., 2014b), decline in frog population (Salman et al., 2014), and change in diet of raptors like the Eagle owl (Amr et al., 2016). The fact that between the river Jordan and the Mediterranean, there are now over 12 million people with over 3 million cars has also created a large

problem with air pollution and we already see increased lead pollution (Tal, 2002; Safi et al., 2006). There is increased population density coupled with Israel's restriction on Bedouin communities and this causes Bedouins to overuse shrinking areas they are allowed to use. Jahhalin for example moved from Naqab to Jordan valley in 1948 then to Jerusalem eastern hills in 1967 and soon will be moved to Aizarya). This results in overgrazing in the few remaining open areas (ARIJ 2015).

In Gaza there are limitations on going out to see beyond a very small 3 nautical mile area allocated for **fishing**. The restrictions developed over years especially after discovery of large gas reserves offshore (Ismail et al., 2013). The restrictions result in overfishing and combined with the environmental impact of prospecting for and extracting the gas, there is a significant threat to Mediterranean biodiversity. There is also significant hunting of wildlife including via nets and traps and even guns (even though guns are not allowed to Palestinians many have them) by locals and visitors to Palestine (Yom-Tov, 2003). **Illegal hunting** has decimated the areas like Wadi Gaza (Abd Rabou et al., 2007, 2015; AlHirsh, 2016). Recent work in the West Bank showed that 79 species of wild vertebrates (mostly birds) were traded illegally in pet shops around the areas (Handal et al. 2021). The EQA and the environmental police have improved their capacities to track and punish some people but much more needs to be done in this area.

Illegal wood harvesting (cutting trees) in protected areas is also common practice in many parts of Palestine (e.g. Wadi Al-Quff, see Qumsiyeh et al., 2016). But also infrastructure development needs to take into account the cutting of forests and allowing wildlife continuity whether this is for road building (Achiron-Frumkin 2013) or for the building of the segregation barrier deep inside the west bank that damaged the environment and is against International law (International Court of Justice ruling 2004).

Alien (non-native) **invasive species** increasingly form a increasing percentage of local fauna and floral species around the world pausing threats to biodiversity (Sandlund and Johan 1999 and see ABT 9 in this report). Nearly half a million species are reported as invasive (Pimental et al., 2001). The invasiveness threat increased because of ease of transportation and human habitat destruction that opens many avenues for invasive species to get established around the world. In fact, these invasive species are now considered the second most important threat to biodiversity after direct habitat destruction by humans (Kettunen et al., 2009). There is still some debate on the issue of whether increased local biodiversity protects from invasive species or not and how best to deal with this phenomenon (Levine, 2000). Massive changes in landscape in historic Palestine included introduction of non-native species (by the British then by the Israelis) which caused destructive effects on the local fauna and flora. The biggest was the planting of European trees to cover-up the remains (including native trees) of over 500 Palestinian villages and towns depopulated in 1948-1950. Israel did a similar process after 1967 with three Palestinian villages creating the "Canada Park" area (NW Jerusalem). Calling this "afforestation" and writing articles that hides its true devastating environmental impact is now common place (Ginsberg, 2006). Many plants and animals are invasive in Palestine. Invasive bird species include Pisttacula krameri, Acridotheres tristis, and Lonchura malabarica. Bird species escape from human captivity and in the case of the myna are highly adaptable and significantly impacted local species. Invasive plants species includes about 50-species, the species of high invasiveness include Prosopis juliflora, Acasia saligna, Ailanthus altissim, Conyza bonariensis, Cronquist, Nicotiana glauca, Oxalis pes-caprae, Solanum elaeagnifolium, and Ambrosia confertiflora. The invasive species in Palestine are increasing both in the number of species and in the degree to which some of them have proliferated. The main restrictions on the import of species into the country are those of the Ministry of Agriculture but Israel remains the authority in charge of borders (EQA, 2015a). But we need better surveys, assessments, and research studies of invasive species and how to control them. The result according to UNEP-WCMC (2015) is an estimated loss of 15% in biodiversity.

Social and socioeconomic issues (including demography etc.) plays a role. The occupied Palestinian territory is home to some 5 million Palestinians (60% WB, 40% in Gaza) including the 1948 refugees (PCBS 2018). This population is expected to grow to 6.9 million by 2030 and to 9.5 million in 2050 (UNFPA 2016). This growth is explained by a young population with over half the population under 18 years of age. Gaza has a very high density of population and essentially unlivable conditions (UN 2012; OCHA 2019). In East Jerusalem, the urban growth rate is 3.3 per cent, population density is an average of 13,500 capita per km2 and the poverty rate is 75.4 per cent (OCHA 2019).

Table 4.1 Selected indicators and statistics for 2019 (PCBS 2020).

Indicator	Palestine	West Bank	Gaza Strip
Number of Population, End Year 2019	**5,038,918**	3,019,948	2,018,970
Males	**2,562,304**	1,539,038	1,023,266
Females	**2,476,614**	1,480,910	995,704
Total Area (km^2)	**6,024.82**	5,659.91	364.91
Population Density (Capita/km^2), End Year 2019	**836**	534	5,533
Percentage of Population Below 15 Years, End Year 2019	**38.3**	36.3	41.4
Average Household Size, 2019	**5.0**	4.6	5.7
Unemployment Rate for Population Participated in the labour force Aged 15 Years and Over, 2019	**25.3**	14.6	45.1
Students per Class at Basic Stage, 2019/2020*	**31.6**	27.3	39.5
Students per Class at Secondary Stage, 2019/2020*	**28.4**	23.3	39.7
Percentage of Households Who have Computer Desktop, 2019	**33.2**	35.7	28.7
Hospital Beds per 1000 of Population, 2018	**1.3**	1.3	1.3
Gross Domestic Product (Million USD), 2018 (Constant Prices)	**15,616.2**	12,797.3	2,818.9
Gross Domestic Product Per Capita (USD), 2018 (Constant Prices)	**3,417.7**	4,854.4	1,458.3
Total Registered Value of Exports (Million USD), 2018***	**1,155.6**	1,141.5	14.1
Total Registered Value of Imports (Million USD), 2018***	**6,539.6**	5,899.6	640
Number of Fixed Telephone Lines, 2018**	**469,741**	343,777	125,964
Average Housing Density (Person per Room), 2017	**1.4**	1.3	1.6

*: Primary data.
**:Data excluded those parts of Jerusalem which were annexed by Israeli Occupation in 1967.
***: Differences in the results of certain indicators are due to approximation

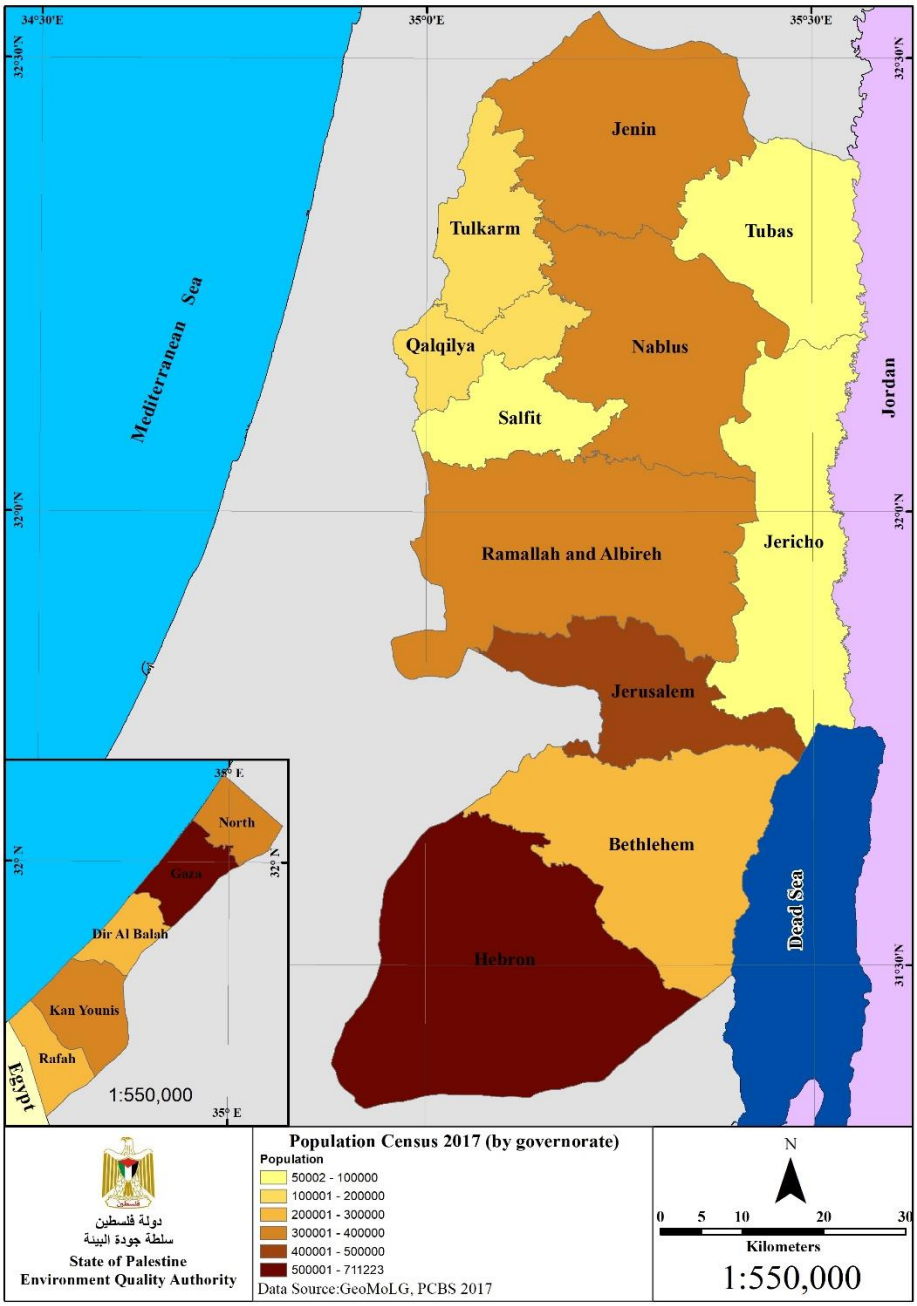


Figure 4.3 Estimated population by governorate for the occupied Palestinian areas (PCBS 2020).

Table 4.2 Palestinian population world wide (PCBS 2020)

Country	Number	Percentage
State of Palestine	5,038,918	37.7
1948 Territory	1,597,483	12.0
Arab Countries	5,986,187	44.8
Foreign Countries	727,455	5.5
Total	**13,350,043**	**100**

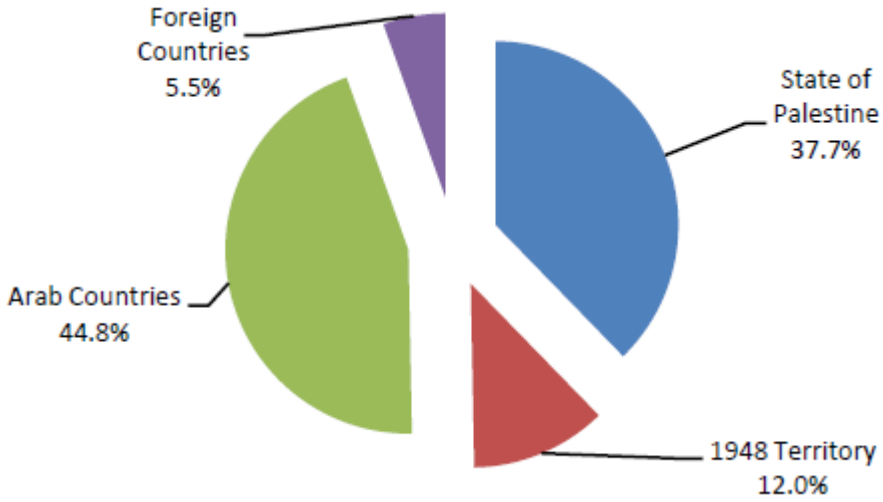


Figure 4.4 Palestinian population distribuion worldwide (PCBS 2020).

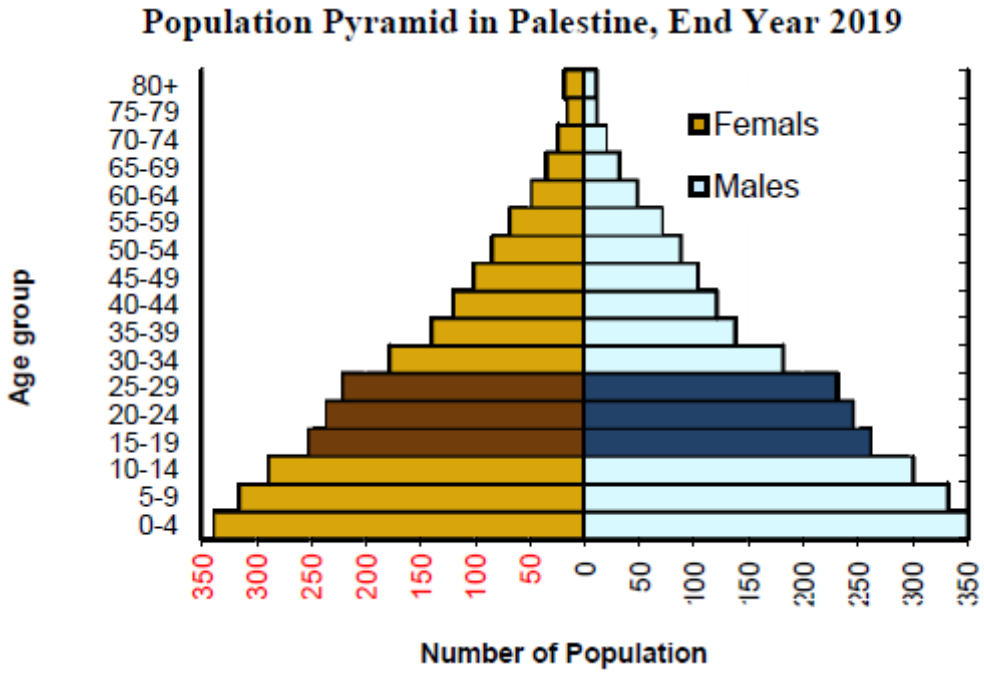


Figure 4.5 Population pyramid in Palestine, 2019 (PCBS 2020)

The analysis for ARIJ (2006) the urban expansion has been significant expansion which of the strip has affected the ecosystem especially in areas like Gaza e. The statistics for PCBS to Area, Population, and Population Density in Palestine showed that Gaza strip area (365 Square km) have a Population Density (Person/Square km) 5,204 by total population of 1,899,291.

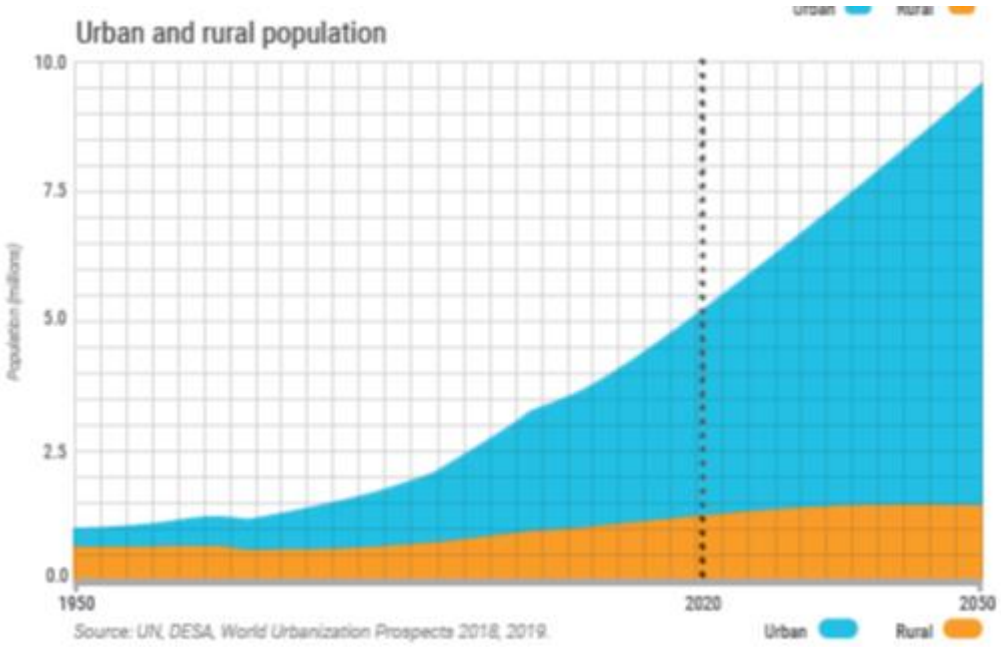


Figure 4.6 Urban and rural population (SP 2020a)

Total GDP in the Palestinian areas in 2019 was $15,829 million and gross national disposable income was $19,960 million and the GDP per capita was only $3378. The GDP per capita had grown for many years after Oslo but has stagnated or declined lately (https://tradingeconomics.com/palestine/gdp-growth-annual) and is expected to have declined sharply in 2020 due to the added aspect of closure due to the pandemic. Poverty and unemployment are both high.

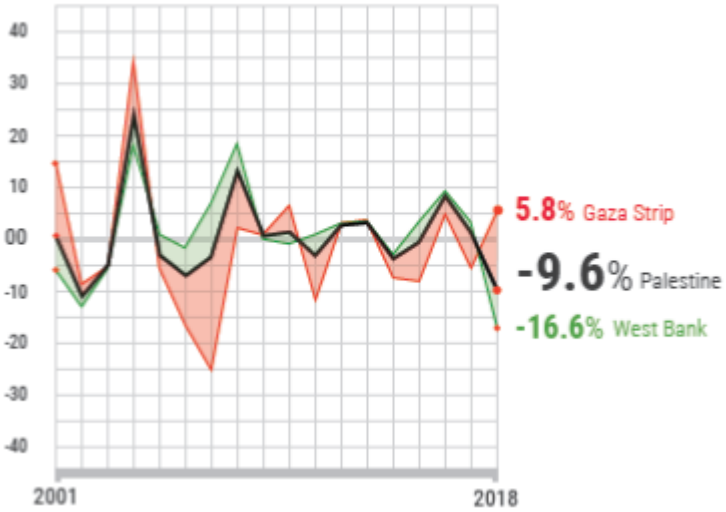


Figure 4.7 GDP growth is stagnant (SP 2020b)

The average individual poverty rate was 30% in the Palestinian areas - higher in Gaza than in the WB (PCBS 2020) The labor force participation rate held steady 2016-2019 at 43-44% (PCBS 2020). Palestinian economy before 1948 was largely dependent on rural agriculture (70% - British era Data). The political transformations, removal of people from their land (2/3rd of Palestinians are refugees or displaced people) resulted in significant decrease in agriculture dependency where now about 6% of labor is engaged in agriculture (PCBS 2020; Table and Figure below).

Table 4.3 Percentage distribution of employed person (15 years or older) in various sectors (PCBS 2020)

Economic Activity	2016	2017	2018	2019
Agriculture, Hunting, Forestry and Fishing	7.4	6.7	6.3	6.1
Mining, Quarrying and Manufacturing	13.2	13.1	13.0	12.3
Construction	16.3	17.2	17.7	17.4
Commerce, Hotels and Restaurants	20.9	21.6	21.7	22.6
Transportation, Storage and Communications	6.3	6.5	6.2	5.9
Services and Other Branches	35.9	34.9	35.1	35.7
Total	**100**	**100**	**100**	**100**

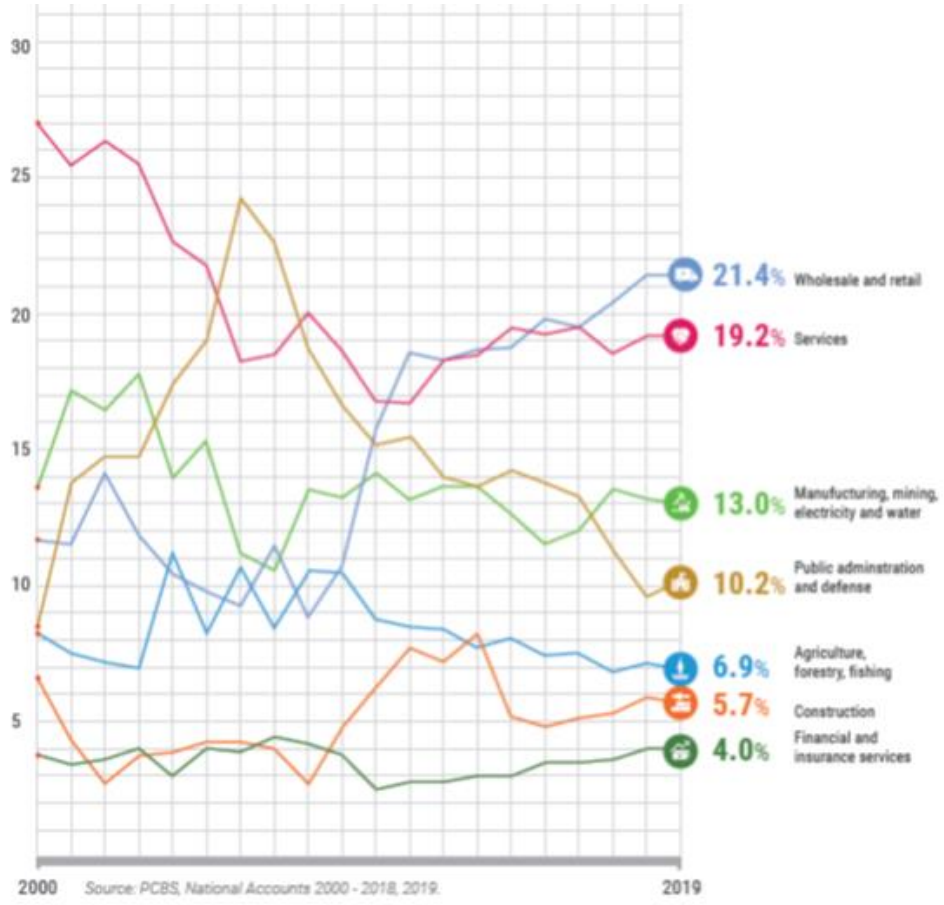


Figure 4.8 GDP by sector notice decline in agriculture (SP 2020b)

While there is a decline in agricultural production tied to settlement expansion and much more, we do notice that there are key areas which could be developed further in this sphere after the end of the Israeli occupation (Table below).

Table 4.4 Agro-ecological zones (UNEP 2020)

Zones	Area (km2)	Rainfall (mm/yr)	Agricultural activities
The Jordan Valley	400 – to the east of West Bank	100–200. Semi-tropical.	Intensive production (citrus and banana, date palm, grapes, herbs and vegetables).
The eastern slopes	1,500	150–300. Semi-arid or desert.	Small parts for agriculture (irrigated) with spring water; main activity is grazing livestock.
The central highlands	3,155 – the largest part of the West Bank	300–600. Mountains and hills.	Rainfed crops (olive, stone fruits, field crops, vegetables, and fodder).
The semi-coastal zone	600	400–700. The soil is medium-textured of alluvial origin.	Olives, stone fruits, field crops and vegetables.
The coastal zone (Gaza Strip)	365 – entirely within the Gaza Strip.	200–400. Sand dunes, intensive agriculture.	Strawberries, cut flowers, citrus, vegetables, almonds, dates and guava.

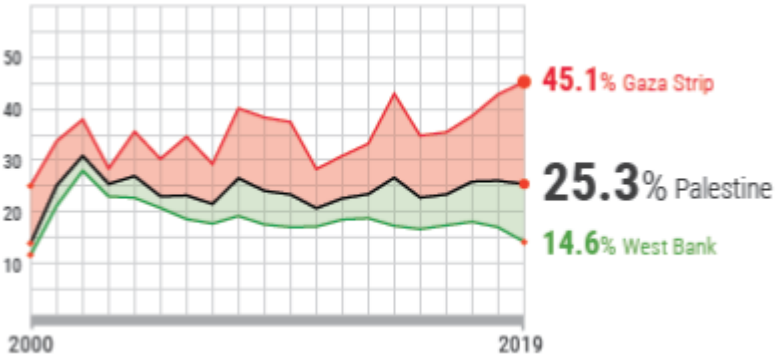


Figure 4.9 Unemployment in Palestine (SP 2020a)

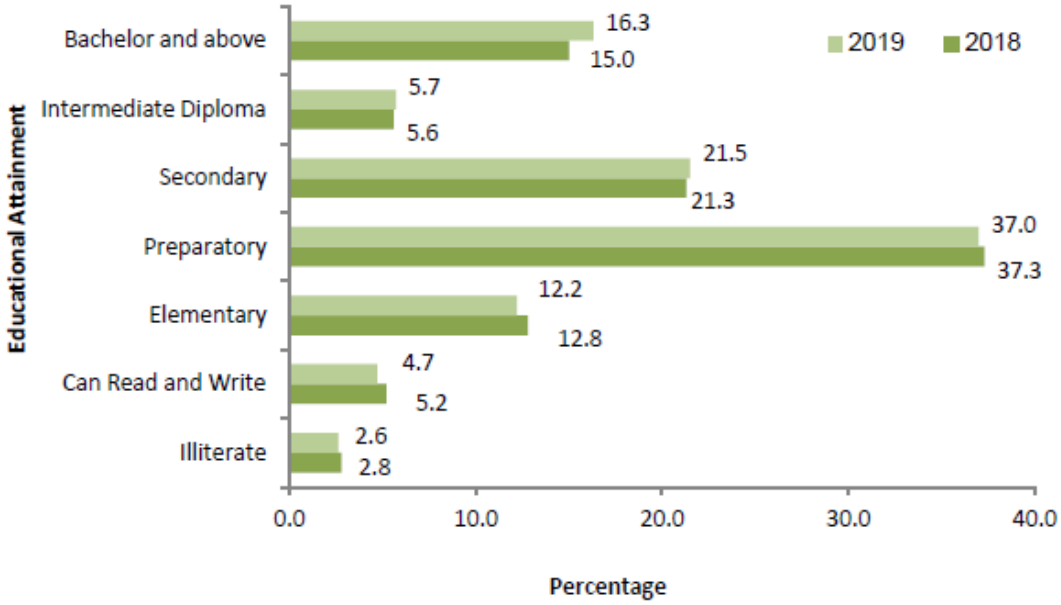


Figure 4.10 Percentage Distribution of Persons aged 15 Years and over in Palestine by Educational Attainment, 2018, 2019 (PCBS 2020).

Most household expenditure is going to food (Figure below; PCBS 2020, see also EQA 2016).

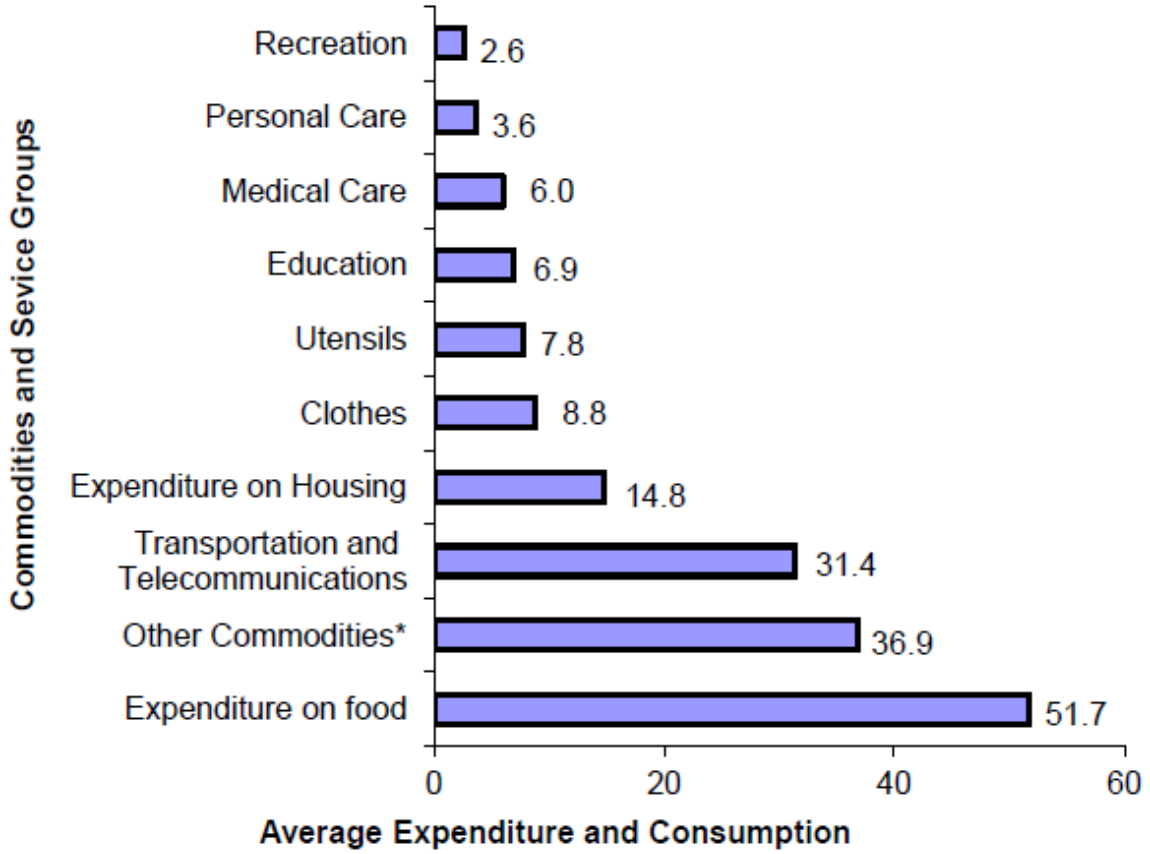


Figure 4.11 Average Expenditure and Consumption percentage by Palestinian Households (PCBS 2020).

The figure below shows the percentage contribution to GDP by the different sectors. Data for 2018 and exclude parts of Jerusalem annexed by Israel (PCBS 2020).

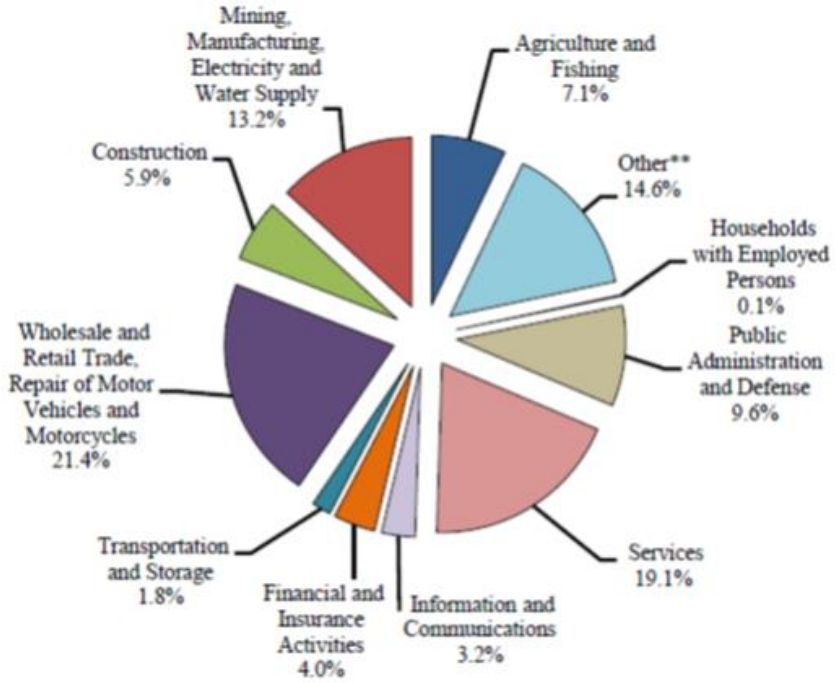


*Figure 4.12 Percentage contribution to GDP by different sectors (PCBS 2020). ** Other includes custom duties and net VAT on imports minus financial intermediation services indirectly measured.*

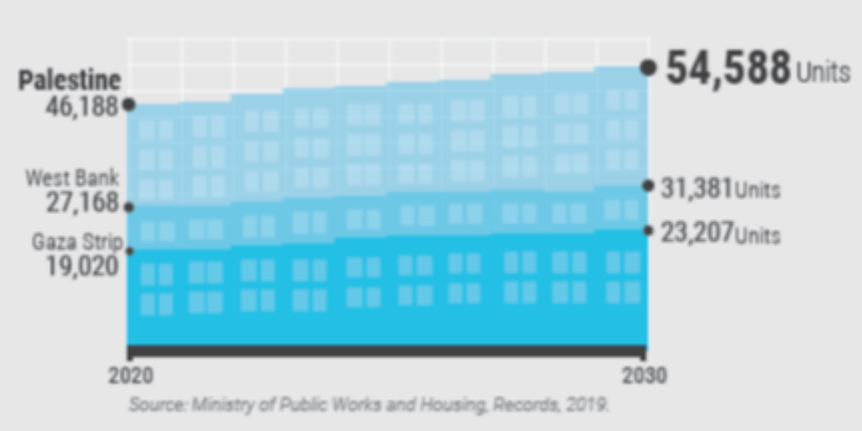


Figure 4.13 Housing needs (SP 2020b)

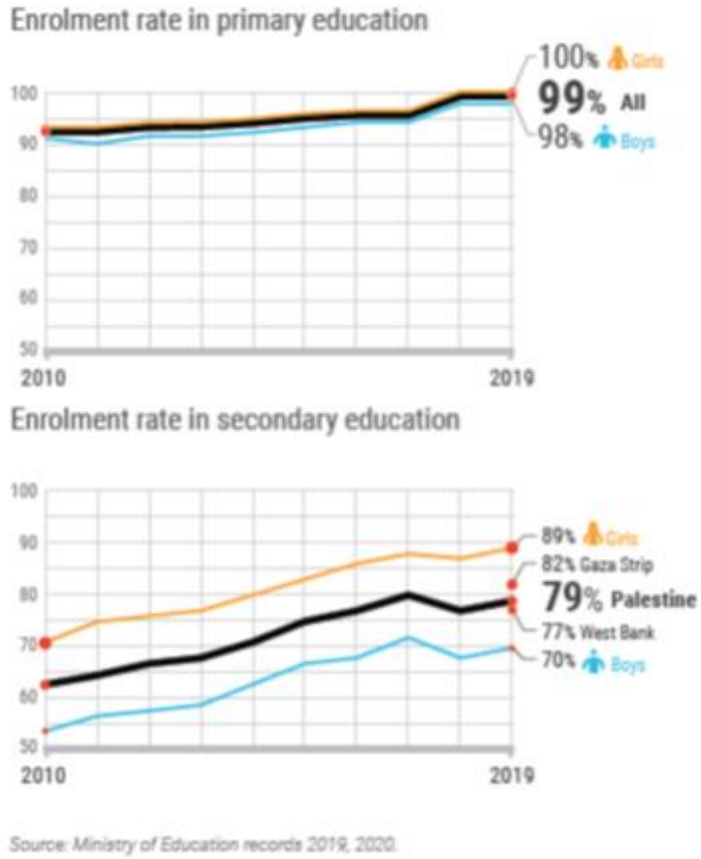


Figure 4.14 Enrollment rates in primary and secondary education (SP 2020a)

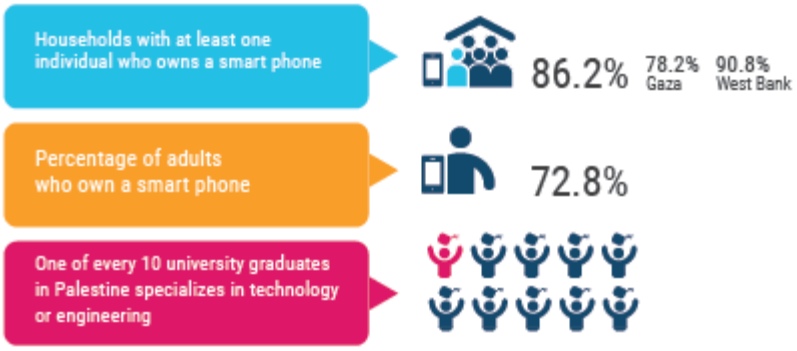


Figure 4.15 Use of smartphones and technology (can be useful in biodiversity education) (SP 2020b)

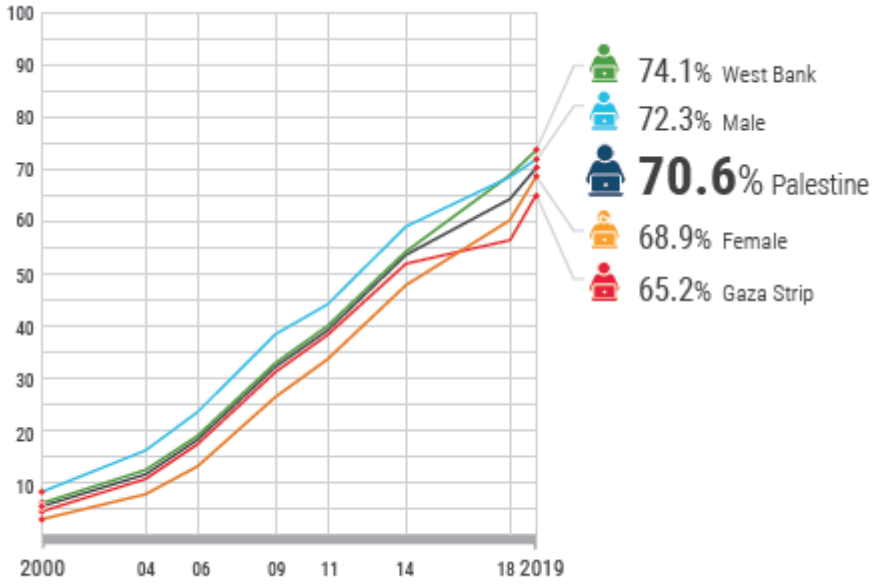


Figure 4.16 Proportion of people using internet (SP 2020b)

Figure 4.17 Green and public spaces per capita are very limited (SP 2020b)

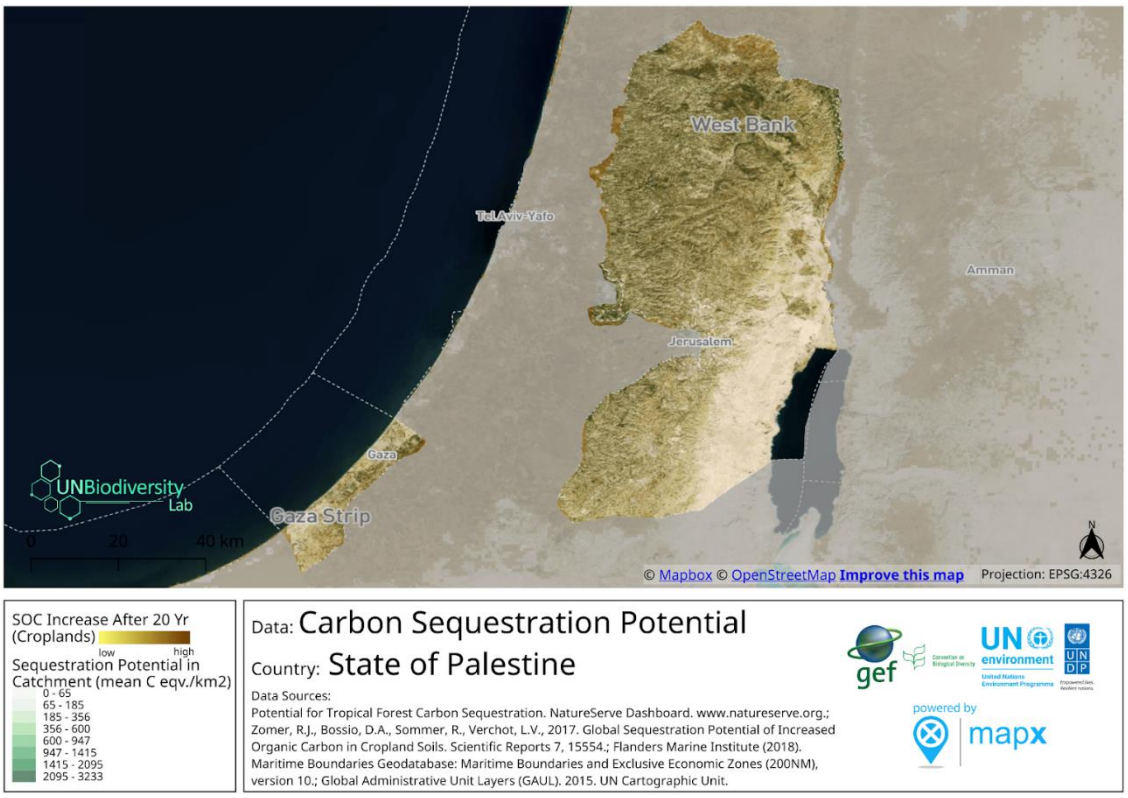


Figure 4.18 carbon Sequestration Potential in Palestine.

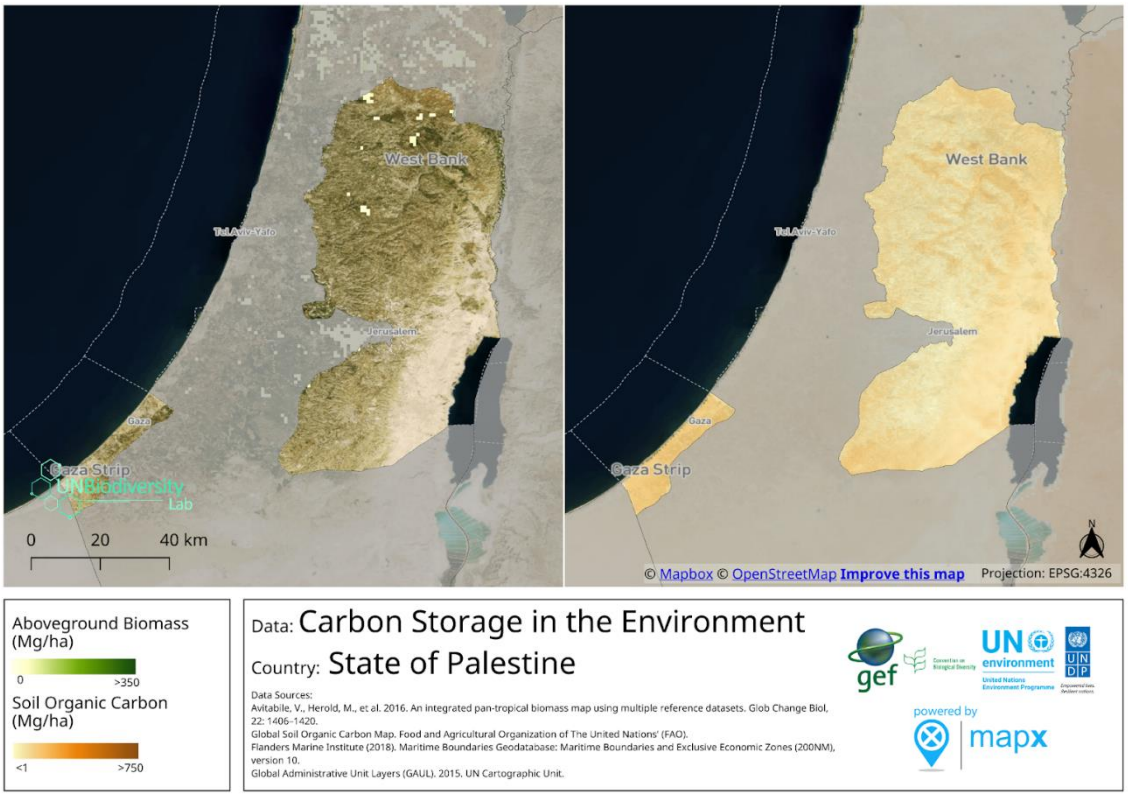


Figure 4.19 Carbon Storage in the Environment.

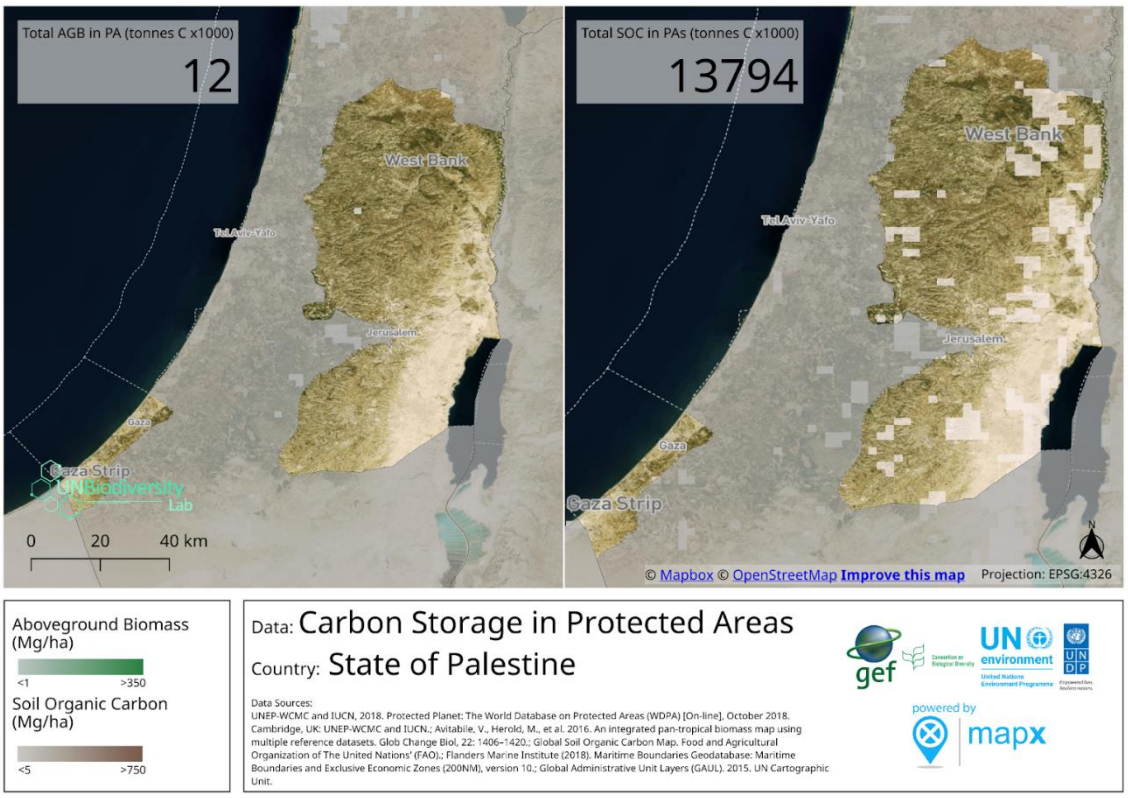


Figure 4.20 Carbon Storage in Protected Areas in Palestine.

Colonial settler activities

According to UNEP (2020) there has been a substantial increase in the Israeli settler population of the West Bank and East Jerusalem over past decades. In 2016, the Quartet reported that "Since the beginning of the Oslo process in 1993, the population of settlements has more than doubled, with a threefold increase in Area C alone." (UN, 2016). During the years since this Quartet report was published, there has been a further increase in the settler population: there are now over 600,000 settlers in the West Bank including East Jerusalem (OCHA, 2017). The growth of the settler population has an impact on the environment of the occupied Palestinian territory. Settlement expansion and the developments of factories inside settlements has led to an increase in the amount of groundwater being extracted, to the pumping by some settlements of untreated wastewater (see ABT 8) into wadis and agricultural lands, to industrial pollution, and to land and soil degradation.

From its foundation as a Jewish state in a multiethnic, multicultural and multi-religious land, Israeli policy makers believed in segregation - the removal and enclosing of natives behind borders and walls. Walls were also used to force the natives to leave. For example, after the ethnic cleansing of 1948-1949, the nascent state of Israel wanted to remove the remaining Palestinians from some areas. The villages of Faluja and Iraq Al-Manshiya were actually populated after the war and the withdrawal of the Egyptian army was predicated on allowing the natives to continue living there. But Israeli planners wanted them out so, settling the natives in bordered villages (large prisons), they pressured them economically to finally "volunteer to leave".

The walls set up around inhabitants of Gaza in 1967 accelerated as colonies were established in the Gaza strip. The Israeli partial withdrawal from the strip in 2005 eliminated some walls and added others. The Israeli planners hoped to shift the burden of the internal policing of Gaza's population to external policing. At the same time, the plan was to intensify colonization in the West Bank. The plans for walls and fences in the West Bank started in 1993-1994 with the Oslo accords where Israel hoped to give limited autonomy to Palestinians in urban areas (designated area A in the parlance of Oslo) while increasing colonization throughout the West Bank. Settler population mushroomed from 150,000 in 1993 to over 600,000 by the year 2000. The Wall and settlements in the Bethlehem district had significantly impacted biodiversity (Qumsiyeh et al. 2014; PLO 2018).

The vast majority of the Wall route was located deep inside the West Bank, causing confiscation of approximately 630,090 acres. Excluding East Jerusalem, this area - representing 10.9% of the total West Bank (EQA, 2010) - includes land used for building the Wall or creating buffer zones, and land lost because the line of construction put some land on the Israeli side leaving Palestinians with fewer resources in highly populated areas. Dense population caused land and soil degradation due to urban building (EQA, 2010). The Wall caused fragmentation of farms, forests, grasslands and water resources and prevented access to land and other natural resources (ARIJ, 2015). Additionally, Construction of the Wall has created Seam Zones that lie between the segregation Wall and east of the Green Line (ARIJ, 2015). Cultivated land left behind the Wall are subjected to desertification because Palestinian farmers are banned from reaching or cultivating their land (Abdallah & Swaileh, 2011). >83% of respondents in a recent survey done by PIBS & EQA indicated that the wall has impact on both wild plants and animals of the area.

The loss of land and the uprooting of many plants is damaging and endangering agro-biodiversity with high ecological and socio-economical impact (ARIJ 2005). Many vegetables and crops in these areas are threatened to disappear from the West Bank, especially those cultivated on plains and lower rainfall areas (EQA 2010). Overgrazing is another issue - a consequence of smaller areas permitted for access - causing depletion of plants (Abdallah & Swaileh, 2011). There are also indirect negative effects on plant species whose pollinators or seed dispersers do not cross the barriers (Abdallah & Swaileh, 2011). In addition to removing wide areas of green vegetation cover around the Wall - including endangered plant species (EQA, 2019) - construction led to the uprooting of many crop trees, especially olive trees used by many families as a source of income (EQA,2010; ARIJ, 2015). Forests and Protected Areas and nature reserves were also disrupted by the Wall construction. Almost 42,000 dunums of forest were included in the Wall area. Additional annexation took place of forests and protected areas west of the wall with high ecological value, such as Umm Al Rayhan forest (EQA, 2010).

The Wall disrupted the contiguity of natural water flow of streams and springs and this affects local flora and fauna (Qumsiyeh, 2014). The Wall caused changes and damage to the local environment endangering many local animal species. According to the EQA, 16 wild animals are endangered as a result of the construction of the segregation Wall (EQA, 2010). Disruption of the natural habitat for many wild species has affected population size and prevented normal movement of wildlife (Abdallah & Swaileh, 2011). Local residents report an increasing number of attacks from wild animals on their agriculture lands as the

populations of wild animals, especially pigs, now stuck on one side of the wall, increase (Abdallah & Swaileh, 2011). Wild animals are frequently trapped by the electric fences as they try to cross (Abdallah & Swaileh, 2011). And for large mammals, such as Hyenas with large foraging areas, the wall has restricted movement in ways that has reduced the availability of food (Handal et al. in press). Furthermore, the walls and the siphoning of spring water in many areas has produced a decline in Amphibian populations (Salman et al. 2014).

Importantly, the restrictions on movement imposed on the Palestinian people by the wall and checkpoints, severely limit their ability to protect rich biodiversity areas (Qumsiyeh and Amr. 2016; Qumsiyeh et al. 2016).

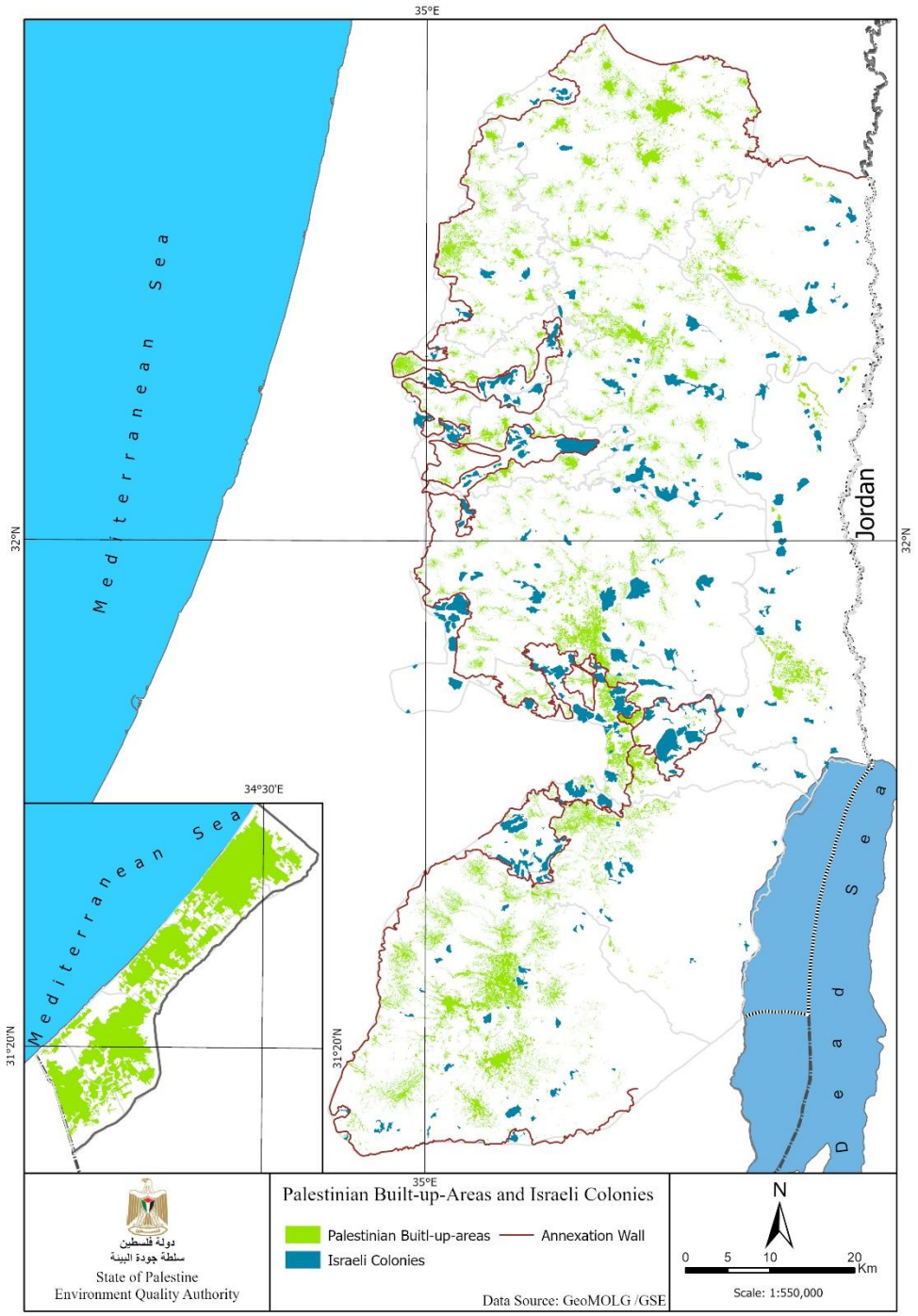


Figure 4.21 Palestinian Localities and Israeli Colonies.

Other threats: The changes in our fauna over the past 100-150 years are the result of many factors, some due to colonialism and some due to other human activities. For example, settlement growth in the Bethlehem region coupled with native population growth (including refugees from 1948 areas) resulted in the decline of vertebrate biodiversity (Qumsiyeh et al 2014). Saeed and Qumsiyeh (2020) also showed that researching ancient travelers' books such as those of Tristram can reveal significant negative impacts on fauna, especially birds. A good example of a bird that was impacted by human activity is the Eagle Owl. A study conducted in Al Makhrour valley showed the owl's diet had significantly deteriorated from a very rich diet including hedgehogs, various birds and lizards to one dominated mostly by house rats (Amr et al. 2016). Results also show that climate change coupled with colonial activities do impact sensitive invertebrate species like land snails (Amr et al. 2018) and can also lead to expanded presence of invasive species (Handal and Qumsiyeh 2019). When the public were asked about the threats to the environment in Palestine, most of them indicated the occupation as the major threat to the environment (33) followed by building areas expansion (21) and pollution (19).

A UN report on the Gaza Strip states that the territory (>2 million people most of them refugees) is not habitable by 2020 (UN, 2012). It alludes briefly to how the small strip of arid region in the Southwestern corner of Palestine came host so many Palestinians. Currently at over 1.6 million of whom over a million are refugees from the 1948 ethnic cleansing that created the state of Israel. The UN projects that by 2020 if the trends continue, Gaza population would have grown to 2.13 million and thus to 5835 people per square kilometers. One half of the population is children. Meanwhile the existing water aquifer will become unusable perhaps by 2016 while water demand would have grown to 260 million cubic meters by 2020. Some 60% of households are food insecure or vulnerable to food insecurity in 2011. Currently some 33 million cubic meters of untreated or partially treated wastewater is dumped to the Mediterranean Sea. The political siege imposed by the state of Israel adds to the economic and environmental challenges (UN, 2012). Some information on the Gaza environmental issues is gleaned via interviews, focus groups and workshops on people's perceptions of environmental and other damage of wars and occupation. A good example of this is a report on the 2014 War on Gaza Strip that was funded by Europeans and funneled through PENGON (Safi, 2015).

Summary of threats

Other threats included overgrazing, lack of awareness, lack of law enforcement, desertification and climate change, animal hunting, fires, and cutting trees. Most people see that adjusting educational curricula at schools and universities to promote the environment are the way to raise awareness locally. But also they suggest raising awareness through social and mass media, hikes, law enforcement, and research. (survey 2021 by PIBS/EQA)

Institutional and legal deficiencies that affect all aspects of governance, including environmental protection and especially land-use planning and management (World Bank, 2008) include: Lack of and weak enforcement of legislation; Weak institutional capacities and capabilities of the public and private sector, non- governmental organizations and civil society organizations, and weak coordination mechanisms among them; Weak services and service delivery systems to stakeholders, including herders and farmers; Weak participation of different stakeholders in decision-making processes; Lack of information and reliable data; Lack of awareness among people, media, legislators and decision makers; Low interest and budget allocation from the Palestinian government and international communities to implement interventions aiming to combat desertification; Lack of proper national policies, strategies and commitments to combat desertification and lack of application of the proper incentives, and policy tools and instruments; Weak regional cooperation; and Ambiguity and overlap of responsibilities.

Implementation of the NBSAP: Please review the text currently displayed in your Biodiversity Country Profile on the Convention's Clearing House Mechanism and update it as necessary.

Limited implementation of the 1999 NBSAP was carried out relating to the subject of threats. It is partly related to limited resources, the political and occupation pressures (attacks and uprisings 2000-2005, 2006, 2008-2009, 2012, 2014, and 2021). The new NBSAP being worked on now will take into account all the lessons learned and develop mechanisms for response appropriate to both improved political situation or endurance of occupation for a decade or more. Below is a summary of where we are.

Table 4.5 Palestinian National Biodiversity Objectives per Fifth national report (EQA 2015) and adjustments past five years

1999 NBSAP Objectives	Global Strategic Plan Objectives (Aichi targets)	Related Aichi Targets	Percent of Progress to 2015	% for 2020
1. Conservation of State of Palestine's Biodiversity	Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society	1, 2, 3, 4	13%	25%
2. Sustainable use of State of Palestine's Biodiversity	Strategic Goal B: reduce the direct pressures on biodiversity and promote sustainable use	5, 6, 7, 8, 9, 10	22%	22%
3. Enhancement of local, skills knowledge, attitudes, and practices for biodiversity conservation & sustainable use	Strategic Goal C: Improve the status of biodiversity by Safeguarding, species ecosystems, and genetic diversity	11, 12, 13	10%	20%
4. Equitable sharing of biodiversity benefits in SP	Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services	14, 15, 16	5%	5%
5. Development of Palestinian institutional and human resource capacity in the field of biodiversity	Strategic Goal E: Enhance implementation through participatory planning, knowledge management & capacity building	17, 18, 19, 20	5%	20%

The integration of biodiversity values accelerated overall in line with both NBSAP and CBD Aichi Strategic goal A. and we propose that the new structures developed 2015-2020 will be important in moving forward even more. But this is limited by the Israeli occupation. It is possible to double the successes in conservation issues including biodiversity values integration if and when the occupation of the state of Palestine ends.

Table 4.6 Internal Targets from EQA (non-published).

Target	Progress
Target-1: **By 2022, Awareness campaigns and programs are implemented such that, the majority of Palestinian society become aware of and recognize the importance and values of biodiversity for conservation and sustainable use.**	50%
Target-2: **By 2022, Biological Diversity mainstreamed and incorporated into all national strategies and sectorial development plans, and in decision-making process.**	35%
Target-3: **By 2022, incentives and subsidies harmful to biodiversity has canceled and the development and application of positive incentives for biodiversity conservation and sustainable use has implemented.**	10%
Target-4: **By 2022, governmental and non- governmental institutions has adopted plans and measures to achieve sustainable production and consumption by 50 percent to ease the impact on biodiversity.**	25%
Target-5: **By 2022, Terrestrial protected areas and inland water areas, accounting for nearly 10% and the coastal and marine protected areas has reached 4% and linked to a national network of protected areas, which are representative of all the environmental and effective ecosystems and managed in a sustainable manner.**	25%
Target-6: **By 2022, the conservation status of the endangered species has improved by 50% through the preservation, conservation, propagation and development programs.**	15%
Target-7: **By 2022, the average loss of natural habitats and biodiversity, particularly habitats with high sensitivity has reduced by 50%.**	22%
Target-8: **By 2022, the efficiency of environmental ecosystems to provide ecological services has raised mainly for the adaptation to climate change and for combating desertification and the proportion of carbon uptake has increased by 50 % through preservation, conservation and the rehabilitation of degraded ecosystems.**	25%

Target-9: **By 2022, the state and trends of biodiversity and protected areas has evaluated, monitored, and linked to decision-making process.**	25%
Target-10: **By 2022, the traditional knowledge, practices, techniques, and traditional innovations related to sustainable use of biodiversity taken into account in policy development and national legislations.**	25%
Target-11: **By 2022. The national capabilities are able to protect, conserve biodiversity and natural genetic heritage and natural environments of the species.**	20%
Target-12: **By 2022, the pollution forms from all sources reduced to levels that do not damage or harm the delicate ecological systems functions, and the ecological services of biodiversity.**	20%
Target-13: **by 2022, all the exotic and invasive alien species, their tracks identified, and the methods of eradication and control and the plans were developed and implemented for the management and control of the priority species.**	15%
Target-14: **By 2022, 70% of the terrestrial and marine natural reserves, wetlands, forests and key biodiversity areas managed effectively and sustainably for the conservation of biodiversity.**	15%
Target-15: **By 2022, the action plans were developed and the implementation starts to reduce the effects of human activities on ecosystems and improve the resistance to climate change**	20%
Target-16: **By 2022, the national biodiversity strategy and action plan adopted by the government and all relevant institutions began to implement their programs at all levels of the state.**	Coming in 2022
Target-17: **By 2022, the financial resources allocated, the human adequate staff and the sufficient techniques specified for the application and effective implementation of the national biodiversity strategy and action plan at the national level.**	25%
Target-18: **By 2022, the Effective coordination and implementation of the international conventions on Biological Diversity has taken place.**	25%

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