



STATE OF PALESTINE

NATIONALLY DETERMINED CONTRIBUTIONS/

United Nations Framework Convention on Climate Change (UNFCCC)

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1. National Context

This document summarises the Nationally Determined Contribution (NDC) of the State of Palestine. The State of Palestine recently gained accession to the United Nations Framework Convention on Climate Change (UNFCCC). On the 17th of March 2016, it officially became the 197th party to the Convention and, on the 22nd of April 2016, signed and ratified the Paris Agreement which entered into force on the 4th of November 2016. While the State of Palestine's priority on climate change is adaptation, it is also committed to ensuring that its emissions pathway is in line with the objective of the UNFCCC to stabilise greenhouse gas emissions at a level that prevents dangerous anthropogenic interference with the climate system.

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. In addition, the State of Palestine also recently developed its National Adaptation Plan (NAP)², in accordance with the UNFCCC's Consultative Group of Experts guidelines for least developed countries, and on November 11th 2016 became the sixth country to have submitted their NAP to the UNFCCC. The period between joining the UNFCCC and submitting the INCR and NAP is less than eight months, highlighting the importance of climate change within the Palestinian national agenda.

The State of Palestine constitutes the Occupied Palestinian Territory, based on the borders of June 1967, and comprises the West Bank including East Jerusalem and the Gaza Strip, which are separated by Israel. The State of Palestine's population increased from 1.5 million in 1980 to 4.0 million in 2010 and is expected to reach 8.9 million by 2050. In addition to the 4 million Palestinians living in Palestine, more than 6.5 million Palestinians are refugees and living abroad and cannot exercise their right to return to their homes because of the Israeli Occupation. Nearly one-third of registered Palestinian refugees, more than 1.5 million people, live in 58 recognised Palestinian refugee camps in Jordan, Lebanon, the Syrian Arab Republic, and within the State of Palestine.

The country is under Israeli occupation, and Israeli settlements have been established throughout the West Bank including East Jerusalem. Consequently, the Palestinian Government does not have control over its own territory and natural resources, which are subject to systematic and widespread Israeli violations, and the Israeli occupation has a negative impact on the delivery of the Palestinian Government's environmental policies. The Gaza Strip has suffered from a siege and blockade imposed by Israel, for the past ten years, which has severely affected the viability of living conditions, decreased their resilience and reduced their adaptive capacities to the adverse impact of climate change.

The State of Palestine is particularly vulnerable to the impacts of climate change, with severe implications for its economy, living standards and environment. The NAP identifies a wide range of 'highly vulnerable' issues across 12 themes/sectors. Many of these issues have inter-connections

¹http://unfccc.int/files/national_reports/non-annex_i_parties/application/pdf/initial_national_communication_report_state_of_palestine.pdf

²http://unfccc.int/files/national_reports/non-annex_i_parties/application/pdf/national_adaptation_plan_state_of_palestine.pdf

more generally across themes/sectors, most notably, in relation to water, agriculture, food and energy. Israeli occupation, along with the illegal settlements regime, annexation and expansion Wall substantially reduces the State of Palestine's adaptive capacities in relation to many issues across all themes/sectors thereby compounding climate vulnerabilities. The NAP identifies and prioritises adaptation options in relation to all 'highly vulnerable' issues.

In an holistic effort to improve conditions, the Palestinian Government also developed a National Development Plan 2014-2016³ with policies and strategies designed to establish the sovereign state, consolidate its control over its natural resources, develop Area C⁴ (particularly in the Jordan Valley), and restore East Jerusalem and the Gaza Strip. The plan also signalled the State of Palestine's determination to boost its national economy, bolster its economic independence, and enhance the private sector's ability to build its productive capacity, its competitiveness and ability to create jobs for its people. The National Development Plan continues national endeavours to strengthen institutions, ensure financial stability and deliver quality public services efficiently and sustainably. Moreover, the Environment Quality Authority (EQA) led the preparation and development of the Environment Sector Strategy (2014-2016) with the vision of: "A protected, maintained and safe Palestinian environment that achieves sustainability of natural resources, under an independent Palestinian sovereignty." Sectoral strategies (2017-2022) have been developed for 21 sectors in total, including: water, agriculture, energy and waste among others. Three sectors were considered cross-cutting: environment, gender and Youth. These include strategic goals some of which are linked to climate change mitigation and/or adaptation. As such, the NDC builds upon the INCR, the NAP, and is in line with the National Development Plan and the recently developed sectoral strategies to achieve sustainable economic development in line with emissions reduction.

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). The State of Palestine's ability to mitigate and adapt to climate impacts will be crucial to the ability to achieve, by 2030, not only SDG 13 on combating climate change, but a number of other SDGs such as SDG 1 on ending poverty in all its forms, SDG 3 on good health and well-being, SDG 5 on gender equality, SDG 6 on clean water and sanitation, and SDG 7 on affordable and clean energy among others. Hence, implementing NDCs can support the achievement of the sustainable development goals across all sectors and levels of government.

³http://www.mopad.pna.ps/en/images/PDFs/Palestine%20State_final.pdf

⁴ The Oslo II Accord, formally entitled the 'Interim Agreement on the West Bank and the Gaza Strip of 1995', created three territorial zones in The West Bank: Area A, where the Palestinian Government has responsibility for public order and internal security; Area B, where the Palestinian Government assumes responsibility for public order for Palestinians, while Israel controls internal security; and Area C, where Israel maintains exclusive control. Area C covers 61% of the West Bank

The NDC has been developed by a multi-stakeholder engagement process building on the stakeholder engagement undertaken to develop the INCR and NAP and with high-level political endorsement by the Palestinian Government.

2. Mitigation

2.1 Mitigation contribution

Palestine intends to reduce its CO₂eq emissions as set out in Table 1, conditional on receiving international support in the form of finance, technology transfer and capacity building.

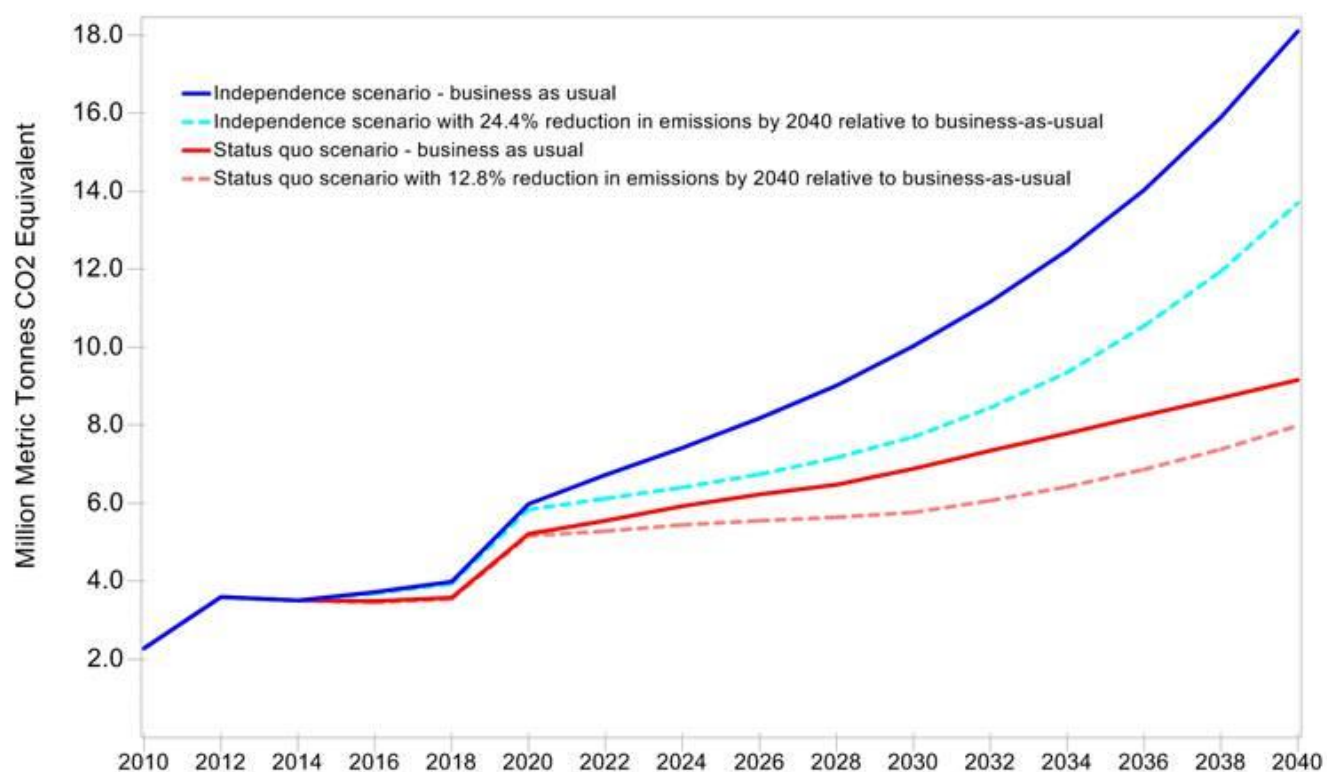
Table 1: The State of Palestine's conditional mitigation contribution

Independence	Status quo
24.4% by 2040 relative to business-as-usual	12.8% by 2040 relative to business-as-usual

Until independence is achieved, two scenarios are provided for the NDC:

- *Independence* scenario—by ending the Israeli occupation, 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.

Figure 1: The State of Palestine's conditional mitigation contribution



The State of Palestine will implement the mitigation actions set out in Table 2 below, conditional on receiving international support. Further information on the mitigation actions are provided in the State of Palestine's INCR.

Table 2: Mitigation actions to be implemented, conditional on receiving international support

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.

Mitigation action	Brief description of the action
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.

In addition, the State of Palestine commits to unconditionally undertake the mitigation actions set out in Table 3 below.

Table 3: Mitigation actions to be implemented unconditionally

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	Installation of a small-scale wastewater treatment plant powered by solar energy in Za'atara, Palestine, and evaluation of the feasibility of upscaling this technology in	2015-2017

⁵SUDEP involves improving the capacities of local authorities to develop and implement sustainable energy efficiency practices and renewable demonstration actions

Mitigation action	Brief description of action	Timescale for implementation
Projects	Central Asia	
Afforestation Project	Afforestation through: • reclamation of approximately 1200 dunums⁶ 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

2.2 Information to facilitate clarity, transparency and understanding

Table 4: Information to facilitate clarity, transparency and understanding

Information to facilitate clarity, transparency and understanding	
Period for implementation	
<i>Timeframe for implementation</i>	2040
Scope and coverage	
<i>Scope of gases included in the contribution</i>	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous oxide (N ₂ O).
<i>Sectors/sources covered by the contribution</i>	Energy; industrial processes and product use; agriculture, forestry and other land use; waste. Industrial processes and product use (IPPU) is not included in the mitigation measures as emissions from that sector are negligible.

⁶ 1 dunum= 0.1 hectare

<i>Geographies covered by the contribution</i>	All national territories are included, which are the West Bank, including East Jerusalem, and Gaza Strip. Emissions from illegal Israeli settlements on Palestinian land are not included.
Assumptions and methodological approaches	
<i>Methodology for emissions accounting</i>	2006 Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories.
<i>Global warming potentials</i>	Global warming potential 100 values (i.e. 100-year timescale) in accordance with the Intergovernmental Panel on Climate Change's (IPCC) Second Assessment Report.
<i>Approach for land use, land-use change and forestry emissions</i>	Agriculture, forestry and other land use emissions are accounted for in the Greenhouse Gas Inventory and these are included in the baseline scenarios. Palestine's mitigation contribution covers the agriculture and forestry section.
<i>Business-as-usual emissions in the target year (2040)</i>	18.1Mt CO ₂ eq in 2040 under independence scenario. 9.1Mt CO ₂ eq in 2040 under status quo scenario.
<i>Baseline projection methodology</i>	Palestine employs two fixed baselines for the two political scenarios set out above (independence; status quo).
<i>Projection methodology for low carbon scenarios</i>	The Long-range Energy Alternatives Planning (LEAP) System model was used to estimate projections. Please see Palestine's Initial National Communication Report for the assumptions used in the projections.
<i>Net contribution of International Market Based Mechanism</i>	Palestine does not rule out the use of international market-based mechanisms to achieve its NDC targets.

2.3 Fairness and ambition

The State of Palestine's emissions per person are extremely low. In 2011, there were 0.8tCO₂eq per capita per year⁷, forecasted to grow to 1.6 tCO₂eq per capita per year in 2040 under the independence scenario or 1.2 tCO₂eq per capita per year under the status quo scenario. This is significantly less than the global average of 7.58 tCO₂eq⁸percapita per year. Moreover, the State of Palestine's gross domestic product (GDP) per capita was approximatelyUS\$ 2,800 in 2011 and is forecast to be US\$ 9,400in 2040 under the independence scenario or US\$ 7,400 in 2040 under the status quo scenario. This is also significantly less than the global average of US\$ 10,400 GDP/capita in 2011⁹. However, despite the State of Palestine's small share of global greenhouse gas emissions and low level of economic development, the Palestinian Government is committed to making a fair and ambitious contribution to global efforts to limit emissions consistent with the objectives of the UNFCCC. The Palestinian Government reaffirms its belief in the principles of equity, and of common but differentiated responsibilities and respective capabilities.

Given that the State of Palestine is not a high emitter, and is very vulnerable to climate change impacts, the NDC is ambitious in putting forward a quantified emission reduction contribution. The State of Palestine's NDC is also ambitious in light of the country's challenging political circumstances. The Israeli occupation obstructs the State of Palestine's ability to implement adaptation and mitigation activities. It is difficult for the State of Palestine to have full control over its emissions profile, as it is almost entirely dependent on imported energy from Israel due to political and logistical factors. In addition, the occupation prevents the State of Palestine having control of its own borders in the West Bank, including east Jerusalem, and Gaza Strip, which impacts on Palestine's resilience to climate change. The occupation has also made information sharing and networking at a national level very difficult, impacting on the Palestinian Government's ability to address climate change challenges. The flow of information, cooperation and coordination between staff members that work on climate change in both the West Bank, including east Jerusalem, and Gaza Strip is hindered by road blocks, check points and the inability to move freely between both areas.

The NDC is also ambitious given that the State of Palestine has only been a party to the UNFCCC since March 2016. Despite being the newest State Party to the UNFCCC, in less than 9 months the State of Palestine has signed and ratified the Paris Agreement, developed and published its INCR and NAP, and submitted its NDC to the UNFCCC.

3. Adaptation

Adaptation to adverse impact of climate change is considered as the highest priority. The State of Palestine's NAP was approved by all relevant ministries in May 2016. All stages of Element A ('Lay the groundwork and address gaps') and Element B ('Preparatory elements') described in the

⁷These emissions are calculated for the West Bank (including East Jerusalem) and the Gaza Strip. These calculations do not include emissions from illegal Israeli settlements as the Palestinian Government has no direct control over the activities that cause these emissions, although they occur within the Occupied Palestine Territory.

⁸ Greenhouse gas time series 1990-2012 per capita emissions for world countries http://edgar.jrc.ec.europa.eu/overview.php?v=GHGts_pc1990-2012.

⁹<http://data.worldbank.org/indicator/NY.GDP.PCAP.CD>.

UNFCCC's NAP Guidelines for Least Developed Countries have been completed; in addition the NAP sets out a replicable approach for monitoring and evaluation of the adaptation actions in the NAP. The State of Palestine aims to maintain the NAP as a living document, and is intent on driving forward implementation of the NAP, subject to **securing appropriate international support**.

The NAP identifies 'highly vulnerable' issues in relation to the following 12 theme/sectors: agriculture, coastal and marine (Gaza Strip only), energy, food, gender, health, industry, terrestrial ecosystems, tourism (West Bank only –because Israel's occupation and blockade of the Gaza Strip prevents opportunities for tourism), urban and infrastructure, waste and wastewater, and water. Many of these issues have inter-connections more generally across themes/sectors, most notably, in relation to water, agriculture, food and energy. Israeli occupation substantially reduces the State of Palestine's adaptive capacities thereby compounding climate vulnerabilities. For example, Israeli occupation of the State of Palestine restricts availability of land and resources, freedom of movement, import and export of raw materials and products, and the development of domestic and industrial infrastructure. These limitations on the State of Palestine's adaptive capacities are most prevalent in the so-called Area C, which covers 61% of the occupied West Bank, and in the Gaza Strip.

The State of Palestine's particular circumstances mean that the NAP is focused on the implementation of immediate, near-future adaptation actions that address highly vulnerable themes/sectors under Israeli occupation. However, the NAP also gives limited consideration to medium- and long-term adaptation actions that could be taken if the Israeli occupation was resolved. The adaptation actions aim to reduce climate sensitivity or increase adaptive capacity in relation to each of the highly vulnerable issues across the 12 themes/sectors, and take into consideration national development goals.

Wherever possible, adaptation actions have been identified that are relevant to three future-climate scenarios for the State of Palestine that are representative of all projections considered in the Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report. Such actions will, therefore, be beneficial whichever of the scenarios comes to pass.

Under the most pessimistic scenario in the NAP, should emissions continue to increase with some reductions from historic level but breaching the 2°C target, the below impacts are expected:

- Temperature increases (by about 1.5°C by 2025, 2.5°C by 2055 and 4.5°C by 2090)
- Reduced cold periods and more warmer periods, both becoming more prominent over time
- Decreased rainfall overall (up to around 20% less by 2025, 15% by 2055 and 30% less by 2090), but also extended dry periods, reduced wet periods and heavier rainfall days. This presents an overall increase in drought risks, as well as an indication that the rare wettest days might become more frequent, especially in the West Bank, and hence potentially increase flood risks.

Table 5 below summarises the issues that are ranked as highly vulnerable to climate change for each of the themes/sectors. The complete vulnerability assessments for all themes/sectors in relation to the West Bank and the Gaza Strip are available on request from the Environment Quality Authority.

Table 5: Issues ranked as ‘Highly vulnerable’

Theme/sector	Highly vulnerable issue	
	West Bank	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	Groundwater supply; Groundwater quality; Flood management

Theme/sector	Highly vulnerable issue	Highly vulnerable issue
	West Bank	Gaza Strip
	infrastructure	

The adaptation actions in the NAP comprise management and operational strategies, infrastructural changes, policy adjustments or capacity-building. Some actions involve adjusting (climate-proofing) current activities, while others are new, or require major transformations in operations. Some are ecosystem-based, i.e. helping people adapt to the impacts of climate change through the conservation, sustainable management, and restoration of ecosystems. A full list of costed adaptation actions for each of the sectors is presented in the means of implementation section.

In addition, Palestine unconditionally commits to undertake the specific adaptation actions set out in Table 6 below. Many of these reflect adaptation actions that will be undertaken locally, but need to be scaled up and implemented more widely or currently under implementation across the State of Palestine, as set out in the NAP and summarised in see Table 9.

Table 6: Adaptation actions to be implemented unconditionally

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 irrigation by installing water tanks.	Ongoing
Rehabilitation of agricultural land (Salfit, Bethlehem, Hebron, Jenin)	Implemented by MOA	Ongoing
Land development and water resources project (Jenin, Nablus, Qalqilya, Tulkarem, Hebron)	- Increase water availability by constructing a 2,000 m³ capacity earthy pond - Improved irrigation scheduling by installing 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	Ongoing

Adaptation action	Brief description of action	Timescale for implementation
	(5,000- 10,000m³each) - constructing 15-170 cisterns(70m³capacity each) - rehabilitating 500 dunums¹⁰ of sloped terrain to minimise soil erosion	
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 70-100M³)	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

¹⁰ See footnote 6

Adaptation action	Brief description of action	Timescale for implementation
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

4. Planning processes

The implementation of the NDC will require effective governance to drive progress, ensure accountability, coordinate decision-making processes and maintain political will at all levels. This includes supporting sectors with the planning and implementation of mitigation and adaptation actions, the assessment and communication of financing and support needs (nationally and internationally), and monitoring, reporting and verification (MRV) related to NDC implementation. It will involve further mainstreaming of mitigation and adaptation within economic development, promoting mitigation and adaptation actions, improving cooperation among ministries, and mobilising support for mitigation and adaptation actions.

MRV of NDC implementation will include tracking the implementation of mitigation and adaptation activities, assessing the impacts (greenhouse gas and non-greenhouse gas) of mitigation and adaptation activities, as well as tracking climate finance (both national and international) flows. The State of Palestine aims to integrate the necessary MRV activities into existing processes and structures for international reporting to ensure an efficient and consistent approach. Palestine is in the process of determining the most appropriate process for MRV of NDC implementation and is intending to implement a robust MRV system.

The Palestinian Government has chosen the Environment Quality Authority to be the single national entity responsible for driving the implementation of the NDC, and reporting on progress on NDC implementation. The State of Palestine has a National Committee on Climate Change, which is a cross-ministerial expert advisory committee. Its aim is to support the Palestinian Government in the implementation and evaluation of its climate policies. It advises on where attention is required with regard to risks and on mitigation and adaptation needs. The National Committee on Climate Change, on behalf of the Palestinian Government, is responsible for preparing climate-related policies, and following decisions by the Cabinet, and monitoring implementation of these policies. The Environment Quality Authority will be given the responsibility to coordinate NDC implementation at the national level and between sectors.

5. Means of implementation

5.1 Mitigation

The mitigation actions proposed in this NDC can only be delivered with appropriate international support. Technology, capacity building and financial needs across mitigation are set out in Chapter 5 of the INCR, and summarised in Table 7 below. The total cost of implementing the mitigation actions set out in Table 7 is US\$ 10.6 billion.

Table 7: Type of international support required for mitigation actions

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	Finance

Mitigation action	Brief description of the action	Type of support needed
	hectares of forestland	

Further to Table 7, additional conditional mitigation actions have been identified since the publication of the INCR and are not included in the cost estimate above. These are presented in the table below.

Table 8: Additional conditional mitigation actions, identified since the publication of the INCR

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, which aims 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)

Sector	Action
	to improve fuel efficiency and reduce emissions

5.2 Adaptation

The total cost to implement the adaptation actions set out in the NAP is \$3.5 billion USD (targeting the highly vulnerable sectors only), with the cost per adaptation action per theme/sector further detailed in Table 9 below. The NAP has also identified for each adaptation action where technology or capacity (knowledge and skills) within the State of Palestine are required and the necessary steps required to enable their implementation, e.g. import of relevant technologies or capacity building.

Table 9: Cost and support needed for adaptation actions for 'highly vulnerable' themes/sectors

Theme/sector	Highly vulnerable issue	Adaptation action	Cost (US\$)	Type of support need
Agriculture (West Bank)	Irrigated vegetables	Enhance sustainable community-level irrigation schemes and infrastructure	19,400,000	Finance, capacity building
	Production of olives, grapes, stone fruits, rain-fed vegetables and field crops	Climate-smart agriculture	146,000,000	Finance, capacity building
	Irrigation water	Improve water-use efficiency and using alternatives water resources	140,000,000	Finance, capacity building, technology
	Grazing area and soil erosion	Land-use planning and management - greening, afforestation, and rangeland development	600,000,000	Finance, capacity building
	Production of olives, grapes, stone fruits, rain-fed vegetables, field crops and livestock	Agricultural disaster risk reduction and management (DRR/M)	88,000,000	Finance, technology, capacity building
	Livestock production	Increase the availability of animal feed (including plant and organic residues) at an affordable price	16,000,000	Finance, technology, capacity building
	Livestock production	Improve livestock-production pens	15,000,000	Finance, capacity building
Agriculture (Gaza strip)	Citrus, Olive production, Vegetable production, Employment	Climate-smart agriculture: Management of crop production systems including soil and water resources for better environmental sustainability along with improved economic profitability for farmers	40,400,000	Finance, technology, capacity building
	Irrigation water	Improve water-use efficiency and using	14,270,000	Finance, technology, capacity

Theme/sector	Highly vulnerable issue	Adaptation action	Cost (US\$)	Type of support need
		alternatives water resources		building
	Cost of agricultural production	Establishment of farmers' support (subsidies, awareness training programs)	85,000,000	Finance, technology
	Cost of agricultural production	Agricultural disaster risk reduction and management (DRR/M)	44,000,000	Finance, technology, capacity building
	Livestock production	Improve livestock-production pens	15,000,000	Finance, capacity building
Coastal and Marine (Gaza strip)	Coastal agriculture	Rain-water harvesting	500,000	Finance
	Condition of beaches	Construction of detached breakwaters	10,000,000	Finance
	Coastal agriculture	Introduction of new saline-tolerant crops	500,000	Finance, technology, capacity building
	Fishing/fisheries	Enlargement of the fishing area and improve fishing equipment	90,000,000	Finance
	Condition of beaches	Provision of beach nourishment, reclamation and beach drift rehabilitation	10,000,000	Finance, technology, capacity building
	Condition of beaches	Provision of laboratories and equipment for data collection and analysis	2,000,000	Finance, technology, capacity Building
	Fish catch	Fish packaging/preservation industry	1,000,000	Finance, technology, capacity building
Energy (West Bank)	Domestic/local energy production	Generation of solar electricity for medium-large scale commercial and industrial application	99,548,000	Finance, capacity building
	Energy imports	Use of renewable energy such as solar to reduce imported energy.	106,048,000	Finance, capacity building

Theme/sector	Highly vulnerable issue	Adaptation action	Cost (US\$)	Type of support need
	Domestic/local energy production	Implement energy efficiency measures to reduce consumption, mainly for commercial and industrial application	10,500,000	Finance, technology, capacity building
	Energy imports	Implement energy efficiency measures to reduce consumption and hence imported energy	13,500,000	Finance, technology, capacity building
	Condition of infrastructure	Electricity grid upgrading	16,250,000	Finance, capacity building
	Condition of infrastructure	Building fossil-fuel storage facilities	21,200,000	Finance, technology, capacity building
Energy (Gaza Strip)	Total energy imports	Additional supply of energy from neighbouring countries	10,000,000	finance, technology
	Total domestic energy production	Enhancing the equipment and efficiency of the Gaza Power Plant (GPP)	10,000,000	Finance, capacity building
	Total energy imports	Use of renewable energy, such as solar, to reduce imported energy.	50,000,000	Finance, capacity building
	Total domestic energy production	Implement energy efficiency measures to reduce consumption and hence imported energy	6,000,000	Finance, technology, capacity building
	Condition of infrastructure	Electricity grid upgrading	100,000,000	Finance, capacity building
Food (West Bank)	Domestic food prices	Enhancing agricultural value chain and improving infrastructure for livestock-production	227,500,000	Finance, capacity building
	Domestic food prices	Greenhouse management	25,000,000	Finance
	Domestic food prices	Construction of large-scale cold storage	33,000,000	Finance, capacity building
	Imported food prices	Construct large-scale steel silos for grain to enable import and storage during periods when	4,000,000	Finance, technology, capacity building

Theme/sector	Highly vulnerable issue	Adaptation action	Cost (US\$)	Type of support need
		prices on the international markets are low		
Food (Gaza Strip)	Domestic food prices	Enhancing agricultural value chain and improving infrastructure for livestock-production	121,250,000	Finance, capacity building
	Domestic food prices	Greenhouse management	12,500,000	Finance
	Domestic food prices	Construction large-scale cold storage	15,000,000	Finance, capacitybuilding
	Imported food prices	Construct large-scale steel silos for grain to enable import and storage during periods when prices on the international markets are low	5,000,000	Finance, technology, capacity building
Gender (West Bank)	Major diseases related to water, sanitation, and food	Increasing the awareness of people, particularly women, in water-poor areas of measures they can take to help prevent major diseases related to water, sanitation, and food	2,200,000	Finance, capacity building
Gender (Gaza Strip)	Major diseases related to water and sanitation	Increasing the awareness of people, particularly women, in water-poor areas of measures they can take to help prevent major diseases related to water, sanitation, and food	3,200,000	Finance, capacity building
	Employment and gender	Supporting improvements in efficient use of water in women's private small-scale agricultural projects	3,000,000	Finance, capacity building
	Food security and gender	Encouraging women to use their house gardens to produce food	3,200,000	Finance
Health (West Bank)	Major diseases related to water, sanitation, and food	Development of water, food and sanitation monitoring and safety systems using high technology	5,850,000	Finance, technology, capacity building

Theme/sector	Highly vulnerable issue	Adaptation action	Cost (US\$)	Type of support need
	Major diseases related to water, sanitation, and food	Training health professionals and increasing the awareness of people, particularly women, in water-poor areas about measures they can take to help prevent major diseases related to water, sanitation, and food	2,680,000	Finance, capacity building
Health (Gaza Strip)	Major diseases related to water, sanitation, and food	Training health professionals and increasing the awareness of people, particularly women, in water-poor areas about measures they can take to help prevent major diseases related to water, sanitation, and food	850,000	Finance, capacity building
	Major diseases related to water, sanitation, and food	Development of water, food and sanitation monitoring and safety systems using high technology	2,900,000	Finance, technology, capacity building
Industry (West Bank)	Energy supply	Providing reliable electricity supply	29,400,000	Finance, capacity building
	Value of raw materials imported	Replace imported raw materials with local materials whenever possible	28,000,000	Finance, technology, capacity building
	Infrastructure	Improve water supply through wastewater collection and treatment systems	58,000,000	Finance, technology, capacity building
	Energy demand	Reducing energy consumption through introduction of modern production technologies	31,000,000	Finance, technology, capacity building

Theme/sector	Highly vulnerable issue	Adaptation action	Cost (US\$)	Type of support need
	Energy supply	Building fossil-fuel storage facilities	25,400,000	Finance, technology, capacity building
Industry (Gaza Strip)	Value of raw materials exported	Improve handling, fumigation, packaging, and storage techniques for raw materials intended for export	1,000,000	Finance, capacity building
	Employment	Capacity building to enable industries to adapt to climate change	4,000,000	Finance, technology, capacity building
	Value of industrial products exported	Rehabilitation of industrial facilities	30,000,000	Finance, capacity building Finance, Capacity Building
	Energy demand	Conducting energy audits in order to increase industries' use of energy efficiency measures	5,500,000	Finance, capacity building Finance, Capacity Building
	Value of industrial products exported	Provision of suitable storage facilities for industrial products intended for export	18,000,000	Finance
	Energy demand	Rehabilitation and maintenance of industrial equipment	9,000,000	Finance, capacity building
	Energy supply	Providing reliable electricity supply	10,000,000	Finance, capacity building
Terrestrial ecosystems (West Bank)	Habitat connectivity	National network of protected areas, including 50 protected areas and 51 biodiversity hotspots	12,000,000	Finance, technology, capacity building

Theme/sector	Highly vulnerable issue	Adaptation action	Cost (US\$)	Type of support need
Terrestrial ecosystems (Gaza Strip)	Habitat connectivity in Wadi Gaza	National network of protected areas, including Wadi Gaza and 3 biodiversity hotspots	1,400,000	Finance, technology, capacity building
Tourism (West Bank)	Condition of cultural heritage	Identify, design and implement flood management schemes for cultural heritage sites, where appropriate	4,800,000	Finance
	Condition of cultural heritage	Identify, design and implement flood management schemes for eco-tourist attractions, where appropriate	4,800,000	Finance
Urban and infrastructure (West Bank)	Urbanization	Promoting green buildings	10,000,000	Finance
	Urbanization	Rehabilitation of resilient road infrastructure	21,000,000	Finance
Urban and infrastructure (Gaza Strip)	Building conditions	Promoting green buildings	12,600,000	Finance
	Urbanization	Rehabilitation of resilient road infrastructure	10,000,000	Finance
Waste and wastewater (West Bank)	Waste management	Improving waste collection system	34,250,000	Finance, technology, capacity building
	Waste management	Improve management of leachate from landfill sites	5,000,000	Finance, technology, capacity building

Theme/sector	Highly vulnerable issue	Adaptation action	Cost (US\$)	Type of support need
	Waste management	Reduce, re-use, recycle	8,000,000	Finance, technology, capacity building
Waste and wastewater (Gaza Strip)	Waste management	Improving waste collection system	12,000,000	Finance, technology, capacity building
	Waste management	Improve management of leachate from landfill sites	2,000,000	Finance, technology, capacity building
	Waste management	Reduce, re-use, recycle	2,000,000	Finance, technology, capacity building
Water (West Bank)	Condition of infrastructure	Rehabilitate water sources: wells, canals and springs	4,400,000	Finance, capacity building
	Condition of infrastructure	Control of leakage from distribution systems	16,500,000	Finance, capacity building
	Groundwater supply	Allocate transboundary water resources equitably and reasonably between Israel and the State of Palestine	117,600,000	Finance
	Groundwater supply	Enhance the use of additional and alternative water resources for non-domestic purposes	152,000,000	Finance
	Flood management	Develop and improve storm-water systems and	20,800,000	Finance

Theme/sector	Highly vulnerable issue	Adaptation action	Cost (US\$)	Type of support need
		drainage infrastructure		
Water (Gaza Strip)	Groundwater supply	Increase share of imported water	1,000,000	Finance
	Groundwater supply	Enhance the use of alternative water resources for non-domestic purposes	61,000,000	Finance
	Groundwater quality and supply	Build a large desalination plant for Gaza	510,000,000	Finance, capacity building
	Flood management	Develop and improve storm-water systems and drainage infrastructure	10,200,000	Finance

Further to Table 9, additional conditional adaptation actions have been identified since the publication of the NAP and have not been included in the cost estimates above. These are presented in Table 10 below:

Table 10: Additional conditional adaptation actions, identified since the publication of the NAP

Sector	Action
Urban and infrastructure	Support for dangerous cliffs through retaining walls and trenches.
Cross-cutting	The establishment of an early warning system, including utilising mobile phone applications.