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The State of Palestine's Nationally Determined Contribution (NDC) implementation plans: Water – Water treatment and conservation

Report for Palestine's Environment Quality Authority and the Islamic Development Bank under the NDC Partnership's Climate Action Enhancement Package



Environment Quality
Authority



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List of abbreviations

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AFD	French Development Agency (Agence Francaise de Developpment)
EIB	European Investment Bank
EQA	Environment Quality Authority
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
FCDO	Foreign Commonwealth and Development Office
GCF	Green Climate Fund
KfW	KfW Development Bank
MoA	Ministry of Agriculture
MoWA	Ministry of Women's Affairs
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
NGEST	North Gaza Emergency Sewage Treatment
NGO	Non-Governmental Organisation
PSI	Palestine Standards Institution
PWA	Palestinian Water Authority
UNOPS	United Nations Office for Project Services
WB	World Bank

1 Introduction

1.1 Overview

This plan for “**Water treatment and conservation**” is intended to enhance Palestine’s opportunities to access climate finance and thereby facilitate successful implementation and delivery of Palestine’s Nationally Determined Contribution (NDC). Details of the methodology used to develop this plan are provided in Annex 1.

The plan lays out steps to deliver the following NDC action that is conditional on being able to secure international funding:

- Enhance the use of additional and alternative water resources for non-domestic purposes in both the West Bank and Gaza Strip.

This plan seeks to increase water availability in Palestine by treating and re-using wastewater and by harvesting rainwater. This is to be achieved through completion of 11 activities, each contributing to the following targets that align with the NDC actions:

- 70% of the treated wastewater in large-scale wastewater treatment plants in the West Bank and Gaza are re-used by 2030
- 7 MCM of rainwater in the West Bank is harvested by 2032.

The indicative total cost of achieving these targets is 198 million USD. Taking national contributions into account, there is a total funding gap of 176 million USD. Achieving the targets will provide considerable adaptation benefits for Palestine by reducing the sensitivity of the water sector to climate change through increasing the amount of water available for consumption from alternative sources. There is strong government support to undertake these activities, which feature in national and sectoral strategies.

1.2 Geographical scope

Activities in this NDC implementation action plan are an equal priority for the whole of the Occupied Palestinian Territory, i.e. the West Bank, including East Jerusalem, and the Gaza Strip. However, the consequences of Israel’s military actions during May 2021 have major implications for the water sector, related infrastructure and the capacity of the Palestinian Water Authority (PWA) to provide services to the Palestinian people living in Gaza. As this plan was developed in the months immediately prior to Israel’s military actions, there is an urgent need to re-assess the water sector’s needs for rehabilitation before implementing specific activities in Gaza. Hence, the activities laid out may need to be revisited to address resultant damage to the infrastructure.

2 Relevance of the GCF Country Programme

The Green Climate Fund (GCF) Country Programme includes a priority project for “Addressing climate-related water scarcity through the enhancement of water resources.” This is to be achieved through several outputs seeking to improve the supply of water (including recycled wastewater and harvested rainwater), one of which is particularly

relevant to this plan: “**improv[e] water supply and wastewater systems (e.g. collection and treatment)**”¹.

3 Reasons for prioritisation of NDC actions

The NDC action that can be implemented through this plan seeks to enhance the use of additional and alternative water resources. National stakeholders scored the relevance and feasibility of the actions based on: the extent to which the Government’s existing national and sectoral policies, strategies and plans already acknowledge their importance (High = 10, 5, 0 = Low); their adaptation and mitigation benefits (Very positive = 10, 5, 0, -5, -10 = Very negative) and the capacity and technology available to achieve them (High = 5, 2.5, 0 = Low).

The capacity scores reflect that the activities in this plan are not currently being implemented, although this plan aims to increase the capacity available, as necessary, to address constraints. The results are shown in Table 1.

Table 1 Priority scores for NDC action

NDC action	Government support	Adaptation benefits	Mitigation benefits	Capacity available	Technology available	Total
Enhance the use of additional and alternative water resources for non-domestic purposes	10	10	0	5	5	30

These scores draw upon and are justified by information in the following sub-sections that address each of the priority criteria.

3.1 Government support

Specific targets for re-using treated wastewater and harvesting rainwater are featured in the National Water Policy 2013 – 2022², the sectoral strategic plan of PWA, which aims to “develop additional quantities of water from non-conventional water resources without infringing upon Palestinian Water Rights”³.

¹Climate Resilient Transformation with the Green Climate Fund (2019), p.72. Accessible [here](#).

²“The National Water Policy and Strategy provide the planning and management framework necessary for the protection, conservation, sustainable management and development of water resources and for the improvement and sustainable management and provision of water supply and wastewater services and related standards in the Palestinian Territories.”

³Palestinian Water Authority, *National Water Policy and Strategy* (2013), p.14. Accessible [here](#).

The National Agricultural Sector Strategy 2017-2022 also highlights the importance of rainwater harvesting, which is another type of alternative and non-conventional water resource.⁴

3.2 Benefits for adaptation to climate change

Future climate scenarios for Palestine project an increase in temperature and a decrease in average annual rainfall, translating into an increase in the risk of drought. The wettest days may also become more frequent, leading to an increased risk of flood.⁵

These events and slow-onset changes are expected to cause a decrease in the availability of water resources, while simultaneously leading to an increase in the demand. Efforts to meet this demand may lead to a reduction in groundwater quantity, which would damage ecosystems and soil health. The quality of water resources may also reduce as a result of runoffs following heavy rain events and floods. This may lead to contamination of water and food resources, and subsequent impacts on people's health.

Using alternative water resources, such as treated wastewater and rainwater, reduces demand pressure on traditional water resources, such as groundwater and surface water, ensuring a stable source of water for human consumption and for ecosystems to function.

3.3 Benefits for mitigating climate change

No mitigation benefits were identified for this NDC action. However, building and operating wastewater treatment plants may lead to increases in greenhouse gas emissions. Rainwater harvesting will have no impact on greenhouse gas emissions.

3.4 Capacity available

The capacity, knowledge and skills for treating wastewater is available in Palestine. Several wastewater projects are already being undertaken at both local and national scales. Where necessary, consulting engineers can assist. For example, the PWA can commission international engineering firms to implement joint ventures with them for the collection, treatment and re-use of wastewater.

The capacity, knowledge and skills for rainwater harvesting is also available in Palestine. A Master Plan for rainwater harvesting in the West Bank has already been initiated by PWA. Local engineering firms have the knowledge and skills to implement the Master Plan, either by themselves or jointly with international firms.

3.5 Technology available

Where possible, re-use and harvesting projects will make use of existing technologies deployed in Palestine for wastewater treatment and rainwater harvesting:

- Several wastewater treatment plants have recently been established. In Tubas, for example, a wastewater treatment plant (including two reservoirs and a conveyancing system) has been operational since 2020.

⁴Ministry of Agriculture, *National Agricultural Sector Strategy* (2016), p.46. Accessible [here](#).

⁵ State of Palestine Environment Quality Authority (2016). *National Adaptation Plan* p.109-110. Accessible [here](#).

- The necessary equipment and technology for rainwater harvesting is already available in Palestine. The construction of small dams is achievable through local construction firms and will not require equipment to be imported.

4 Gender mainstreaming

4.1 Rationale for mainstreaming gender in this plan

The impacts of climate change are not gender neutral.⁶ Globally, women and girls are disproportionately affected by the impacts of the climate crisis, as existing vulnerabilities are intensified and intersect with a range of social, economic and political inequalities.⁷ A business-as-usual approach is likely to exacerbate existing inequalities and limit the opportunities for gender-sensitive and, where appropriate, gender-responsive adaptation actions that may improve gender equality.

At the UNFCCC's 25th Conference of the Parties in 2019, the Enhanced Lima Work Programme on gender and its gender action plan acknowledged the need for gender mainstreaming through all relevant targets and goals. It noted that gender-responsive implementation of climate policy and action can raise ambition, enhance gender equality, and promote a just transition of the workforce.⁸ Integrating gender equality into development leads to better outcomes in terms of economic efficiency, productivity and policy choices.⁹ Gender responsive solutions can help to tackle poverty and inequality while providing better community representation and technical solutions.¹⁰

4.2 Gender mainstreaming in this plan

All activities and targets under this plan have been reviewed by a team of gender experts, including a representative of the Ministry of Women's Affairs (MoWA). Activities identified as "gender-relevant" were devised to ensure that they are at least gender-sensitive¹¹ and at best gender-transformative.¹² More specifically, this implementation plan addresses the following gender issues identified in the water sector:

⁶Toolkit for a Gender-Responsive Process to Formulate and Implement National Adaptation Plans (NAPs) (2019), p.2. Accessible [here](#).

⁷Climate change, agriculture and gender in Gaza: Assessing the implications of the climate crisis for smallholder farming and gender within olive and grape value chains in Gaza (2020), p.5. Accessible [here](#).

⁸Report of the Conference of the Parties on its twenty-fifth session, held in Madrid from 2 to 15 December 2019 (2019), p.6-15. Accessible [here](#).

⁹World Development Report 2012: Gender Equality and Development (2012). p.3-6. Accessible [here](#).

¹⁰Implementation of gender-responsive climate action in the context of sustainable development (2016). Accessible [here](#).

¹¹Gender-sensitive programmes and policies are Level 3 in the WHO Gender Responsive Assessment Scale, which is defined as "Considers gender norms, roles and relations; Does not address inequality generated by unequal norms, roles or relations; Indicates gender awareness, although often no remedial action is developed". Accessible [here](#).

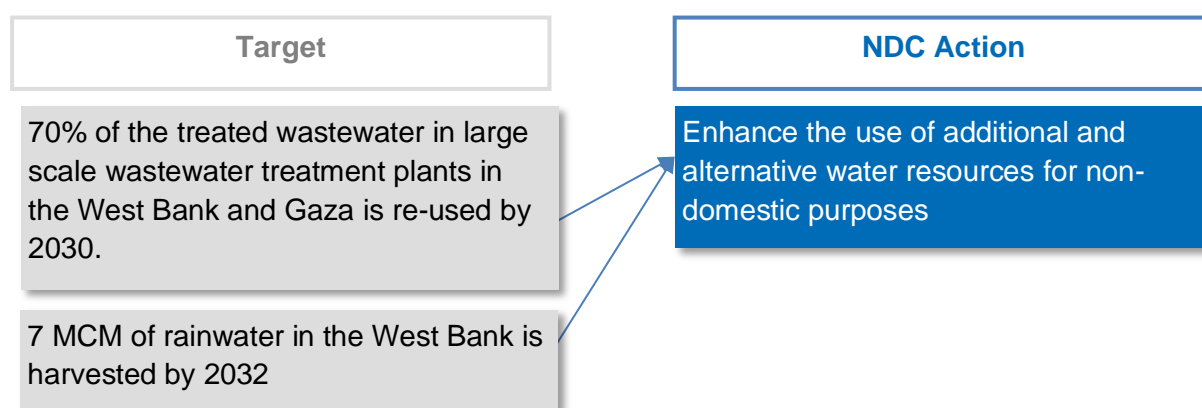
¹²Gender-transformative programmes and policies are Level 5 in the WHO Gender Responsive Assessment Scale, which is defined as "Considers gender norms, roles and relations for women and men and that these affect access to and control over resources; Considers women's and men's specific needs; Addresses the causes of gender-based health inequities; Includes ways to transform harmful gender norms, roles and relations; The objective is often to promote gender equality; Includes strategies to foster progressive changes in power relationships between women and men" Accessible [here](#).

- Women should be exposed to more sustainable practices in water management and be able to voice their specific interests and concerns relating to water use, quality and access. Hence, they should be represented in water users’ associations, which benefit from the implementation of schemes for wastewater collection and re-use.
- Women are usually active in water harvesting for agricultural production. Therefore, training will be targeted to women, so that they can be introduced to new knowledge and technologies.

5 Activities

Two targets were set by national stakeholders to facilitate implementation of this plan and achieve the prioritised NDC action, as outlined in Figure 1.

Figure 1 Targets for water conservation



In total, 11 activities were identified to achieve these targets. They are listed in Figure 2, and further details are provided in the subsequent sections.

Figure 2 Summary of activities to enhance the use of additional and alternative water resources

Enhance the use of additional and alternative water resources for non-domestic purposes	
70% of the treated wastewater in large-scale wastewater treatment plants in the West Bank and Gaza are re-used by 2030.	
Updating the enabling administrative and legal environment for wastewater re-use	0.051m USD (total) .004m USD (gap)
Implementing a re-use scheme in Al-Bireh and Al-Awja	9.500m USD (total) 9.009m USD (gap)
Implementing a re-use system from Nablus West to Jericho or Jenin	20.394m USD (total) 19.385m USD (gap)
Implementing wastewater collection, treatment and re-use for North East Ramallah villages	40.000m USD (total) 39.982 USD (gap)
Implementing a wastewater treatment plant and re-use system for Tulkarem	40.689m USD (total) 34.060m USD (gap)
Implementing a re-use system to transport treated wastewater from Hebron to Arab Al-Frejat and Masafer Yatta	11.144m USD (total) 9.710m USD (gap)
Completing the implementation of the re-use project in Tubas	1.668m USD (total) 1.510m USD (gap)
Re-using treated wastewater for agricultural irrigation in the Southern Gaza Strip	19.000m USD (total) 18.255m USD (total)
Re-using treated wastewater for agricultural irrigation in North Gaza Emergency Sewage Treatment (NGEST), Phase 2	18.760m USD (total) 17.810m USD (gap)
161.201m USD (total) 149.756m USD (gap)	
Target	
7 MCM of rainwater in the West Bank is harvested by 2032	
Building dams for water harvesting in the West Bank	20.000m USD (total) 19.976m USD (gap)
Building agricultural ponds and other harvesting structures	16.789m USD (total) 3.210m USD (gap)
36.789m USD (total) 23.186m USD (gap)	
Target	
NDC Action	

5.1 Activities to re-use the treated wastewater

The current amount of wastewater reused in the West Bank is 2MCM (2020). National stakeholders have identified the specific activities that need to be undertaken to achieve this plan's target and increase the amount of wastewater from large-scale wastewater treatment plants that is re-used. Activities to achieve the target are listed below:

1. Updating the enabling administrative and legal environment for wastewater re-use

Existing re-use standards can only be achieved with high-cost treatment, making re-use unsustainable at present. Hence, this activity involves revising existing standards and bylaws to make them more applicable to Palestine's conditions. Specifically, this activity will include:

- Updating the Sludge-Use of Treated Sludge and Sludge Disposal (PS 898-2010), established by the Palestine Standards Institution (PSI)
- Updating the Bylaw-House and Facilities' Connection System to Public Sewage Network, established by Cabinet resolution No. 16/2013
- Updating the Technical Regulation-Treated Sludge for Agricultural Re-use (TS 59/2015), established by the PSI.

2. Implementing a re-use scheme in Al-Bireh and Al-Awja

The feasibility study for this activity was completed in 2015 and funded by the European Union (EU). It will involve the building of a conveyancing system to transport treated wastewater from Al-Bireh (point of generation) to Al-Awja (point of re-use), as well as building a pool reservoir and re-use scheme. Importantly, this activity has been approved by Israeli and is awaiting funding.

The preliminary study and design of the system has already been conducted. Hence, to implement the scheme, the following sub-activities will be undertaken:

a. Building works

The re-use scheme requires the construction of a pipeline to convey 7,000 m³/day of treated wastewater from Al-Bireh Wastewater Treatment Plant to Al-Awja through 300 mm ductile pipeline with two cascades and a pool of 30 km in length.

Additionally, a 50,000 m³ pool reservoir and re-use scheme will be installed for 2,500 dunums to transport the water to the re-use sites (i.e. farms).

b. Capacity-building activities

To ensure the sustainability of the re-use scheme, the capacity of users will be developed through:

- Establishing a farmers' association, ensuring that women are represented and provided with opportunity to voice their interests and concerns relating to water use, quality and access
- Training farmers on treated wastewater re-use.

c. Operation and maintenance of the conveyancing system, pool reservoir and re-use scheme

Maintenance work will be performed by the farmers' association to ensure that the system is sustainable. This will involve the cleaning of pipelines, manholes and

laterals, preventive maintenance and the replacement of defective parts and accessories.

3. Implementing a re-use system from Nablus West to Jericho or Jenin

In 2018, AECOM completed a feasibility study for this activity, funded by the United States Agency for International Development. The system for conveying water for re-use will transfer 60% of treated wastewater (2.7 MCM/year) from Nablus West wastewater treatment plant in Dier Sharaf to Jericho or Jenin. This will enable the distribution of 7,000 m³/day of wastewater for re-use. Hence, implementation of this activity requires:

a. Designing the conveyance system to transport the excess treated wastewater from Nablus West to Jericho or Jenin.

This involves surveying routes, soil testing, preparing bidding documents and developing an environmental and social impact assessment study.

b. Building works

This re-use scheme requires the construction of a 22 km conveyance system to transport the excess treated wastewater from Nablus West to Jericho or Jenin, and building the additional manholes, pool reservoir, booster pumping station and re-use scheme.

c. Capacity-building activities

To ensure that the re-use scheme can be sustained, the capacity of users will be developed through:

- Establishment of a farmers' association, ensuring that women are represented and provided with opportunities to voice their interests and concerns relating to water use, quality and access
- Training farmers on treated wastewater re-use.

d. Operation and maintenance of the conveyancing system, pool reservoir and re-use scheme

Maintenance work will be performed by the farmers' association to ensure that the system is sustainable. This will involve the cleaning of pipelines, manholes and laterals, preventive maintenance and the replacement of defective parts and accessories.

4. Implementing wastewater collection, treatment and re-use for North East Ramallah villages

The feasibility study for North East Ramallah Villages Wastewater Collection and Treatment System was drafted in July 2020 and financed by FEMIP Trust Fund/CAMENA (European Investment Bank, Department for International Department and UKaid). The subsequent implementation of this activity requires:

a. Designing the wastewater collection, treatment and re-use system

This will require designing collectors, networks and a wastewater treatment plant.

b. Building works

The system requires the construction of sewage systems, manholes, treatment plant and conveyancing systems. Sewage systems must be built to the following dimensions: 15,685 m of 8-inch diameter, 11,306 m of 10-inch diameter, 656 m of 12-

inch diameter and 4,366 m of 14-inch diameter. PWA will commission an international engineering firm to construct the treatment plant and conveyancing systems as a joint venture. The design flow for the wastewater treatment plant is 6,000 m³/day.

c. Capacity-building activities

To ensure that the re-use scheme can be sustained, the capacity of users will be developed through:

- Establishment of a farmers' association, ensuring that women are represented and provided with opportunities to voice their interests and concerns relating to water use, quality and access
- Training farmers on treated wastewater re-use.

d. Operation and maintenance of the system

Maintenance work will be performed by a Joint Service Council¹³ (JSC). This activity will involve the cleaning of pipelines, manholes and laterals, preventive maintenance and the replacement of defective parts and accessories.

5. Implementing a wastewater treatment plant and re-use system for Tulkarem

This activity involves:

a. Updating the current feasibility study

The feasibility study for this activity was completed in 2010. It requires updating in order to accommodate the increase in wastewater and to reflect the consensus reached with the Israelis for this plant.

b. Building works

Building works required under this activity include:

- Building primary treatment and biological treatment systems, which will allow 2.3 MCM/year of wastewater to be treated
- Constructing a 22 km conveyancing system, as well as multiple water tanks, a booster pumping station, an irrigation water network and associated facilities. This will allow 2.3 MCM/year of the treated wastewater to be transferred from Tulkarem wastewater treatment plant to South Jenin (Yabad and Araba).

c. Capacity-building activities

To ensure that the re-use scheme can be sustained, the capacity of users will be developed through:

- Establishing a farmers' association, ensuring that women are represented and provided with opportunities to voice their interests and concerns relating to water use, quality and access
- Training of farmers on treated wastewater re-use.

d. Operation and maintenance

Maintenance will be performed by the farmers' association and will involve the cleaning of pipelines, manholes and laterals, preventive maintenance and

¹³ The JSC is formed under the law for all projects that requires joint implementation by several community and villages. Organisations, municipalities, and local governments combine their resources to plan, implement, and maintain a project.

replacement of defective parts and accessories. Operation and maintenance activities will include

- Operation and maintenance of the wastewater treatment plant
- Operation and maintenance of the conveyance system to ensure sustainability.

6. Implementing a re-use system to transport treated wastewater from Hebron to Arab Al-Frejat and Masafer Yatta

The wastewater treatment plant in Hebron is currently under construction, with co-financing from the French Development Agency, EU and World Bank. Subsequent activities required for designing and implementing the re-use system from this plant are:

a. Designing the re-use system

This involves surveying routes, soil testing, preparing bidding documents and developing an environmental and social impact assessment study.

b. Building works

The re-use system requires construction of a 30 km conveyancing system, booster pumping station, pool reservoir and re-use scheme. This activity will allow 22,500 m³/day of treated wastewater to be transported to Arab Al-Frejat and Masafer Yatta for re-use.

c. Capacity-building activities

To ensure that the re-use scheme can be sustained, the capacity of users will be developed through:

- Establishing a farmers' association, ensuring that women are represented and provided with opportunities to voice their interests and concerns relating to water use, quality and access.
- Training of farmers in the re-use of treated wastewater.

d. Operation and maintenance of the re-use system

Operation and maintenance of the wastewater treatment plant will be performed by the farmers' association and will involve the cleaning of pipelines, manholes and laterals, preventive maintenance and the replacement of defective parts and accessories.

7. Completing the implementation of the re-use project in Tubas

The wastewater treatment plant in Tubas has been operational since 2020, with part of the re-use scheme already constructed (two reservoirs of 500 m³ each and a 1,200 m conveyancing system). The plant currently has a capacity of 4,200 m³/day. To complete the re-use scheme, a local farmers' association needs to be established, and a disinfection system and laterals need to be installed. Implementation of this activity will subsequently involve:

a. Installing disinfection system and laterals

A disinfection system and laterals will be constructed to complete the re-use scheme.

b. Capacity-building activities

To ensure that the re-use scheme can be sustained, the capacity of users will be developed through:

- Establishing a farmers' association, ensuring that women are represented and provided with opportunities to voice their interests and concerns relating to water use, quality and access
- Training of farmers in the re-use of treated wastewater.

c. Operation and maintenance of the re-use system

Ongoing maintenance will be performed by the farmers' association to ensure that the re-use system is sustainable. Operation costs will include the salary of workers and usage of electricity, while maintenance will involve the cleaning of pipelines, manholes and laterals, preventive maintenance, the replacement of defective parts and accessories, and chlorine for disinfection.

8. Re-using of treated wastewater for agricultural irrigation in the Southern Gaza Strip

a. Building works

Building the system will involve the construction of two reservoirs with a volume of 5,000 m³ each, a total of 30 recovery wells and booster pumping stations, in addition to 50 km of mains and submains. This is anticipated to lead to the re-use of 26,000 m³/day of wastewater.

b. Operation and maintenance of the system

Operation and maintenance will be performed by the PWA to ensure that the system is sustainable. Operational costs will include the salary of workers and usage of electricity. Maintenance will involve the cleaning of pipelines, manholes and laterals, preventive maintenance, the replacement of defective parts and accessories, and chlorine for disinfection.

9. Re-using of treated wastewater for agricultural irrigation in North Gaza Emergency Sewage Treatment (NGEST), Phase 2

This activity will involve the implementation of the second stage of the re-use project in North Gaza. The first stage of the NGEST project is established, consisting of 15 recovery wells and connection pipes, civil works within the booster pumping station, five booster pumps, one 4,000 m³ water tank and five monitoring wells. This was financed by the French Development Agency. The irrigation network is not fully implemented, although Phase 1 involving 5,000 dunums is currently underway.

Implementation of Phase 2 will involve:

a. Building the system

This will involve building 14 recovery wells and associated connection pipes, the remaining civil works within the booster pumping station, a further five booster pumps, an additional 4,000 m³ water tank and five more monitoring wells. The system will allow 35,000 m³ per day of treated water to be utilized in agricultural irrigation.

b. Capacity-building activities

To ensure that the re-use scheme can be sustained, the capacity of users will be developed through:

- Establishing a farmers' association, ensuring that women are represented and provided with opportunities to voice their interests and concerns relating to water use, quality and access
- Training of farmers in the re-use of treated wastewater.

c. Operation and maintenance of the system

Ongoing maintenance will be performed by PWA to ensure that the system is sustainable. Maintenance will involve the cleaning of pipelines, manholes and laterals, preventive maintenance, the replacement of defective parts and accessories, and chlorine for disinfection.

5.2 Activities to harvest rainwater in the West Bank

Rainwater harvesting is an important means to increase agricultural water supply in Palestine. For example, dams can be a practical solution to current and future water shortages associated with climate change. Hence, national stakeholders have identified the following specific activities that need to be undertaken to achieve the target:

10. Building dams for water harvesting in the West Bank

PWA is planning to conduct a master plan for water harvesting in the West Bank, with the intent to increase water supply for domestic and agricultural uses. A master plan for water harvesting at community level has already been finalised for the southern part of West Bank. The World Bank is providing funding for the development of this Master Plan for the whole West Bank under the "Associated Water Works Project". Following completion of the final Master Plan, activities to build the dams in the West Bank will involve:

a. Conducting a detailed engineering study

The study will assess the feasibility of building dams for water harvesting and subsequent development of detailed specifications for their implementation. The assessment will consider potential downstream implications for people and ecosystems to ensure that the dams do not lead to maladaptation by compounding climate vulnerabilities elsewhere.

b. Building of dams for water harvesting

This activity encompasses building activities for the expansion of one dam and the building of five new dams. In total, these activities will increase the water volume by 3.750 m³.

Building will involve excavation activities, soil compaction, construction of dam layers from the surrounding soils, removing trees from the area behind the dam and the removal of debris. In total, the dams will enable 3.75 MCM of water to be stored annually.

c. Operation and maintenance

The dams will be maintained by the Ministry of Agriculture, where appropriate, and by the local communities, village councils and water users' associations. Maintenance works require clearing weeds and vegetation from side slopes.

11. Building agricultural ponds and other harvesting structures

a. Conducting a feasibility study

This activity is required in order to assess the feasibility of building agricultural ponds and associated facilities, and subsequently to develop specifications for implementation.

b. Building of ponds and other harvesting structures

This activity will be coordinated with the Ministry of Agriculture (MoA) to build agricultural ponds and other harvesting structures (such as collection wells). 32 ponds and 200 water collection wells will be built. It is estimated that these ponds and harvesting structures will allow 670,000 m³ of water to be harvested annually. Building will require detailed design of the ponds and their structure, clearing of the area, excavation, lining, compaction, laying of the agricultural network to distribute water, and pumps to pressurize the water in the network.

c. Operation and maintenance

Maintenance will be undertaken by beneficiaries with coordination by the MoA. It is required to sustain these systems and prevent water contamination. Maintenance work will include clearing of side slopes from weeds and vegetation.

6 Timeframes, indicative costs, existing funding and likely sources of funding

For each of the activities and sub-activities, Table 2 (below) identifies:

- The indicative implementation period
- Indicative costs
- National contributions, where relevant
- Existing international funding, where specifically relevant
- Any remaining funding gap, and
- Potential international public funding sources that were preliminarily identified as potential support to address the funding gap. Note that international funders' and development priorities are subject to change and negotiation.

7 Institutional arrangements

Figure 3 (below) sets out the institutional arrangements for implementing the “Water treatment and conservation plan.” It identifies PWA as the lead organisation of a cross-ministerial Project Steering Committee, as well as other project stakeholders and delivery partners. Delivery partners will be specific to the activities. They will be identified according to their interests and expertise, and may change depending on the location of the activities. PWA is intended to be the main point of contact for project partners and stakeholders, including international public funders. The committee should aim for equal gender representation in order to encourage gender mainstreaming throughout plans and activities.

It will be of key importance for PWA to allocate appropriate financial and administrative resources and secure internal ownership of each activity in the implementation plan. In this way, PWA can ensure that the implementation plan is delivered and the Project Steering Committee is functional, delivering the activities to achieve the targets of the plan while adhering to timescales.

8 Recommendations for an enabling environment

The successful delivery of this plan will be ensured by developing a supportive enabling environment where it does not yet exist. This may include updating or developing legislation, regulations, statutory guidance (and standards), national or sectoral policies and strategies, and incentives (including fiscal measures) that would contribute to ensure the successful implementation of the activities or remove potential barriers to implementation.

Overall, the policies in place are sufficient to support the targets, and no existing policies and/or incentives contradict its achievement. Additional incentives that were identified and will be given further considerations include:

- Providing treated wastewater at a reduced price for farmers or reducing taxes if they use treated wastewater. Developing a marketing and awareness raising programme on the ground, sharing knowledge and success stories. This would involve the MoA, EQA, the Ministry of Local Government and the Ministry of Telecommunications & Information Technology
- Providing farmers security throughout the whole value chain for production in exchange for treated wastewater use, such as by buying their agricultural production at a guaranteed price.

Other cross-sectoral recommendations for development of the enabling environment to support the implementation of this plan identified by national stakeholders that will be given further consideration include:

- **Palestine's Environment Law Amendment** that is yet to be enacted **should be used as an enabling context** for the development of the legislation, regulation, statutory guidance, policies, strategies or incentives that are relevant to this plan.
- **Developing regulations for employers** to ensure that awareness-raising and training activities are included within the terms of their employment, so that individuals are paid to attend during working hours. This will improve women's access to such activities by addressing the time and economic constraints that they face. Implementing this recommendation requires securing formal approval from the Council of Ministers.
- **Developing regulations and statutory guidelines to enforce gender budgeting**, i.e. analysing all budget lines and financial instruments for climate change adaptation and mitigation from a gender-perspective, to ensure gender-sensitive or gender-responsive investments in relevant programmes (e.g. addressing technology transfer and capacity building), such as this plan. The MoWA can be responsible for taking forward this recommendation and securing formal approval from the Council of Ministers.

9 Challenges for implementation

Israeli control over Palestinian territories is no impediment to the implementation of this plan. Palestine's unique geo-political situation since 1995 means that the PWA and its delivery partners have adapted to the requirements and restrictions enforced by Israel's various

levels of control and occupation across the West Bank and the Gaza Strip¹⁴. Efficient decision-making and implementing structures have been developed to circumvent restrictions, including by communicating with the Israeli authorities.

Over the years, the PWA has worked with a range of international development partners, including the French Development Agency, KfW, the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNWRA), the Islamic Development Bank and others. In doing so, the PWA has assisted them in navigating the administrative procedures required to ensure that programmes can be successfully implemented.

Regarding this plan for water treatment and conservation, constraints arising from Israel's occupation could include delays in the entry of engineering materials and delays in approval processes for building works. These challenges have been considered when developing this plan with PWA, which has been responsible for managing water resources in Palestine under Israeli restrictions since 1995. PWA's Project Coordination Unit has implemented multi-million-dollar projects successfully in the past, securing approval from the Israelis where required. PWA also sits on the Joint Water Committee¹⁵ and has experience of successfully securing approvals. The same governance structures will be in place to deliver this plan's activities. The costs and timescales of the activities presented in Table 2 also take account of the potential delays that may be incurred to obtain approvals.

¹⁴ Palestine constitutes the Occupied Palestinian Territory, which is made up of the West Bank (including East Jerusalem) and the Gaza Strip, based on the borders of June 1967 and are separated by Israel, the occupying power. 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.

¹⁵ The Joint Water Committee (JWC) is a joint Israeli–Palestinian authority, created in 1995 by the Oslo II Accord. Its purpose is to manage water and sewage related infrastructure in the West Bank, particularly to take decisions on maintenance of existing infrastructure and approval of new projects.

Table 2 Timeframes, indicative costs, existing funding (USD million) and likely sources of funding

Activity	2021 - 2025	2026 - 2030	2031 - 2040	Unit cost	No. units	Unit type	Total cost	National contribution	International funding	Funding gap	Indicative options to secure international public funding to address funding gaps
1				0.017 ¹⁶	3 ¹⁷	Standards and by-laws	0.051	0.007 ¹⁸	0.000	0.044	AFD; EIB; EU; FAO; FCDO; UNOPS; WB
2a				8.649 ¹⁹	1	Re-use scheme	8.649	0.009 ²⁰	0.000	8.640	
2b				0.017	1		0	0.000	0.017		
2c				0.834 ²¹	1		0.482 ²²	0.000	0.352		
3a				0 ²³	1	Re-use system	0	0	0.000	0	
3b				19.384 ²⁴	1		19.384	0.009 ²⁰	0.000	19.375	
3c				0.01	1		0.01	0	0.000	0.01	
3d				1.000 ²⁵	1		1.000	1.000 ²⁷	0.000	0	
4a				0 ²⁶	1	0	0	0.000	0		

¹⁶ International consultancy service to upgrade the standard. Costs based on similar consultancy services requested by PWA and MoA to prepare by-laws.

¹⁷ Three by-laws/standards need to be updated.

¹⁸ Help-in-kind: Office space, catering, etc .

¹⁹ Laying a 300mm ductile pipeline with two cascades and pool of 30km length. Including manholes and associated facilities (2.61 M USD). 50,000 cubic meter pool reservoir a 5 cm concrete floor and 30 cm side wall around the pool. The proposed dimensions are 150 m by 150 m and depth of 2.5 m (0.35 M USD). A re-use scheme for some 2,500 dunums that includes all construction up to the individual re-use site (1.2 M USD).

²⁰ Office spaces and municipality equipment will be provided.

²¹ Operation and maintenance for: the conveyance system (0.313M USD; pool reservoir (0.014 M USD); re-use scheme (0.075 M USD).

²² Maintenance costs will be covered by the water association's income from selling the water to farmers.

²³ The consultancy service for design will be included in the contract for implementation of Activity 3b.

²⁴ Design, supply and install contract for laying a 22 km conveyancing system and manholes (2.5 M USD) including manholes and pool reservoir (6 M USD), booster pumping station (4 M USD) and re-use scheme (3 M USD) and establishment of Farmer Association. Design and supervision is 20% of the construction cost.

²⁵ Operation and maintenance for: the conveyancing system (0.3 M USD); pool reservoir (0.016 M USD); re-use scheme (0.085 M USD); and booster station (0.5 M USD).

²⁶ The consultancy service for design will be included in the contract for implementation of Activity 4.2.

Activity	2021 - 2025	2026 - 2030	2031 - 2040	Unit cost	No. units	Unit type	Total cost	National contribution	International funding	Funding gap	Indicative options to secure international public funding to address funding gaps
4b				38.446 ²⁷	1	Collection, treatment, and re-use system	38.446	0.009 ²⁰	0.000	38.437	
4c				0.015	1		0.015	0	0.000	0.015	
4d				1.531 ²⁸	1		1.539	0.009 ²⁰	0.000	1.530	
5a				0.05	1		Treatment plant and re-use system	0.05	0	0.000	0.05
5b				34.009 ²⁹	1	34.009		0.009 ²⁰	0.000	34.000	
5c				0.010	1	0.010		0	0.000	0.010	
5d				6.620	1	6.620		6.620 ³⁰	0.000	0.000	
6a				0.00	0	Re-use system	0.000	0.000	Not available ³¹	0.000	
6b				9.709 ³²	1		9.709	0.009 ²⁰	0.000	9.700	
6c				0.010	1		0.010	0.000	0.000	0.010	
6d				1.425 ³³	1		1.425	1.425 ³⁴	0.000	0.000	
7a				1.509 ³⁵	1	Tubas re-use project	1.509	0.009 ²⁰	0.000	1.500	
7b				0.010	1		0.010	0.000	0.000	0.010	

²⁷ Estimated cost of the project as per the feasibility study (16.65 M USD for wastewater treatment plant and conveyancing system and 8.55 M USD for networks). The cost is for design, supply and install contract for all project components.

²⁸ Estimated cost of the operation and maintenance as per the feasibility study.

²⁹ Estimated cost of the project by PWA and according to the feasibility study. Building the wastewater treatment plant as well as laying 22 km pipeline and manholes (2.5 M USD), booster pumping station (300,000 USD), pool reservoir (3 M USD) and re-use scheme (1.0 M USD).

³⁰ Operation and maintenance costs will be covered by Tulkarem Municipality from the fee to be collected from users.

³¹ This activity is ongoing and funded by the French Development Agency.

³² Laying 30 km pipeline and manholes (3.7 M USD), booster pumping station (1 M USD), pool reservoir (3.5 M USD) and re-use scheme (1.5 M USD).

³³ Operation and maintenance for: the conveyancing system (0.5 M USD), pool reservoir (0.025 M USD); re-use scheme (0.1 M USD); and booster station (0.8 M USD).

³⁴ Operation and maintenance cost will be covered by the farmer association from the fees of selling the water to farmers.

³⁵ Laying 3 km pipeline and manholes (0.45 M USD), disinfection system (0.2 M USD), pool reservoir (0.35 M USD) and re-use scheme (0.5 M USD).

Activity	2021 -	2026 -	2031 -	Unit cost	No. units	Unit type	Total cost	National contribution	International funding	Funding gap	Indicative options to secure international public funding to address funding gaps
	2025	2030	2040								
7c				0.149 ³⁶	1		0.149	0.149 ³⁷	0.000	0.000	
8a				2.005 ³⁸	2	Reservoirs	4.010	0.009 ²⁰	0.000	4.001	
				0.300 ³⁹	20	Kilometres	6.000	0.009 ²⁰		6.000	
				0.250 ⁴⁰	30	Recovery wells	7.500	0.009 ²⁰		7.500	
8b				1.490 ⁴¹	1	Irrigation system	1.490	0.745 ⁴²	0.000	0.745	
9a				2.000 ⁴³	1	Network	2.000	0.009 ²⁰	0.000	2.000	
				6.000 ⁴⁴	1	Water tank	6.000		0.000	6.000	
				0.300 ⁴⁵	15	Kilometres	4.500		0.000	4.500	
				0.250 ⁴⁶	12	Recovery wells	3.000		0.000	3.000	
				0.150 ⁴⁷	5	Monitoring well	0.750		0.000	0.750	

³⁶ Operation and maintenance for: the conveyancing system (0.05 M USD); pool reservoir (0.004 M USD); re-use scheme (0.015 M USD); and booster station (0.08 M USD).

³⁷ Maintenance cost will be covered by the farmer association from the fees of selling the water to farmers.

³⁸ 5,000 m³ water tank.

³⁹ Laying 20 km mains and submains and manholes.

⁴⁰ 30 recovery wells and associated facilities including booster pumps and laterals.

⁴¹ Operation and maintenance for: the conveyancing system (0.5 M USD); pool reservoir (0.04 M USD); re-use scheme (0.15 M USD); and recovery wells and pumps (0.8 M USD).

⁴² 50% of the operation and maintenance cost will be covered by the farmers' association from the fee of selling the water to farmers.

⁴³ Building irrigation network.

⁴⁴ 4,000 m³ water tank.

⁴⁵ Laying 15 km mains and submains and manholes.

⁴⁶ 12 recovery wells.

⁴⁷ 5 monitoring wells.

Activity	2021 -	2026 -	2031 -	Unit cost	No. units	Unit type	Total cost	National contribution	International funding	Funding gap	Indicative options to secure international public funding to address funding gaps
	2025	2030	2040								
				0.30 ⁴⁸	2	Booster pumping station	0.600		0.000	0.600	
9b				0.010	1	Network	0.010	0	0.000	0.010	
9c				1.90 ⁴⁹	1	Network	1.900	0.950 ⁵⁰	0.000	0.950	
10a				0.002	6	Dams	0.010	0	0.000	0.010	
10b				0.698	1	300k m ³ dam	0.698	0.009 ²⁰	0.000	19.960	
				1.482	1	500k m ³ dam	1.482		0.000		
				1.134	1	200k m ³ dam	1.134		0.000		
				1.395	1	250k m ³ dam	1.395		0.000		
				13.952	1	2m m ³ dam	13.952		0.000		
				1.308	1	500k m ³ dam	1.308		0.000		
10c				0.003 ⁵¹	6	Dams	0.021	0.021	0.000	0	
11a				0.000 ⁵²	232	32 ponds and 200 wells	0.110	0.000 ⁵³	0.000	0.110	
11b				1.000	10	Ponds	13.100	0.009 ²⁰	9.991	3.0998	
				0.655	2	Ponds	1.310				
				0.008	200	Wells	1.572				

⁴⁸ Booster pumping stations.

⁴⁹ Operation cost will include the salary for workers and the electricity cost, etc. (0.6 USD), Maintenance requires cleaning of pipelines, manholes and laterals, (0.8 M USD) preventive maintenance, replacement of defective parts and accessories for the recovery wells and booster pump, chlorine for disinfection, etc. (0.5 M USD).

⁵⁰ 50% of the operation and maintenance cost will be covered by the farmer association's income from the sale of water to farmers.

⁵¹ Yearly maintenance of side slopes, cleaning of side slopes from weeds and vegetation.

⁵² 32 ponds and 200 water collection wells at 32*2000+200*200.

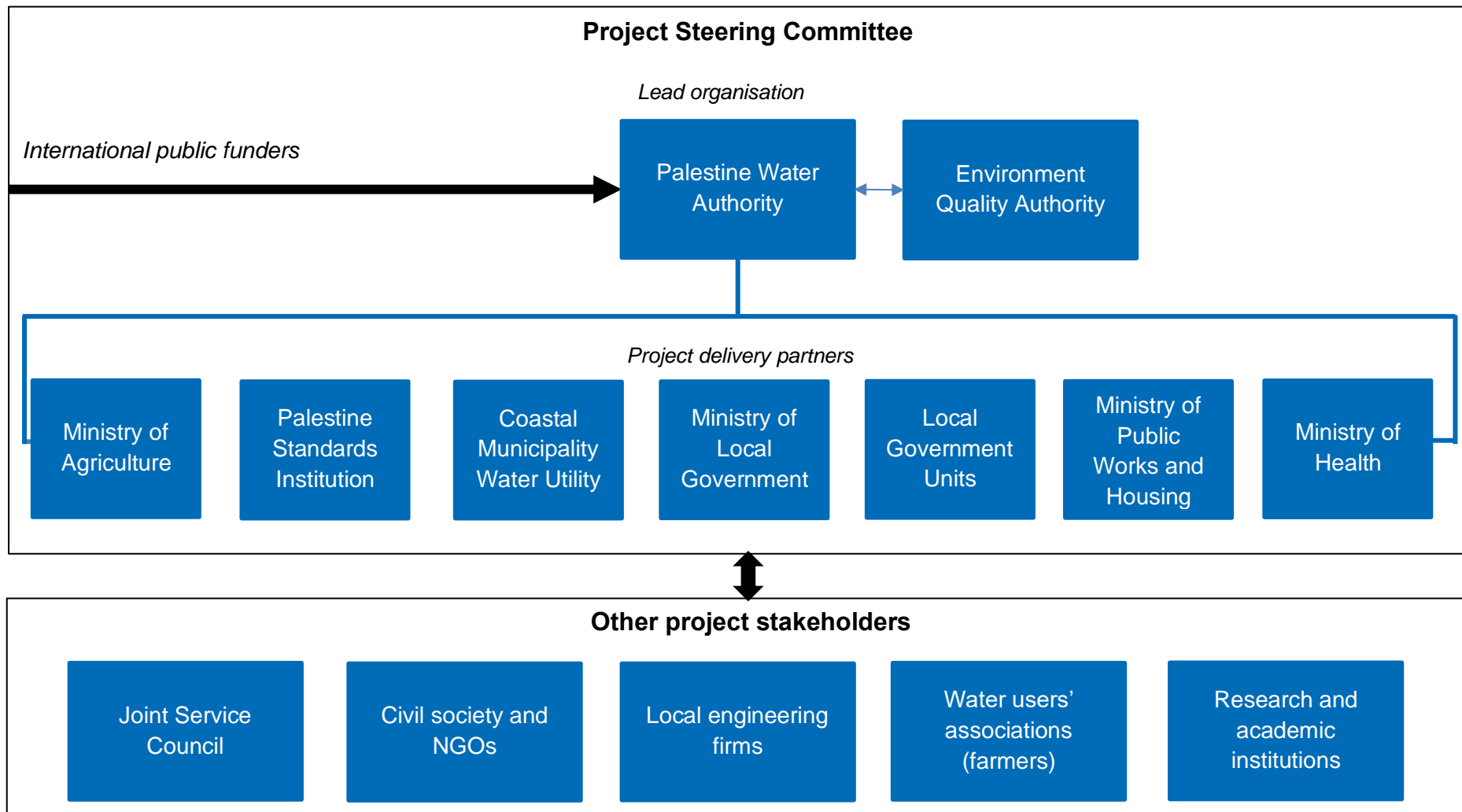
⁵³ In-kind support with farm-level water harvesting techniques.

Activity	2021 - 2025	2026 - 2030	2031 - 2040	Unit cost	No. units	Unit type	Total cost	National contribution	International funding	Funding gap	Indicative options to secure international public funding to address funding gaps
11c				0.033 0.000 ⁵⁴	20 232	Ponds 32 ponds and 200 wells	0.655 0.042	0.042	0.000	0.000	
TOTAL							197.992	11.603	9.991	176.398⁵⁵	

⁵⁴ 500 USD for each pond (total of 32) and 16,000 USD for the 200 wells.

⁵⁵ Total funding gap is subject to rounding errors.

Figure 3 Institutional arrangements for implementation⁵⁶



⁵⁶Note: MoA will lead on Activity 1.1 (Updating the Sludge-Use of Treated Sludge and Sludge Disposal (PS 898-2010), established by PSI) and on Activity 10.2 (Building of dams for water harvesting), as well as Activities 11.2 and 11.3 (Building and maintenance of agricultural ponds).



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STATE OF PALESTINE
WATER AUTHORITY
Minister's Office



دولة فلسطين
سلطة المياه
مكتب الوزير

2021/08/25

حفظه الله

معالي الأخ / م. جميل مطور

رئيس سلطة جودة البيئة

الموضوع:- اعتماد خطط العمل لتنفيذ المساهمات المحددة وطنياً في قطاع المياه

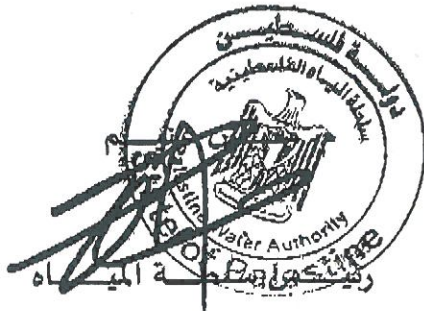
تحية طيبة وبعد،

بالإشارة إلى الموضوع أعلاه وبناء على طلبكم نود إعلامكم بأن سلطة المياه تؤيد وتدعم خطط العمل لتنفيذ المساهمات المحددة وطنياً والتي تم اعدادها بالتنسيق والتعاون مع اللجنة الوطنية لتغيير المناخ والشركاء ذوي العلاقة وذلك ضمن نشاطات المشروع المنفذ من قبل سلطة جودة البيئة وشراكة المساهمات المحددة وطنياً ويدعم من البنك الاسلامي للتنمية.

وفيما يلي قائمة بأسماء الخطط والكلفة الاجمالية لها:-

1. خطة معالجة المياه والمحافظة عليها وكلفتها الاجمالية 198 مليون دولار.
 2. خطة البنية التحتية لشبكات المياه وكلفتها الاجمالية 71 مليون دولار.
 3. خطة البنية التحتية لمصادر المياه وكلفتها الاجمالية 25 مليون دولار.
- علماً بأن هذه الخطط تأتي انسجاماً مع توجيهات مجلس الوزراء وبما يتوافق مع الأولويات الوطنية والاستراتيجية الوطنية لقطاع المياه.

مع فائق الاحترام والتقدير،



دولة فلسطين

سلطة جودة البيئة

وارد عام

الرقم 758-2021

التاريخ 25-8-2021