Funding Proposal

FP119: Water Banking and Adaptation of Agriculture to Climate Change in Northern Gaza

Palestine | Agence Française de Developpement(AFD) | Decision B.24/09

4 December 2019

GREEN CLIMATE FUND

Funding Proposal

Version 1.1

The Green Climate Fund (GCF) is seeking high-quality funding proposals.

Accredited entities are expected to develop their funding proposals, in close consultation with the relevant national designated authority, with due consideration of the GCF's Investment Framework and Results Management Framework. The funding proposals should demonstrate how the proposed projects or programmes will perform against the investment criteria and achieve part or all of the strategic impact results.

Project/Programme Title:	**Water Banking and Adaptation of Agriculture to Climate Change in Northern Gaza**
Country/Region:	PALESTINE
Accredited Entity:	Agence Française de Développement (AFD)
Date of Submission:	25 June 2018

GREEN CLIMATE FUND

Contents

Note to accredited entities on the use of the funding proposal template

- Sections **A, B, D, E** and **H** of the funding proposal require detailed inputs from the accredited entity. For all other sections, including the Appraisal Summary in section F, accredited entities have discretion in how they wish to present the information. Accredited entities can either directly incorporate information into this proposal, or provide summary information in the proposal with cross-reference to other project documents such as project appraisal document.
- The total number of pages for the funding proposal (excluding annexes) is expected not to exceed 50.

Please submit the completed form to:
fundingproposal@gcfund.org

Please use the following name convention for the file name:
"[FP]-[Agency Short Name]-[Date]-[Serial Number]"

LIST OF KEY ABBREVIATIONS

AFD Agence Française de Développement
EQA Environment Quality Authority
FAO Food and Agriculture Organization of the United Nations
INCR Initial national communication
IPCC Intergovernmental Panel on Climate Change
IRR Internal Rate of Return
GEDCO Gaza Electricity Distribution Company
MAR Managed Aquifer Recharge
MoA Ministry of Agriculture
MoFP Ministry of Finance and Planning
NAP National Adaptation Plan
NGEST North Gaza Emergency Sewage Treatment
NWC National Water Company
NDC Nationally Determined Contribution
PENRA Palestinian Energy and Natural Resources Authority
PNA Palestine
PRECIS Providing Regional Climates for Impact Studies
PMU Project Management Unit
PWA Palestinian Water Authority
TWW Treated Wastewater
RS Recovery Scheme
UNDP United Nations Development Programme
UNFCCC United Nations Framework Convention on Climate Change
WB World Bank
WHO World Health Organization
WSRC Water Sector Regulatory Council
WUA Water Users Association
WWTP waste water treatment plants

A.1. Brief Project/Programme Information			
A.1.1. Project / programme title		**Water Banking and Adaptation of Agriculture to Climate Change in Northern Gaza**	
A.1.2. Project or programme		Project	
A.1.3. Country (ies) / region		**Palestine**	
A.1.4. National designated authority (ies)		**Environment Quality Authority**	
A.1.5. Accredited entity		**Agence Française de Développement**	
A.1.5.a.Access modality		☐ Direct ☒ International	
A.1.6. Executing entity / beneficiary		Executing Entity: Palestinian Water Authority; Ministry of Agriculture – Food and Agriculture Organization Beneficiary: Palestinian Authority	
A.1.7. Project size category (Total investment, million USD)		☐ Micro (≤10) ☐ Medium (50<x≤250)	☒ Small (10<x≤50) ☐ Large (>250)
A.1.8. Mitigation / adaptation focus		☐ Mitigation ☐ Adaptation ☒ Cross-cutting	
A.1.9. Date of submission		25 June 2018, V2 28 May 2019	
A.1.10. Project contact details	Contact person, position	MECHALI Zacharie – Task Team Leader (TTL) BALLIN Quentin – co-TTL OURBAK Timothée – Climate Change Specialist, GCF focal point	
	Organization	Agence Française de Développement - AFD	
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A.1.11. Results areas*(mark all that apply)*

Reduced emissions from:

- ☒ Energy access and power generation
  (E.g. on-grid, micro-grid or off-grid solar, wind, geothermal, etc.)
- ☐ Low emission transport
  (E.g. high-speed rail, rapid bus system, etc.)
- ☐ Buildings, cities and industries and appliances
  (E.g. new and retrofitted energy-efficient buildings, energy-efficient equipment for companies and supply chain management, etc.)
- ☐ Forestry and land use
  (E.g. forest conservation and management, agroforestry, agricultural irrigation, water treatment and management, etc.)

Increased resilience of:

- ☒ Most vulnerable people and communities
  (E.g. mitigation of operational risk associated with climate change – diversification of supply sources and supply chain management, relocation of manufacturing facilities and warehouses, etc.)
- ☒ Health and well-being, and food and water security
  (E.g. climate-resilient crops, efficient irrigation systems, etc.)
- ☐ Infrastructure and built environment
  (E.g. sea walls, resilient road networks, etc.)
- ☒ Ecosystem and ecosystem services
  (E.g. ecosystem conservation and management, ecotourism, etc.)

A.2. Project / Programme Executive Summary (max 300 words)

The Palestinian National Adaptation Plan (NAP) and the initial national communication (INCR) to the United Nations Framework Convention on Climate Change (UNFCCC) in addition to the Palestinian Nationally Determined Contribution (NDC) have identified water and food security as the most vulnerable issues in Palestine, with knock-on implications for all sectors. In Gaza, the population has one of the lowest per capita water availability in the world, with quality far below World Health Organization (WHO) standards.

Food and water insecurity will increase in the baseline scenario with a "climate contribution" to this trend, in terms of acceleration of existing anthropic factors, estimated at 30% (as will be explained further down). The project intends to counterbalance the negative compounding effect of climate change on already degraded resources by delivering infrastructure and innovative hydraulic technology -Managed Aquifer Recharge (MAR)- to create a new non-conventional water resource to be injected in the aquifer and to be reused for agricultural purposes.

The project will increase the resilience of 4 200 people involved in agriculture, and enhance the livelihood of 23 553 people, including 11 776 women; MAR will alleviate the pressure on the aquifer, thereby improving access to domestic water of 200 000 additional people.

It will also increase the production of Palestinian renewable energy, through the installation of 8,5 ha of PV scheme.

This is a huge paradigm shift for Palestine, where the MAR technology is implemented for the first time and will allow engaging directly with the neuralgic issue of adaptation to climate change in the area, which is the Nexus Food – Water – Energy. A map of the project area and key infrastructure is provided in **Annex 2.**

A.3. Project/Programme Milestone

Expected approval from accredited entity's Board (if applicable)	14/11/2019
Expected financial close	31/12/2026
Estimated implementation start and end date	Start: 01/07/2019 End: 01/07/2024
Project/programme lifespan	5 years

B.1. Description of Financial Elements of the Project / Programme

Output	Activity	Input	Financing Source	Budget Account Description	Amount Year 1 (EUR)	Amount Year 2 (EUR)	Amount Year 3 (EUR)	Amount Year 4 (EUR)	Amount Year 5 (EUR)	Total (EUR)
Output 1 : Production of additional quantities of water for agricultural use	Activity 1.1 An additional water resource is created by Managed Aquifer Recharge	Input 1.1.1 Rehabilitation of 7 infiltration basins for recharge of the aquifer	AFD	Constuction cost	217 965	217 965	0	0	0	435 929
		Input 1.1.2 Delivery of the recovery scheme	GCF	Equipment	1 000 000	0	0	0	0	1 000 000
				Constuction cost	1 204 083	2 000 000	2 214 000	0	0	5 418 083
	Activity 1.2 Water – Energy Nexus, development of renewable low-emission energy solutions	Input 1.2.1 Delivery of 2 PV schemes to sustain the overall needs of the NGEST scheme	IrishAid	Equipment	3 642 857	3 642 857	0	0	0	7 285 714
	Total Component 1				6 064 905	5 860 822	2 214 000	0	0	14 139 726
Output 2 : Development of irrigation, water	Activity 2.1 An improved water service	Input 2.1.1 Delivery of an irrigation	GCF	Constuction cost	0	2 165 179	2 165 179	2 165 179	2 165 179	8 660 714

efficiency and climate resilient agriculture	for irrigation is brought to 4 200 beneficiaries serving 1 500 ha	scheme, 1 500 ha	AFD	Constuction cost	2 467 857	2 467 857	2 467 857	2 467 857	0	9 871 429
	Activity 2.2 Increased climate resilience of agriculture, adaptation of cropping systems to climate change	Input 2.2.1 Extension services to farmers	GCF	Local consultants	148 200	148 200	148 200	148 200	148 200	741 000
				Equipment			194 000			194 000
		Input 2.2.2 Subsidy of on-farm water saving equipment	GCF	Equipment	0	0	1 480 349	1 480 349	1 480 349	4 441 046
		Input 2.2.3 Gender, land tenure and irrigation – a Gender-responsive approach to agricultural resilience to climate change	GCF	Equipment	0	25 000	25 000	25 000	25 000	100 000
				Local consultants	21 750	21 750	21 750	21 750	0	87 000
	Total Component 2				2 637 807	4 827 986	6 502 334	6 308 334	3 818 727	24 095 189
Output 3 : Management of the water cycle	Activity 3.1 Strenghtening of PWA	Input 3.1.1 Technical assistance	AFD	Local consultants	0	100 000	100 000	100 000	100 000	400 000

and capacity building of stakeholders	capacities in its role of coordination and quality control of the process of reuse of treated waste water			International consultant	0	100 000	100 000	100 000	100 000	400 000
		Input 3.1.2 Setting-up of a water quality monitoring and control system	GCF	Equipment	0	0	150 784	0	0	150 784
	Activity 3.2 Exit Strategy and Transfer of O&M to Water Users	Input 3.2.1 Identification and establishment of the co-management scheme – Structuring and capacity building of a WUA	AFD	Local consultants	93 500	93 500	93 500	93 500	0	374 000
		Input 3.2.2 Integration of women in the governance bodies of the WUA	GCF	Local consultants	0	47 000	47 000	0	0	94 000

	Activity 3.3 Communities are empowered and supported, in the context of the conflict in Gaza	Input 3.3.1 Diagnostic and analysis of the conditions of restoration of unused land within the irrigable area	AFD	Local consultants	0	0	208 000	0	0	208 000
		Input 3.3.2 Psychosocial support and strengthening of community and household bounds	GCF	Local consultants	0	62 333	62 333	62 333	0	187 000
	Activity 3.4 Capitalization of the outputs/outcomes for replication and upscaling in Palestine	Input 3.4.1 Intellectual services for capitalization	GCF	Local consultants	0	0	50 000	50 000	50 000	150 000
				International consultant	0	0	50 000	50 000	50 000	150 000
	Total Component 3				93 500	402 833	861 617	455 833	300 000	2 113 784
Project Management Component	*Operation costs of the PMU at PWA*	AFD			112 500	108 738	68 000	42 596	37 400	369 234
		GCF			181 250	171 250	92 000	53 251	56 100	553 851
		Irish Aid			56 250	41 355	30 000	18 792	16 500	162 897
	Operation costs of the FAO (7% of inputs	AFD			11 950	11 950	11 950	11 950	11 950	59 749
		GCF			16 674	16 674	16 674	16 674	16 674	83 370

	2.2.1,2.2.3, Act. 3.2 and 3.3)	Irish Aid			0	0	0	0	0	0
	Total PM Component				378 624	349 967	218 624	143 263	138 624	1 229 101
Project cost					**9 174 835**	**11 441 607**	**9 796 575**	**6 907 430**	**4 257 351**	**41 577 799**
		AFD			2 903 771	3 100 009	3 049 307	2 815 903	249 350	**12 118 340**
		GCF			2 571 957	4 657 386	6 523 268	4 072 735	3 991 501	**21 816 848**
		Irish Aid			3 699 107	3 684 212	30 000	18 792	16 500	**7 448 611**
Contingency rate	8%									
Contingencies		AFD	29%		175 939	175 939	175 939	175 939	175 939	879 693
		GCF	53%		339 787	339 787	339 787	339 787	339 787	1 698 935
		Irish Aid	18%		110 278	110 278	110 278	110 278	110 278	551 388
	Total Contingencies				626 003	626 003	626 003	626 003	626 003	3 130 016
Total Amount					**9 800 839**	**12 067 610**	**10 422 579**	**7 533 434**	**4 883 354**	**44 709 782**
Total Amount GCF					**2 911 744**	**4 997 172**	**6 863 055**	**4 412 522**	**4 331 288**	**23 709 783**
Total Amount Irish Aid					**3 809 385**	**3 794 490**	**140 278**	**129 070**	**126 778**	**8 000 000**
Total Amount AE					**3 079 710**	**3 275 948**	**3 225 245**	**2 991 841**	**425 288**	**13 000 000**

As presented in the table above, only few activities / inputs won't be financed by GCF Proceeds: 1.1.1, 1.2.1, 3.1.1, 3.2.1 and 3.3.1. Since the GCF requirements apply to the entire funded activity, including parts which the GCF does not finance, AFD will pass down the GCF requirements to the parts of the funded activity that is not being financed by GCF.

B.2. Project Financing Information

	Financial Instrument	Amount	Currency	Tenor	Pricing
(a) Total project financing	**(a) = (b) + (c)**	**44.709782**	million euro (€)		
(b) GCF financing to recipient	(i) Senior Loans	.....	Options	( ) years	( ) %
	(ii) Subordinated Loans	.....	Options	( ) years	( ) %
	(iii) Equity	.....	Options		( ) % IRR
	(iv) Guarantees	.....	Options		
	(v) Reimbursable grants *	.....	Options		
	(vi) Grants *	**23.709782**	million euro (€)		
	** Please provide economic and financial justification in section F.1 for the concessionality that GCF is expected to provide, particularly in the case of grants. Please specify difference in tenor and price between GCF financing and that of accredited entities. Please note that the level of concessionality should correspond to the level of the project/programme's expected performance against the investment criteria indicated in section E.*				
	Total requested (i+ii+iii+iv+v+vi)	**23.882617**	million euro (€)		

	Financial Instrument	Amount	Currency	Name of Institution	Tenor	Pricing	Seniority
(c) Co-financing to recipient	Grant	13	million euro (€)	AFD	( ) years	( ) %	Options
	Grant	8	million euro (€)	Irish Aid	( ) years	( ) %	Options
	Options	.....	Options	.....		( ) % IRR	Options
	Options	.....	Options	.....			Options
	Lead financing institution: AFD						

	** Please provide a confirmation letter or a letter of commitment in section I issued by the co-financing institution.*
(d) Financial terms between GCF and AE (if applicable)	*In cases where the accredited entity (AE) deploys the GCF financing directly to the recipient, (i.e. the GCF financing passes directly from the GCF to the recipient through the AE)or if the AE is the recipient itself, in the proposed financial instrument and terms as described in part (b), this subsection can be skipped.* *If there is a financial arrangement between the GCF and the AE,which entails a financial instrument and/or financial terms separate from the ones described in part (b), please fill out the table below to specify the proposed instrument and terms between the GCF and the AE.* **Financial instrument** | **Amount** | **Currency** | **Tenor** | **Pricing** Choose an item. | ..... | Options | ( ) years | ( ) % *Please provide a justification for the difference in the financial instrument and/or terms between what is provided by the AE to the recipient and what is requested from the GCF to the AE.*

B.3. Financial Markets Overview (not applicable)

How market price or expected commercial rate return was (non-concessional) determined?

Please provide an overview of the size of total banking assets, debt capital markets and equity capital markets which could be tapped to finance the proposed project/programme.

Please provide an overview of market rates (i.e. 1-year T-Bill, 5-year government bond, 5-year corporate bond (specify credit rating) and 5-year syndicate loan.

Provide examples or information on comparable transactions.

Please fill out applicable sub-sections and provide additional information if necessary, as these requirements may vary depending on the nature of the project / programme.

C.1. Strategic Context

Acute water scarcity in Palestine is a strong determinant of the climate vulnerability of its population, in particular for rural areas and communities. The Palestinian National Adaptation Plan and the initial national communication to the UNFCCC have identified water and food security as the most vulnerable issues in Palestine, with knock-on implications for all sectors. This is also highlighted in the Nationally Determined Contribution (NDC).

The geopolitical situation substantially reduces the Palestinian's adaptive capacities, thereby compounding climate vulnerabilities with anthropic constraints and limitations of access to water resources, in particular in the Gaza Strip and in rural areas of the West Bank.

Palestine has one of the lowest *per capita* water availability in the world, with quality far below World Health Organization (WHO) standards. The average domestic water consumption is only 72 liters per capita per day (l/c/d) in the West Bank and 96 l/c/d in the Gaza Strip (availability of drinkable quality water is deemed to be half that number), below the 100 l/c/d minimum recommended by the WHO.

The impacts of climate change identified at regional level or in neighboring countries broadly apply to the Palestinian situation. Studies have attempted to model the impacts of climate change on Palestine's water resources: the regional climate model PRECIS (Providing Regional Climates for Impact Studies) with the Intergovernmental Panel on Climate Change (IPCC) A1B emissions scenario (AR5), predict a decrease in precipitations of 15% by mid-century and 23% by the end of the century, lowering per capita internal water resources in Palestine to 67 m^3 (cubic meter) by 2050 compared to 190 m^3 in 2010.
United Nations Development Programme - UNDP's analysis of climate vulnerability in Palestine highlights **climate risks as a humanitarian threat**, placing the Palestinians within the policy realm of disaster risk management and emergency response operations. Current high levels of food and water insecurity in Gaza and the West Bank are forecasted to be exacerbated by climate change, on account of worsening food growing conditions (the agricultural sector consumes over two-thirds of water abstracted or flowing from springs in Palestine) and a fragile water supply infrastructure. This will have severe implications on the human health, social development and general unrest in the Gaza Strip.

Combining population growth forecasts and regional climate change projections, it has been estimated that Palestine will experience a water deficit of 271Mm^3 (million cubic meters) **a year by 2020.** In the Gaza Strip, each year, around 195 Mm^3 are pumped from the coastal aquifer for the needs of the population and agricultural activities (representing less than 30% of total usages), while the water annual natural recharge of this aquifer does not exceed 60 Mm^3 per year. As a result, the capacity of the aquifer is declining at high speed, leading to significant intrusion of seawater into the only freshwater resource in the area, already heavily polluted by fertilizers, pesticides and untreated sewage.

Water availability is crucial to the food security of Palestinians, in particular in Gaza. Agriculture in Palestine is very dependent on precipitations: though irrigation is often the only option in this semi-arid territory and presents a gross productivity 6 times that of rain-fed agriculture, only 25% of agricultural land is irrigated in Palestine. Increasing aridity due to climate change (increasing temperature, decrease of precipitations, as well as sea level rise) will increase the pressure on already over-exploited aquifers, with consequences on the quality of the water (saline intrusions) and increases the risk of collapse of the system (irreversible deterioration of the aquifers). The United Nations has reported[1] that the aquifer will irrevocably collapse by 2020 if no significant interventions towards introducing nonconventional water resource such as wastewater reuse and desalination.

[1] Report on UNCTAD assistance to the Palestinian people: Developments in the economy of the Occupied Palestinian Territory, 2015

Water availability for agriculture is also related to existing irrigation and cropping practices, which show relatively low levels of efficiency. The widespread use of submersion irrigation in the area of the project leads to overconsumption of water. The feasibility study also indicates that the cropping systems (in particular the low proportion of tree crops) in place in the area also lead to higher levels of water extraction. Finally, the increasing salinity of water in the aquifer, as a result of climate change (see climate change model Excel sheet, **Annex 4**), also decreases the irrigation efficiency and generates higher volumes applied for the same result.

In the context of increasing aridity, maintaining the existing agricultural and rural livelihoods in Palestine and Gaza (there is limited perspectives of growth in the agricultural sector, in the context of high demographic and urban pressure on land in Gaza and instability of markets) depends on both **securing access to sustainable water resources**, as well adapting irrigation practices and cropping systems on-farm.

For Palestine and its limited access to underground resources (because they are over exploited, for lack of adequate public infrastructure for additional mobilization) treated waste water is about the only new resource (compared to a baseline situation where it is going to the sea or to neighboring countries) that can be introduced in the local context of irrigated agriculture to alleviate the pressure on the aquifers and therefore prevent rupture scenarios, under the increasing effects of climate change.

Making use of non-conventional water resources, such as Treated Wastewater (TWW) is considered a prerequisite for any sustainable development of irrigation in Palestine, thereby increasing the profitability and enhancing climate resilience of Palestinian agriculture.

In Palestine, 50 Mm^3 of TWW are generated every year. If a fraction of this, for example 60% (i.e. 30 Mm^3) met agricultural quality requirements and were used for irrigation, it would entail a 20% increase in water available for Palestinian farmers, enough to irrigate an additional 3 500 ha and create 15 000 jobs (*Source: Food and Agriculture Organization of the United Nations - FAO*). Whereas many other countries with dry conditions are already making use of this resource for irrigation (up to 80% of the TWW can be reused), this potential has not yet been realized in Palestine, mostly due to insufficient infrastructure and capacities to effectively utilize TWW for irrigation.
Water and sanitation, drinking water and associated sewage networks and waste water treatment plants (WWTP) projects, have multiplied over the years in Palestine, mainly through donor funding (KfW, WB, AFD, EU being the main partners of the Palestinian government in this sector), but also by way of public funding. In Gaza, the North Gaza Emergency Sewage Treatment (NGEST) plant (funded by WB, AFD and the EU), in the outskirts of Gaza City, is up and running since March 2018, with a capacity of 36 500 m^3/day (13.3 Mm^3 per year). The NGEST plant will alleviate the pressure on the existing WWTP (Beit Lahia), functioning at six times its design capacity and will help solve the acute environmental and health hazards caused by the accumulation of waste water in Gaza.

The following exert from the Baseline Study On Water Quality & Public Health in The Gaza Strip (2015, **Annex 3**) illustrates the acuteness and severity of the situation and actual health hazards related to water contamination in Gaza:
"*It is needless to say that sewage is the biggest reason for groundwater biological and chemical contamination in the Gaza Strip. Only about 40% of the sewage generated in the Gaza Strip is properly treated. The percentage of population served by sewerage systems has increased in the last two decades and currently reached around 80%, leaving nearly half a million people unconnected to the sewage network and dependent on alternative means for excreta disposal.*

Reports show that 19% of groundwater, 27% of desalinated water and 20% of water network samples are microbiologically contaminated by total Coliform while 13%, 14% and 12%, respectively, are contaminated by fecal coliform bacteria. The water situation in Gaza is dire. The Coastal Aquifer, Gaza's sole fresh water resource, is polluted by the infiltration of raw sewage from cesspits and sewage collection ponds and by the intrusion of seawater (itself also contaminated by raw sewage discharged daily into the sea near the coast) and has been degraded by over-extraction. The water quality will be worse in the next few years and the aquifer will not be able to cover the people water needs, where the water quality will not able to be used for any purposes (domestic, agriculture,…). Taking in

consideration the combined concentrations of both chloride and nitrate, it's clear that 3.8% of the domestic water is only matching with WHO drinking limit, while the remaining 96.2% is out of limit. (p.67)

[…] findings indicate that the incidence of diarrhea as reported by health clinics is constantly increasing over the past five years; almost doubled in five years. Also, hepatitis incidence rate is at the increasing trend (20.7 per 100,000 population to 73.3 per 100,000 in 2013)"

In the baseline situation, non-treated waste water is currently stored in precarious basins outside of Gaza City (posing a threat to nearby populated areas) and transferred to infiltration basins, where it infiltrates into the aquifer resulting in severe pollution of the groundwater of high water table (rejection of these waters to sea is not an option, for environmental and geopolitical reasons), threatening the livelihoods and health of both rural and urban population when using this highly polluted water for agriculture and drinking.

The commissioning of the NGEST plant offers the opportunity to increase water and food security in the Gaza strip by generating an innovative, "new" and non-conventional resource for agricultural purposes, by infiltration in the aquifer (after tertiary treatment), recovery of treated waste water (diluted in ground water then extracted by wells), and development of an efficient irrigation scheme downstream. Infiltration of treated waste water in the aquifer will both increase the quantity and the quality (depollution) of the groundwater, thereby increasing its availability and suitability for agricultural purposes and, by the same token, preventing massive contamination and subsequent proliferation of water-borne diseases within the population of Gaza and Jabalia cities and their rural outskirts (an estimated 200 000 people would be affected positively by the project).

The cycle of production and reuse of TWW relies on an energy mix supplying the power for the functioning of the NGEST WWTP, the Recovery scheme (which involves pumping from the aquifer) and to pressurize the drip irrigation network at the end line. The current power concept consists of an external supply from the grid and on-site generation from emergency generators with sufficient capacity to cover the load of the facility (estimated at 9 MVA). The overall power supply situation in Gaza is constrained due to general geopolitical circumstances and options for extending existing supply system via the distribution network are limited because of cost of fuel for the local power plant or due to difficulties in fuel availability, in particular the limitations to increase the supply from cross-border sources.

Consequently, the Palestinian Water Authority (PWA) seeks, together with other responsible stakeholders (in particular the Palestinian Energy and Natural Resources Authority, PENRA) to **identify the most viable, long-term sustainable power supply option for the NGEST facilities during its whole life-cycle, by combining different sources of energy (electric grid, solar, wind, biogas, diesel), reducing greenhouse gas emissions (see activity 1.2)**.

Closing the water cycle, by the reuse of treated water, calls for increased coordination between several stakeholders (the Palestinian Water Authority and the Ministry of Agriculture, as well as PENRA, and EQA (Environment Quality Authority), and the farmers benefiting from the project). Close and careful monitoring of water quality of water used for irrigation or for recharge the aquifer will be guaranteed. Enforcing regulations for the use of the treated water and monitoring of the quality and quantity of water in the aquifer will be key challenges of the project.

C.2. Project / Programme Objective against Baseline

The Gazan Coastal Aquifer is the only source of fresh water for the population of the Gaza Strip. This aquifer serves mainly as a source of domestic water and for irrigation of agricultural crops.

With one of the world's highest demographic density (around 5 000 people/Km^2) and population growth (around 3%/y), the aquifer is currently severely over exploited (extractions amount to more than 3 times the annual recharged volume), leaving the population in an extreme state of vulnerability (domestic water availability is already under the 100 l/capita/day threshold as defined by the WHO) if this trend was to be continued.

Climate change has a compounding effect on the local anthropic/demographic component of the baseline scenario, with regard to the evolution of the situation of the water balance in Gaza and the future of its availability for domestic and agricultural uses.

The following equation intends to model the baseline scenario with regard to water scarcity and seek out the climate component of the growing vulnerabilities (health and economic) due to lack of water:

$$\mathbf{\Delta WB_{Ag}/\Delta t = 1/\Delta t\{\Delta P - \Delta ETP\ (Ag+\Delta Ag) + \Delta Eff.irri\} + 1/\Delta t\{\Delta Dem + \Delta Ag + \Delta Ind\}}$$

Where $\mathbf{\Delta WB_{Ag}/\Delta t}$ is the variation of the "usable" waterbalance (i.e. polluted and unusable water is not counted as positive quantities) over **Δt** (the lifespan of the infrastructure financed through the project)

In a context of relatively high uncertainty at regional and local level, a no regrets approach calls for the adoption of medium to worst case scenario assumptions for 2050 (Δt = [2018 - 2050]), which are detailed in the Excel sheet in **Annex 4**. Using the available data and published predictions (also presented in **Annex 4**), it is possible to characterize the contribution of each factor to the global trend of water scarcity in Gaza, as follows:

- **ΔP** is the evolution of precipitations over **Δt**, as a result of climate change. Rainfall is the only significant factor of recharge of the aquifer and it is assumed it will decrease 15% (worst case scenario being 30%) by 2050. This will lead to a decrease in the recharge from 60 to 51 Mm^3/y as a result of climate change.
- **ΔETP (Ag + ΔAg)** is the evolution of crop demand for water (evapotranspiration) of the existing agricultural area and of its variation over **Δt** (i.e. ΔAg), as a result of increasing temperatures due to climate change. Predictions (IPCC, AR5 2014) show an increase in temperature expected to be + 2-3°C in the Gaza Strip over **Δt**, which will cause an increase in crop demand for water (ETP) between 10 and 19% (see calculation in **Annex 4**). Initial ETP in the baseline situation is estimated at 1 400 mm/y and the rate of increase in crop water requirement (+ 15%) is applied to the total cultivated area in Gaza (10 000 ha) because (i) for irrigated crops, higher ETP will translate in increased withdrawals from the aquifer; (ii) for rain-fed crops, higher ETP will mean less recharge of the aquifer. Total crop demand for water will increase from 140 to 161 Mm^3/y as a result of climate change.
- **ΔEff.rri** represents the loss in efficiency of irrigation due to increasing salinity of the aquifer, as a result of the sea level rise. Increase of sea level (up to +35 cm according to predictions for 2050) will further salinity intrusions in the aquifer which will, in turn, degrade its quality from moderately saline (600 - 1 000 mg/l) to highly saline (1 000 - 1 500 mg/l). This will have a negative effect on the efficiency of water for irrigation purpose (more water needs to be applied to maintain the same yields and leaching practices are required) by an estimated 25% with regard to baseline. This coefficient is applied only to irrigated areas and generates an increase in crop requirements of 12 Mm^3/y due to climate change.
- **ΔDem** is the evolution of domestic water consumption over **Δt**. Population is expected to double over **Δt** and it is assumed that so is domestic water consumption, bringing it to 200 Mm^3/y in 2050.
- **ΔAg** is the evolution of water usages in agriculture due to an increase in cultivated area or intensification over **Δt**, which is deemed negligible in the case of Gaza.
- **ΔInd** is the evolution of water usages in the industrial sector over **Δt**, which is also deemed negligible in the case of Gaza and its stunted industrial development.

In aggregating these factors together, it is possible to segregate the "Human" component (1/Δt{ΔDem + ΔAg + ΔInd}), contributing a negative 100 Mm^3/y to the water scarcity trend, from **the "Climate" component (1/Δt{ΔP - ΔETP (Ag+ΔAg) + ΔEff-irri}), contributing a negative 42 Mm^3/y to increased water vulnerability for the population of Gaza over the course of the next 30 years, i.e. 30% of the overall determinant of change in the baseline scenario**.

The project aims at limiting the compounding and amplifying effects of climate change on an already degraded scenario of worsening water scarcity by bringing in new resources to the water balance and creating a closed cycle of reused treated waste water for irrigated agriculture. This will enhance the resilience of agriculture and related livelihoods in the Northern part of Gaza and, at the same time, alleviate the pressure on the aquifer and free equivalent amounts of water needed for the needs of the population of the Gaza Strip. Thirteen million cubic meters of treated waste water will be injected in the aquifer, thanks to the infrastructure provided through the project, and channeled to an irrigation scheme (1 500 ha, 4 200 beneficiaries) nearby the NGEST facilities, covering 100% of its needs. In a closed system, as that of the Gazan aquifer, where every drop is needed and used, this additional amount secured for agriculture will free the equivalent amount for other uses, in particular domestic – covering the needs of around 200 000 people. The replicability and scalability of the project in new areas of Palestine, in Gaza Strip and West Bank and even abroad will be an important outcome of the successful implementation of the project.

C.3. Project / Programme Description

As mentioned above, the launching of the NGEST WWTP and, in general, the current development of the Gazan water treatment capacity, offer an important opportunity to bring an additional resource (with regard to the baseline scenario whereby waste water is not treated and becomes a source of pollution for the aquifer) to the water balance in Gaza and, therefore, increase the resilience of its population and reduce the vulnerability of agricultural sector, in the context of climate change.

Objectives of the project

The project's goal is to **develop an integrated low-carbon water management scheme to reduce the impact of warming temperatures, decreasing rainfall and increasing aridity due to climate change, and deliver additional amounts of water usable for sustaining agriculture and increasing the resilience of a highly vulnerable population in the Gaza Strip**.

The outcomes specific to the project are as follows:

O1. Reduce the vulnerability of Gaza's coastal aquifer and secure sustainability of access to domestic and agricultural water;

O2. Promote climate resilient and water-efficient agriculture;

O3. Enhance the institutional and operational capabilities for integrated resilient water management.

Description

The project will deliver infrastructures immediately downstream from the NGEST WWTP that will allow the recharge of the aquifer, using treated waste water (13 Mm^3/year), its recovery by a network of wells, its storage and its transfer to an irrigation scheme (15 000 donums ~ 1 500 ha of gross irrigated area; the net area is estimated at 1 200 ha) located in the vicinity of the WWTP.

The project has three main outputs and its theory of change is described in **Annex 5**.

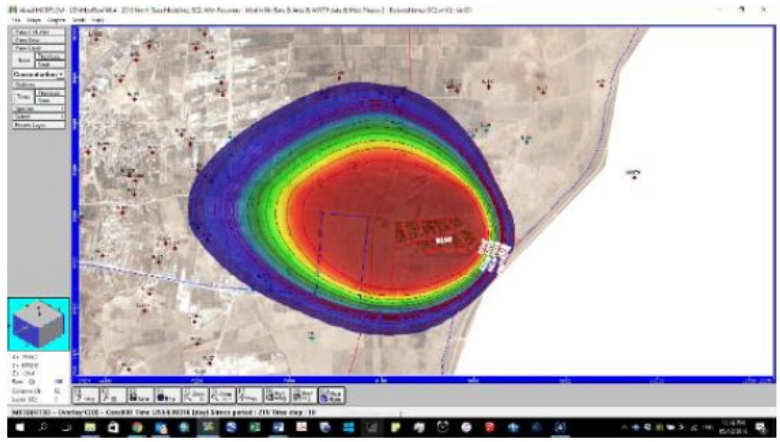
The technical and feasibility studies implemented for the preparation of the project have been conducted over a period of 5 years due to "stop & go's" in the context of intermittent degradation of the security conditions in Gaza. AFD and Palestine have financed updates of the initial studies implemented in 2013 (design of the recovery and irrigation schemes and ESIA/ESMP/RAP related to these infrastructures): the 2017 version of the design study is

presented in **Annex 6**; the original ESIA/ESMP/RAP and its update are located in **Annex 9-Feasibility Studies**. The design study for the photovoltaic (PV) scheme is also presented in **Annex 9**.

OUTPUT 1: PRODUCTION OF ADDITIONAL QUANTITIES OF WATER FOR AGRICULTURAL USE
Main outcomes from this output are:

- Recharge of the aquifer with additional "clean" water coming from the WWTP (tertiary treatment is implemented through the infiltration process) usable in agriculture;

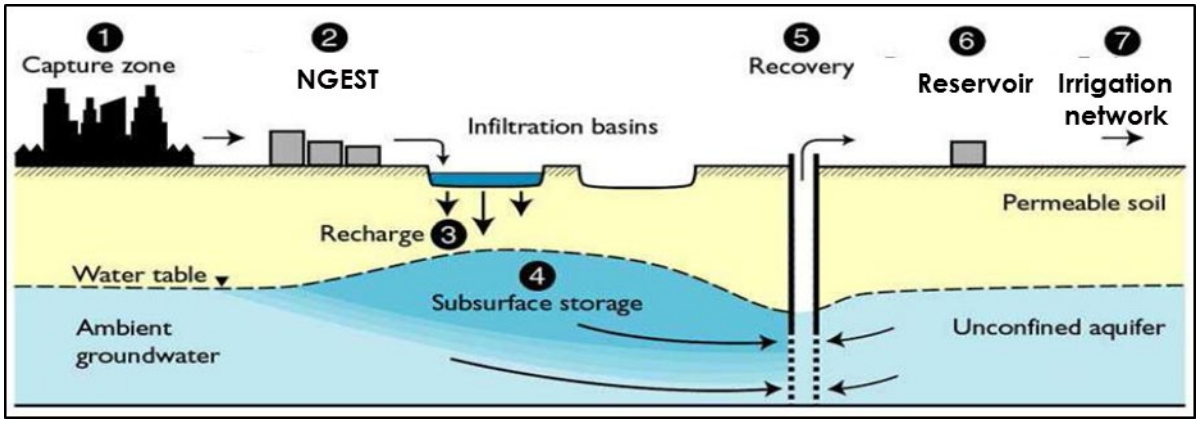
- Depollution of the aquifer and environmental and sanitary impacts of the existing pollution on the Gazan population (see ground water modelling outputs illustrated hereunder).

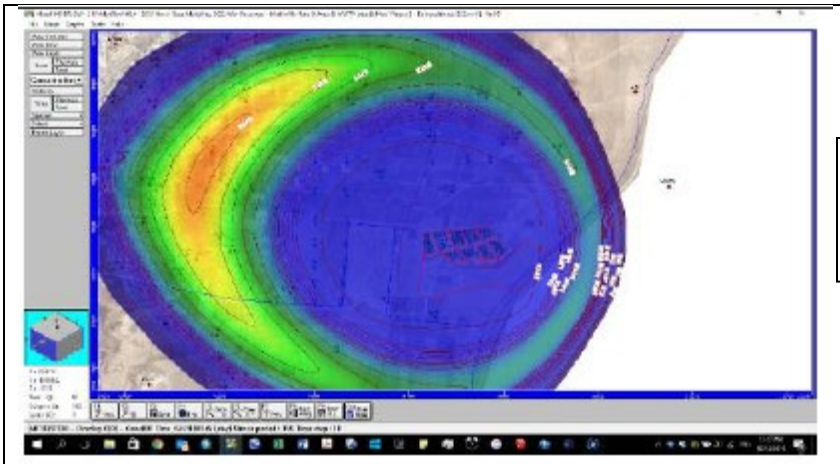


2016

The red area shows the progression of underground pollution due to the infiltration of untreated wastewater and its progression towards the urbanized areas. The infiltration basins cas be distinguished at the origin.

The following illustration presents the Managed Aquifer Recharge (MAR) approach that will be put into place for NGEST:





2024

This image shows the results of MAR in the project scenario and, in particular the depollution effect.

Activity 1.1 An additional water resource is created by Managed Aquifer Recharge

Input 1.1.1 Rehabilitation of 7 infiltration basins for recharge of the aquifer

The belated entry in service of the NGEST WWTP (in 2018 instead of 2015), the dangerous accumulation of raw waste water in the Gaza Strip and the inexistence of alternate solutions in the context of Gaza, has constrained Palestine in transferring the waste water from the Beit Lahia WWTP to the infiltration basins located in the NGEST perimeter. For 8 years, raw waste water has therefore been infiltrated in the aquifer, creating a pollution plume underground, as well as accumulating residue and clogging the infiltration basins.

The World Bank (WB) has undertaken to rehabilitate 2 of the 9 basins and the project will complete the works (rehabilitation of the 7 remaining basins) to deliver a fully operational infiltration scheme for the recharge of the aquifer. Since this input is 100% under AFD grant financing, tender documents have been published in spring 2019 and contractor is currently being selected.

Input 1.1.2 Delivery of the recovery scheme

The TWW reuse scheme relies on a tertiary treatment obtained by infiltration through sandy soil and the recovery of the water, stored in the shallow section of the aquifer, by a network of 28 wells located 500 m downstream from the infiltration point in a concentric formation. The recovered water will converge, through a network of pipes connecting the wells to 2 reservoirs of 4 000 m^3 each, in order to manage the distribution according to the needs. The organization of the full NGEST scheme is presented in the final design study presented in **Annex 9**. Technical specifications are detailed in the same Output of the design study as well as precise location of wells, which are also presented in the ESIA and RAP.

The first part of this investment (14 recovery wells and 1 reservoir) has been completed under WB financing; the project will implement the second phase of this investment (14 remaining wells and an additional reservoir).

Activity 1.2: Water – Energy Nexus, development of renewable low-emission energy solutions

Input 1.2.1 Development of solar energy capacity for the NGEST WWTP and treated waste water (TWW) reuse complex

Securing the treatment of waste water, the recovery of the clean water from the aquifer and its transfer to agricultural lands depends on the performance of the NGEST plant and of the Recovery Scheme (RS) and, in particular, on the reliability of its power supply (strongly constrained in the baseline by restrictions on access to electricity –generated by diesel generators- due to the geopolitical situation).

The water-energy nexus has been part of the NGEST implementation strategy since the inception, as co-generation facilities, using the biogas released by the sludge produced by the WWTP, are already in place (previously financed

by AFD-WB-EC). The present Project will take the water-energy nexus one big step further by taping in a renewable and abundant source of energy in the context of Gaza: solar radiations.

The project, in the framework of a partnership between the PWA, PENRA and the Gaza Electricity Distribution Company (GEDCO), will set up a total surface area of 8.5 ha of ground-mounted photovoltaic (PV) panels within the premises of NGEST WWTP (2 ha – PVc1), around the recovery scheme (3 ha – PVc2) and in the Restricted Access Area (RAA) adjacent to NGEST (3.5 ha PVc3)[2]. The three solar parks, of a total installed capacity of 7.5 MWp, will produce an average useful 9 411 MWh/year in comparison with the 10,659 MWh/year needed for the overall reuse scheme (TPS + WWTP + Recovery + Irrigation). It is important to highlight that electricity production from PVc1 and PVc2 will be used to directly supply the needs to operate the WWTP and the Recovery & Irrigation site and only the excess of energy will be fed to the electricity grid. PVc3 will feed all its production to the electricity grid and will be delivered back to the system (to cover needs when the solar parks are not producing) through the net metering mechanism.

By adding the PV fields to the NGEST system, the annual direct supply from the grid in its first year of operation will be reduced by 59 % and the required annual energy from the emergency diesel is taken down by 45 %, leading to a direct saving of around 4.7 million liters of diesel fuel per year. Accordingly, the PV share in the energy mix feeding NGEST system on the first year of operations should reach 38 % of the total annual power consumption, diesel 12 %, grid electricity 20 % and biogas 30 %.

The NGEST WWTP + RRS power supply without PV and with the current supply options lead to an overall Levelized Cost of Energy (LCOE) of 0.24 USD/kWh. NGEST with the PV installed will have an overall LCOE of 0.155 USD/kWh, making it much cheaper than the "no PV situation". This will generate savings amounting in 700,000 USD in the first year, together with a gain of 1,500,000 USD from net-metering (compensation of electric consumption from other sites by feeding extra PV power to the grid). Over the lifespan of the project, the gain should be around 36,000,000 USD in present value at 5 % discount rate.

The three PV schemes will produce a total of 10 519 MWh/year, both for supply of energy to the WWTP (1 752 MWh/y) and recovery scheme (2 479,5 MWh/y), as well as supply to the grid (6 288 MWh/y), displacing high carbonated generation from diesel generators and from the grid (diesel power plant in Gaza and Israeli electricity). This will lead to emissions reduction of 5 561,95 tCO2e/year over 30 years (GHG calculations are presented in **Annex 21**).

OUTPUT 2: DEVELOPMENT OF IRRIGATION, WATER EFFICIENCY AND CLIMATE RESILIENT AGRICULTURE
Main results from this output are:

- Agricultural farms and livelihoods are maintained in Northern Gaza ;
- Improved agricultural practices and more efficient use of water are extended to increase the resilience of agriculture to the effects of climate change and implementing **climate resilient agricultural practices**.

This output consists of the delivery of an irrigation scheme over a gross irrigable area of 1 500 ha as well as services provided to the farmers/water users aiming at improving their practices, thereby enhancing their resilience and reducing their vulnerabilities. The beneficiaries are all the households end users of the water that will be delivered by the irrigation scheme. They are already identified and aware of the project.

Activity 2.1: An improved water service for irrigation is brought to 4 200 beneficiaries over 1 500 ha

Input 2.1.1 Delivery of an irrigation scheme, 1 500 ha

[2] This land belongs to NGEST but is located within the ARA alongside the boarder; Israeli authorities have communicated their willingness to authorize the implantation of PVc3 on that land adjacent to NGEST facilities. This is an example of the high level of coordination existing between the project and Israeli authorities, which have shown willingness to collaborate in the execution of all phases of the NGEST programme.

The project will deliver a distribution network in order to service two irrigated sub areas of 500 ha and 1 000 ha of gross irrigable area located around the WWTP (see **Annex 9**, Design Study), corresponding to a total of 126 km of pipeline and the upgrading of the booster station in order to support drip irrigation practices. Project areas were selected based on the potential irrigated area around the NGEST facilities, delimitating an irrigation scheme, on which farmers are present in the baseline. On-farm investments will be included in the costs supported by the project but will be reimbursed (with a subsidy rate) by the farmers over a 3 years' period in order to set up an O&M fund for the WUA. The delivery of the irrigation scheme will take place in two lots, one of 500 ha and another of 1000 ha, plus one lot for the provision of on-farm equipment (drip irrigation). Tendering documents for the first lot of 500 ha are currently being prepared by PWA, since it is an investment 100% under AFD grant financing. Also are tendering documents for the Works supervision contract associated to these works.

The NGEST WWTP, which is operating since March 2018, generates 35 600 m^3/day of treated water, i.e. 13 million m^3/y; this represents allocations of about 10 000 m^3/ha/y which is sufficient water to sustain agricultural needs (horticulture and vegetable growing) in Gaza. In the current situation, pumping in the aquifer is done through private wells which partially irrigate the 1 500 ha of interest to the project. Each well is owned and managed by shareholders who are the main users of the water and pay the real cost of its extraction (mainly the cost of diesel, O&M); non-shareholders may have access to water, but will pay an additional fee apart from the cost of extraction. In any case, water for irrigation is not available on a daily basis and water turns are usually of 10 to 12 days.

The project will support the creation of a Water Users Association (WUA), to which the recovered water will be delivered and sold to and which will have the responsibility of equally distributing it to all users through the application of a transparent and approved tariff. The design of the irrigation scheme to be delivered by the project will allow availability of water for all farmers, every day, 12 hours per day. The drip irrigation systems installed by the project will increase on-farm productivity and generate *more crops for the drop* and consequently generate more income for the farmers.

Activity 2.2: Increased climate resilience of agriculture, adaptation of cropping systems to climate change

Input 2.2.1: Extension services to farmers

In the baseline situation, farmers have little access to extension and advisory services and in the context of limited and fluctuating access to water, cropping patterns practiced by farmers show low levels of profitability and efficiency with regard to water. The feasibility study of the project has shown how changes and transformations at farm level can improve the profitability of agriculture and save water.

Nevertheless, these changes cannot be imposed on the farmers and will need to be adapted to the needs on a case by case basis through the provision of professional extension services, to be provided through the project (technical and economic advisory; capacity building by demonstrations; farmer field schools; training).

The preliminary data obtained through hydrological modeling, as well as analysis of the quality of water extracted from the aquifer show that the water recovered from the wells will be fit for all agricultural uses and according to Palestinian law, the recovered water is equivalent to groundwater, on which no restrictions are imposed (contrary to treated waste water coming directly from the treatment plant and used for irrigation). The high level of nitrogen in the water prevents it from being drinkable but constitutes an advantage for agricultural use (saving equivalent amounts of fertilizer).

Finally, the use of treated and disinfected effluent sludge from the NGEST WWTP will be promoted by the project in order to substitute the use of chemical fertilizers for environmental and economic reasons (in line with Palestinian standards and EQA approval).

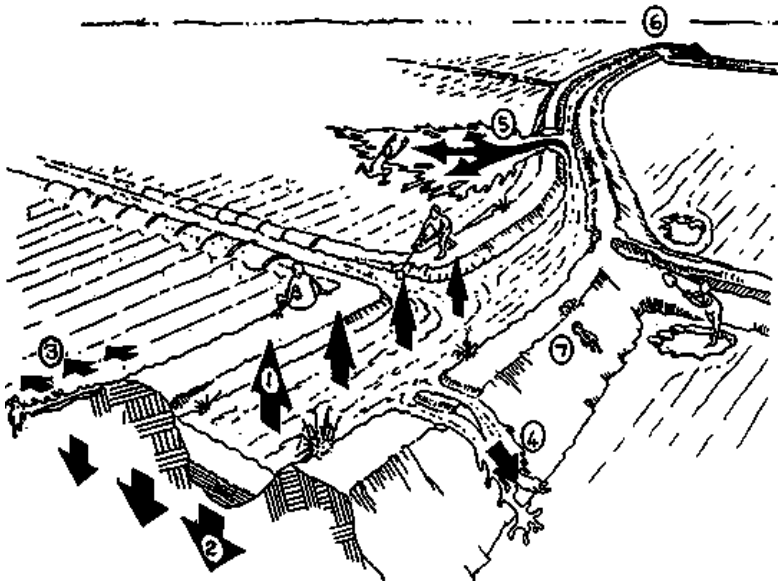
Support to on-farm activities is the mandate of the Ministry of agriculture of the Palestinian Authority, which will seek technical assistance from the Food and Agricultural Organization of the United Nations in order to perform this task in the framework of the project. The FAO will provide technical and training inputs on development of climate resilient agriculture, crop and yield quality control and knowledge management with regard to best practices for reuse of TWW. More details on FAO's input to the project overall (in outputs 2 and 3) are presented in **Annex 10**.

Input 2.2.2: Subsidy of on-farm water saving equipment

The provision of the above technical extension services is an opportunity for Gazan farmers to transform their practices and the ways they manage water at on-farm level in order to adapt to water scarcity and compounding effects of climate change. These transformations nevertheless require a concomitant mix of services to farmers and availability of water-saving-equipment, in particular for drip or sprinkler rather than surface irrigation. Surface irrigation (based on canals which are dug by the farmers or workers) typically requires no equipment and only relies on work force, but suffers from high levels of water losses in canals, in terms of:

1. Evaporation from the water surface
2. Deep percolation to soil layers underneath the canals
3. Seepage through the bunds of the canals
4. Overtopping the bunds
5. Bund breaks
6. Runoff in the drain
7. Rat holes in the canal bunds

As shown in the figure below (source: FAO):



Surface irrigation is widespread in Gaza, as in most low income countries where irrigation is practiced, but its low efficiency is one of the main obstacles to adaptation of the farming systems to growing water scarcity because of climate change. Other irrigation methods exist, which show greater water efficiency (see table below), but require specific equipment:

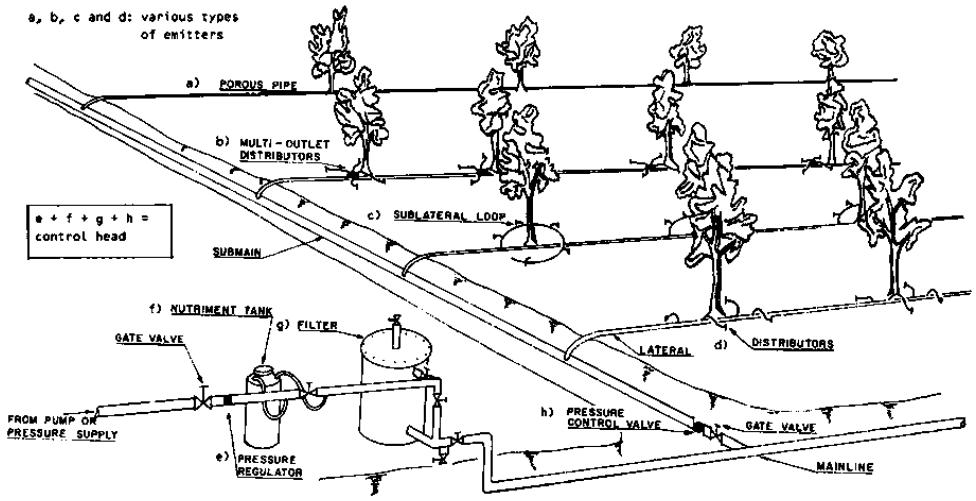
Irrigation methods	**Field application efficiency**
Surface irrigation (border, furrow, basin)	60%
Sprinkler irrigation	75%

Drip irrigation	90%

(Source: FAO)

A typical drip irrigation system is, according to the FAO, generally composed of the following components:

- The **pump unit** takes water from the source and provides the right pressure for delivery into the pipe system.
- The **control head** consists of valves to control the discharge and pressure in the entire system. It may also have filters to clear the water. Common types of filter include screen filters and graded sand filters which remove fine material suspended in the water. Some control head units contain a fertilizer or nutrient tank. These slowly add a measured dose of fertilizer into the water during irrigation. This is one of the major advantages of drip irrigation over other methods.
- **Mainlines, submains and laterals** supply water from the control head into the fields. They are usually made from PVC or polyethylene hose and should be buried below ground because they easily degrade when exposed to direct solar radiation. Lateral pipes are usually 13-32 mm diameter.
- **Emitters** or drippers are devices used to control the discharge of water from the lateral to the plants. They are usually spaced more than 1 meter apart with one or more emitters used for a single plant such as a tree. For row crops more closely spaced emitters may be used to wet a strip of soil. Many different emitter designs have been produced in recent years. The basis of design is to produce an emitter which will provide a specified constant discharge which does not vary much with pressure changes, and does not block easily.



Conversion to drip irrigation combined with the appropriate capacity building of farmers and adaptation of the cropping systems (which the extension services provided by the FAO will ensure) can divide by 2 or 3 the water losses in Gaza, and is therefore a key adaptive measure to tackle compounding effects of climate change on water scarcity.

Nevertheless, investment by the farmers in these technologies (widely spread in Jordan) and appropriate training and extension services are scarce in Gaza. This is mainly explained by the high cost of the appropriate equipment (estimated at 3 000 EUR/ha) and the relatively low profitability of agriculture in the area.

Observation of similar contexts in Israel, Jordan or North Africa shows that promoting water efficient irrigation in Gaza corresponds to a no-regrets approach to adaptation to climate change, as it appears relevant and necessary in all future scenarios, including the present situation.

The project intends to provide a "push" towards conversion of current irrigation practices to more efficient ones (sprinkling and drip) by financially supporting it, through the pre-financing of 100% of the cost of the equipment needed for it to happen (along with training and extension services mentioned above). This pre-financing will be delivered to farmers that will have confirmed their membership to the Water Users Association (WUA) and have agreed to reimburse the amount invested by the project for on-farm equipment, over a period of 5 years. The proceeds of these reimbursements will serve to constitute the WUA's Operation and Maintenance (O&M) and investment fund, which is an important element of the project's Exit Strategy.

Input 2.2.3: Gender, land tenure and irrigation – a gender-responsive approach to agricultural resilience to climate change

A Gender Action Plan (GAP) has been developed and is presented in **Annex 12**. The GAP will be the overall guiding document for the mainstreaming of gender in relation with all outputs of the project. The main specific inputs related to gender are detailed in this section, among which that related to land tenure and irrigation.

In Gaza, land tenure is more in favor of men, as a result of cultural practices, social customs and traditions. This reality is strongly embedded in a relatively rigid and complex cultural apparatus, which the project will have no power to change entirely.

In relation specifically with the development of irrigation in the area, the project will investigate (through an initial diagnostic during inception phase) opportunities whereby women could gain access to the land they own or improve their use of land they already have access to, by increased access to water and technical services. These opportunities will be sought through a process of community involvement, whereby family and community members become instrumental in establishing these channels of improved access to land. Of course, the first step of the community involvement around the issue of "irrigation and gender" will be to mobilize the women in the communities, in order to understand their needs, objectives.

Through a diagnostic and community mobilization work, it is anticipated that a group of women willing to embark on a process of improved access to land and water will be formed, sponsored by the community. This group of women will be supported by the project (namely through a methodology developed by the FAO[3], that will be adapted to the context of Gaza) through positive action with regard to access to water (see hereunder, participation of women to the governance of the WUA) and technical services in order to develop intensive and quality cropping (gardening) on their micro-plots of land.

As a second step, if possible/needed/wished, groups of women will be supported in forming into cooperatives in order to market their products or create food banks for their families, according to their objectives.

This activity will be coordinated by the Ministry of Agriculture and FAO and will involve local civil society and women non-governmental organizations. In terms of methodology, the GAP will be implemented using inputs from the FAO (see **Annex 10**) and particularly from the International Union for Conservation of Nature- **IUCN's training Manual on Gender and Climate Change**[4]. Civil society and WNGOs will not be EEs. They may be recruited or selected to support the implementation of this input.

OUTPUT 3: MANAGEMENT OF THE WATER CYCLE AND CAPACITY BUILDING OF STAKEHOLDERS

Main expected results from this output are:

- Improved water governance (co-management with users) and increased water use efficiency in the context of growing aridity and increased demand due to climate change;
- Sustained operation and maintenance of adaptation infrastructure.

This output represents the institutional aspect of the project, which, in the context of « reuse of waste water » and its multiple stakeholders and need for coordinated action, is of particular importance.

[3] See : www.fao.org/3/a-be879e.pdf
[4] https://portals.iucn.org/union/sites/union/files/doc/training_manual_on_gender_and_climate_change.pdf

Activity 3.1: Strengthening of PWA in its role of coordination and quality control of the process of reuse of treated waste water

Input 3.1.1: Technical assistance

The PWA is the main implementing agency of the project and will be responsible for all the infrastructures that will be delivered through the project; for the establishment of the irrigation scheme (in particular the on-farm investments) and the "soft" components, it will coordinate with the ministry of agriculture and the FAO (see **Annex 10**).

A technical assistance (TA) will be provided to the PWA for the duration of the project. The TA has been designed with the PWA in order to ensure progressive transfer of tools and know-how within the project time frame of five years. Indeed, the PMU is well staffed and has already benefited from several capacity building activities since the NGEST system and associated projects have been initiated (see details in section C.4). Main issues needing support identified by PWA are:

- Coordinating actions of the implementers: MoA/FAO and PWA;
- Setting-up the M&E system for water quality for irrigation and for the whole project implementation (including coordination with MoA/FAO);
- Stakeholders communication: implementing the MSEP and coordinating messages to different stakeholders (including beneficiaries);
- Some specific expertise on a short term basis, such as ESMP and RAP implementation, delivery of on-farm irrigation equipment, Gender action plan implementation.

In the context of Palestine and of the high professional level of the PWA, there is no need for full time TA for the duration of the project. Once all tools and procedures will be implemented and transferred to the PMU, it will gradually be converted from full-time into backstopping support and short term expertise on an *ad hoc* basis, for the remaining duration of the project.

This TA will be integrated within the PMU at the PWA in Ramallah and Gaza. The corresponding services will be acquired through an international bidding process.

Furthermore, the PMU will be supported in Works supervision by specialized contractors.

Tendering documents for Technical Assistance are currently being prepared by PWA (the activity is 100% under AFD grant financing).

Input 3.1.2: Setting-up of a water quality monitoring and control system

The PWA, in coordination with EQA, will be in charge of establishing and implementing monitoring procedures to supervise the water infiltrated in the aquifer and that recovered through the wells downstream in order to guarantee the quality of the water delivered to the irrigation scheme. The system will rely on 15 monitoring wells equipped with measurement probes, 5 of which will be financed through the project. The project will also support the upgrading of the laboratory located at the NGEST WWTP and the capacity building of the staff employed in the laboratory in charge of performing the quality tests.

The monitoring system is a central piece of the ESMP of the project and will provide the information and data necessary to sustain a quality and transparent communication and dialogue between the water provider and the end-users in order, namely, to fine tune agricultural practices and cropping patterns to quality and quantity of the water delivered to the irrigation scheme.

A Groudwater Quality Monitoring Plan will be put into place, based on the Palestinian/Jordanian guidelines for irrigation water. For heavy metals, a stricter standard will applied (WHO/EU standards for Drinking Water) in order to follow a zero risk policy. These standards and the full Groudwater Quality Monitoring Plan are presented in **Annex 23**. The Water Quality Monitoring Plan will pay special attention to the most hazardous contaminants (e.g. Hg and B). If the levels of these elements are close to the permissible limits, those elements should also be periodically tested in the soil in order to control accumulation. If soil samples present values exceeding internationally recognized standards, boron and mercury shall also be tested in plants to control absorption, bioaccumulation and possible health hazards for consumers.

The laboratory and related equipment to be financed through the project will increase the monitoring autonomy of PWA and allow throurough and intensified monitoring of water quality for the duration of the project, prior to and during the activation of the recovery wells and distribution of water to farmers. Once the laboratory is up and running, the WQMP will be put into place.

Activity 3.2: Exit Strategy and Transfer of O&M to Water Users

As per the 2014 Water Law and recently approved by-laws on the Water Users Associations (2018, see **Annex 13**), hydraulic infrastructure must be jointly managed between the public sector and the users themselves and, when possible, be transferred to full management by the users. This co-management or co-operation has both an institutional (establishment and capacity building of a WUA) and financial dimension (cost-sharing of investments and O&M) that gives birth to a transaction between a water provider and a water user, at a certain tariff and to a set of rules and procedures for the management of the infrastructure.

Several co-management scenarios exist and determining the appropriate one in the context of the project is the result of a consultation and feasibility process (including a tariff and "willingness to pay" study) that will be undertaken, in the first few months of the project with the support of the FAO (see **Annex 10**), locally with the farmers/water users/land and well owners of the irrigation scheme.

A possible scenario, that will necessarily have been tested and adapted through the process described above, could be as follows:

1. The PWA would own (and for the first few years, also operate) the Recovery and Reuse Systems with the ultimate goal of transferring the operation and management of the irrigation scheme to the Water Users Association (WUA);

2. This would imply that:

- PWA would own the Reuse System, and operate it for the first 3 years of the project;
- During the first three years the WUA and Ministry of Agriculture in addition to PWA would receive intense capacity building;
- After the first three years of the project, PWA will continue operate the recovery scheme until the functional establishment of the National Water Company (NWC) and the WUA would assume operation and management of the Reuse scheme;
- PWA would continue to own the irrigation scheme but would lease them to the WUA.

3. The farmers will own and be responsible for operation of the On-Farm System (drip irrigation network), with the support of the WUA helping to coordinate farmers for technical assistance and capacity building with modern irrigation techniques and the proposed cropping pattern.

In financial terms, the sustainability and replicability of the project depends on the involvement of various donors, government and farmers, as per their capacity to cover the following costs:

(1) Capital Investment for the Water Recovery Scheme;

(2) Capital Investment for the Water Reuse (irrigation) Scheme up to Farm's Gate;

(3) O&M costs for the Water Recovery Scheme;

(4) O&M costs for the Water Reuse (irrigation) Scheme;

(5) Capital Investment for On-Farm's Development.

The preferred scenario involves Capital (1, 2 and 5) and O&M subsidies from the Government, in a context of high vulnerability of the population. Costs (1) and (2) will be paid by the Government/Donors. Costs (3) and (4) would be subsidized by the Government only until Farmers have paid back cost (5). Farmers are expected to pay for the development of their own farm. All other costs are paid by the Government/Donors for the first 3 years (i.e. the time it takes for the farmers to be able to pay back the improvement of their farm). After that point, farmers will be responsible for paying O&M costs for the whole system (evaluated tariff at .33 USD/m3 and would need validation by the Water Sector Regulatory Council, WSRC, as per the 2014 water law).

Input 3.2.1: Identification and establishment of the co-management scheme – Structuring and capacity building of a WUA

Any scenario of co-management to be established during the lifetime of the project implies that:

- The WUA to be created will be rapidly functional and have the adequate level of capacities to dialogue with the water provider and properly negotiate the financial and non-financial conditions whereby effective co-management and cost-sharing will enter into force;
- The farms, constituting the economic entities using the water, have been sufficiently supported by the project – and first economic outcomes of this support to be observed- in order to create the necessary resources and incentives to participate in the costs of O&M of the scheme.

Setting-up and support to WUAs is the mandate of the Ministry of Agriculture of Palestine; for the purpose of this project, it will be assisted in its mandate by the FAO, as its implementation partner, through which other institutions and NGOs may also be involved.

Input 3.2.2: Integration of women in the governance bodies of the WUA

In order to support change with regard to access of women to land and water, it is essential that positive action be taken to ensure that women are represented in the bureau of the WUA and have effective means of taking part in the decision making with regard to water allocations.

Activity 3.3: Communities are empowered and supported, in the context of the conflict in Gaza

Input 3.3.1: Diagnostic and analysis of the conditions of restoration of unused land within the irrigable area

As it is the case in other parts of Palestine, in particular in occupied areas of the West Bank, the protracted conflict situation has consequences on the state of mind and psychological welfare of the populations, affecting negatively human interactions within the communities (capacity to resolve conflicts and to work together) and also households. In turn, this situation has implications, in the project area, on the capacity of farmers to make use of their land and to work together in community-based or collective water management (WUA) and agricultural (cooperatives) activities.

This situation and its complexity will be analyzed during inception by the FAO in order to understand the determinants of maximizing the irrigated area and agricultural production. This diagnostic study will involve household surveys for all beneficiaries of the project, including economic and social analyses of their situation.

Input 3.3.2: Psychosocial support and strengthening of community and household bounds

As suggested above, transfer to users of hydraulic infrastructure and community based organizations will have a chance to work and perform only if the women and men that constitute them are capable of interacting positively to reach a common goal. All processes related to changes in practices, in particular for adaptation to climate change or change in terms of gender will not take place spontaneously. This is particularly the case in the context of Gaza and when a common pooled resource is at stake. Community and collective work leading to those changes requires changes in the mindset of people and an ability to join forces, to work together: this is not possible in a context of protracted conflict, without psychosocial support. This type of support is then catalytic and quintessential to successful adaptation strategies.

In the context described above, and based on a more detailed baseline study to be performed during the inception phase, the project will design and provide a psychosocial support package to the communities including collective and individual services aiming at re-boosting the community dynamics. A particular set of services and activities will target women and their position within the family – linking with the issue of their access to land described above. This activity will therefore be strategic for and closely linked to the implementation of the Gender Action Plan.

This support will be delivered through the FAO, which will mobilize other specialized organizations.

Activity 3.4: Capitalization of the outputs/outcomes of the project for replication and upscaling in Palestine

Input 3.4.1: Intellectual services for capitalization

The project will help deliver the first large scale reuse of waste water scheme in Palestine. The process of its establishment and the quality of its related services, outputs and outcomes will need to be documented, analyzed through independent expertise, in order for the experience to be evaluated with credibility and, eventually, replicated and/or up-scaled (the overall waste water treatment capacity of Gaza will keep growing over the years).

The project will therefore provide resources to perform such intellectual services for capitalization during the project life time, including a mid-term and final evaluation, and the results could help updating the incoming NDC, for instance.

C.4. Background Information on Project / Programme Sponsor (Executing Entity)

The PWA is a public entity directly attached to the Presidency of the Palestinian Authority; its mission is to manage, develop and protect water resources for Palestinian citizens, while respecting the environment. According to the 2014 Water Law, the PWA is in charge of defining sectoral policy and is responsible for conducting the reform process according to a strategic three-year plan. The plans involves establishing a National Water Company to manage all water resources, a Regional Water Utilities institution to efficiently manage water distribution and Water User Associations in collaboration with the Ministry of Agriculture, which will be responsible for managing the water irrigation infrastructure. It is important to note that the by-law for Water User Association was proposed by PWA and approved by the Palestinian Cabinet in April 2018.

The PWA has headquarters in Ramallah and Gaza, as well as representatives in all governorates. A Project Management Unit (PMU) was set up in 1997 within the PWA to manage all projects implementation financed by donors or by the Palestinian Government. The PMU in Gaza has so far brought together 15 staff members, including 11 engineers (mechanical, civil, environmental, water, and wastewater), and one Financial Manager for the implementation of NGEST WWTP and the first batch of the Recovery Scheme. The PMU in the Ramallah HQ includes a Financial Manager and Procurement Expert to monitor the activities in Gaza and to liaise with other PWA departments (Procurement Department and Financial Controllers within the Palestinian Ministry of Finance). This PMU participated in an extensive capacity building program in 2011-2013 through the World Bank, which helped it streamline its financial and procurement processes to satisfy both the Palestinian procedures as well as international donors' reporting requirements. Several major projects where implemented by the PWA/PMU in Gaza such as North Gaza Emergency Sewage Treatment program (NGEST – 75MUSD) financed by the World Bank, EU, AFD, SIDA and other donors; the ongoing Wastewater treatment Plant at al Bureij (35 MUSD) financed through the KfW. Within the PWA strategy (2017-2022), the PMU in Gaza will form the core team for the future National Water Company.

Thanks to comprehensive working sessions between the PMU/PWA Director and the AFD, the PMU/PWA team has been adjusted for this Project's needs. It will be responsible for all tendering activities for capital investments, recruiting international technical assistance for project management support, and for ensuring the financial management of the Project. The Chairman of the PWA has officially appointed each member of the PMU as per the table below.

This team will be responsible for the operation and maintenance of NGEST WWTP and the first tranche of the Recovery Scheme, as well as the implementation of the Project. As a result, salaries and operational costs of the PMU will be partly funded by the Project, as presented in the table below. The remainder will be financed by the World Bank budget support.

Furthermore, the PWA will prepare a note describing the institutional set up for O&M of all NGEST facilities (WWTP + Recovery and irrigation scheme), as a condition precedent to the first disbursement of AFD's financial contribution to the Project. This note shall include a cost analysis of O&M, including: fixed costs (e.g. labor) and variable costs (e.g. energy), as well as provisions for renewal of the irrigation scheme components (pipes, pumps…), and a discussion of how the costs will be recovered through different scenarios involving the

participation of the farmers, the WUA, and relevant Palestinian Authority institutions. Finally, this note will appraise the scenario presented in **Activity 3.2** and is part of the Exit strategy for the project.

Position within the PMU	Salaries and operational costs financed by the Project
1- PMU Director (based in Ramallah)	The PMU Director will ensure overall coordination of the project and link with the PWA Chairman. His contribution is not financed by the project
2- Project manager and Material access coordinator (based in Ramallah)	2019 : 100% 2020→ 2023: 50%
3- Procurement Manager (based in Ramallah)	2019 : 100% 2020→ 2023: 50%
4- Financial Manager (based in Gaza)	2019 : 100% 2020→ 2023: 50%
5- Site Manager - Environmental and Social + Recovery scheme supervision (based in Gaza)	2019 : 100% 2020→ 2023: 50%
6- Site Manager - Electrical Engineer (based in Gaza)	2019 : 100% 2020→ 2023: 50%
7- Site Manager - Civil Engineer + Irrigation scheme supervision (based in Gaza)	2019 : 100% 2020→ 2023: 70%
8- Site Manager - Rehabilitation of Effluent (based in Gaza)infiltration Basins/Surveyor/Quantity Surveyor	2019 : 100% 2020→ 2023: 50%
9- 1 receptionist/secretary (based in Gaza)	2019→ 2023 : 100%
10- Operator 1 (based in Gaza)	2019→ 2023 : 100%
11- Operator 2 (based in Gaza)	2019→ 2023 : 100%
12- Guard 1 (based in Gaza)	2019→ 2023 : 100%
13- Guard 2 (based in Gaza)	2019→ 2023 : 100%
14- Driver (based in Gaza)	2019→ 2023 : 100%

For activities located outside the mandate of the PWA, related to on-farm activities, the Ministry of Agriculture (MoA) of the Palestinian Authority will take over the implementation as an Executing Entity. The Ministry structure includes the Directorate General for irrigation and the General Directorate for Extension services that are providing services to the framers through their district offices. However, within the particular context of the Gaza Strip, the MoA designated three directors in Gaza Strip to coordinate with PWA for this project implementation and the Ministry will seek the assistance of the FAO as its Implementing Partner to implement Outputs 2.2, 3.2 and 3.3; based on the FAO know-how and previous experience in Gaza, the FAO will engage Civil Society Organizations (CSOs) according to its sets of rules and regulations to implement parts of the tasks within 2.2, 3.2 and 3.3. MoA and FAO have a pre-existing partnership. The MoA will mobilize the FAO under this

partnership umbrella and sign a tripartite project agreement between AFD, MoA (representing Palestine) and FAO for the joint implementation of the aforementioned activities.

FAO's coordination office for the West Bank and Gaza Strip programme is operating since 2002 and implements its programme through a team of 45 employees (35 nationals and 10 internationals) in 3 offices (Jerusalem, Ramallah and Gaza). Having developed strong partnerships with a large number of stakeholders in the Palestinian agriculture sector, FAO is a central stakeholder in capacity development and for the facilitation of institutional coordination between public, private and non-governmental actors in the agriculture sector. In close partnership with the Ministry of Agriculture, FAO recently supported the development of the Revised National Standards for the Use of Reclaimed Wastewater for Irrigation, which defines the required qualities for different types of crops. Building on this experience along with experience of similar work from areas with similar climate and socio-economic conditions, FAO is uniquely positioned to address the enabling conditions for effective and sustainable TWW in a comprehensive manner, which requires taking a combination of legal, regulatory, socio-cultural, economic, environmental and technical factors into consideration. FAO in Jerusalem works also closely with FAO Head Quarters in Rome and FAO RNE (Regional office for the Middle East) in Cairo, which have built a strong expertise in TWW and water management in the MENA region.

In conclusion, All inputs will be implemented by the PWA, with the exception of 2.2.1, 2.2.3, 3.1.1, 3.2 and 3.3, implemented by MoA-FAO.

C.5. Market Overview (not applicable)

Describe the market for the product(s) or services including the historical data and forecasts.
Describe the competitive environment including the list of competitors with market shares and customer base and key differentiating factors (if applicable).
Provide pricing structures, price controls, subsidies available and government involvement (if any).

C.6. Regulation, Taxation and Insurance (if applicable)

Construction permits: they are usually delivered by Municipalities, but Government institutions are exempt from this procedure.

Environmental permit: EQA has approved the updated version of the ESIA; updated version of the RAP will be also submitted to the EQA.

Land titles: the NGEST project land titles are lands registered in PWA benefit as governmental land that was an acquisition of endowment land registered under the Waqf Ministry since 2013 (reference PA Council of ministers Decree 4/284/11 for the year 2013).

Taxation: As AFD financing agreements signed with the PA are exempt from taxes and duties, the funding will get the required exemptions during the implementation as per the PA Tax Regulations.

Insurances: Following the PA procurement law and the signed funds financing agreements, Contractors are always requested to furnish adequate insurance policies within their contracts for the duration of the implementation period.

C.7. Institutional / Implementation Arrangements

Contracting authority

AFD will sign a subsidiary agreement with the Ministry of Finance and Planning in Ramallah (representing the Palestinian Authority). This agreement and the related project documents will specify the tasks dedicated to the PWA and to the Ministry of Agriculture. The project will be implemented by two Executing Entities (EEs): the PWA and FAO.

For the implementation of the project, AFD will also enter into 2 tripartite Project Agreements with, respectively, PWA and MoF and, the FAO and MoA. For the avoidance of doubt, the tripartite project agreements will also be considered Subisidiary Agreements.

Accordingly, there will be a total of three Subsidiary Agreements for the implementation of the project.

AFD, as the AE, will be responsible for the project implementation and activities carried out by EEs.

Project implementation responsibility

The Ministry of Finance and Planning will sign an on-granting agreement with the PWA (the PWA is an independent public organization; therefore, an on-granting agreement is required). The PWA will be the lead Executing Entity for the project and will be in charge of the overall coordination of the activities and of the "hard" components of the project (i.e. delivery of the infrastructure).

The execution of the tripartite project agreement, between AFD, MoFP (representing Palestine) and PWA will be a condition precedent to the first disbursement under the AFD-Palestine Subsidiary Agreement.

The Ministry of Agriculture according to the grant agreement will be responsible, as Executing Entity, for part of the project implementation, for activities related to on-farm development.

MoFP will not channel funds. It is the legal representative of Palestine for the signing of financial agreements with AFD. It also has legal power to on-grant resources to any Public Entity designated by Palestine and AFD to execute the project, in this case PWA. Disbursements will be made directly to PWA (EE 1) or MoA-FAO (EE 2) or to Contractors.

Main stakeholders

The PWA – Executing Entity: will be directly responsible of the project implementation apart from on-farm activities.

PWA is a government body of separate legal personality as Palestine/Palestinian Authority. AFD's sovereign relationship as a bilateral donor and through a Grant Agreement is with Palestine (represented by its Ministry of Finance), which subsequently on-grants the funds to PWA as the Executing Entity. The On-Granting Agreement (or the tripartite project agreement, in case of this project), will strictly transfers all applicable terms and obligations of the Funded Activity Agreement between AFD and GCF to the EE and defines the terms whereby the EE can enter in direct relationship with AFD: the PWA is thus capacitated to request funds directly from AFD and is obligated to manage them under the terms of the Grant Agreement, i.e. AFD's Guidelines.

The Ministry of Agriculture will implement the project downstream the connection points. The FAO will be the MoA's implementing partner for on-farm activities and support the civil society organizations. The FAO will sign an Implementing Partnership Agreement with the MoA, detailing the technical and financial characteristics of this cooperation. The organic and prior relationship existing between the MoA and the FAO, as well as specific knowledge and know-how of this organization in the context of Palestine and Gaza justifies that this United-Nations Organization be directly involved in the project, alongside the MoA.

MoA and FAO have a secular relationship because Palestine's MoA is a FAO Member. The project will activate this pre-existing and non-commercial institutional relationship through a specific FAO-Country MoA Agreement directed to the implementation of specified activities and funded through the project. The terms of this FAO-MoA agreement, which will be the tripartite project agreement between AFD, MoA (representing Palestine) and FAOwill specify the scope of work to be implemented by the FAO and will provide for "direct payment" modalities, which will allow AFD to transfer funds directly to FAO, based on MoA's approval of the workplan and implementation progress.

In this context, MoA will not manage funds itself (direct payments will be made to the FAO), but will remain in the driver's seat in terms of co-piloting the activities technically. This institutional arrangement is necessary in a context where on-farm activities are essential to the project's success, but MoA's capacities to implement them are limited. In general, though capacity is low, we prefer inclusion of State institutions when possible and promote, through the type of partnership described above, their capacity building by Development Partners.

The Water user association (WUA) will be organized with the support of the FAO and will sign a MOU with PWA (see input 3.2.1).

Environment Quality Authority (EQA). In its capacity as NDA and a partner in the water quality monitoring scheme.

Project implementation

Activities under the PWA responsibility

A project management unit (PMU) within the PWA will be responsible for all tendering activities for capital investments, the recruitment of an international technical assistance and for the financial management of the project. All tendering activities will follow AFD procurement guidelines and will be subject to prior review by AFD at each stage of the procurement process: tender documents review; technical evaluation; financial evaluation; contracting. This consists in a three level verification process by: AFD-Jerusalem Office, AFD Headquarters technical department and disbursement officer. All contracts for goods and works will be managed under "direct payment" procedure (standard procedure described in AFD's financing agreement), whereby AFD will be the paying agency on the basis of invoices from the contractors reviewed and transmitted by the PWA/PMU to AFD Jerusalem Office.

The PMU will include a Gender Action Plan Coordinator, with previous experience in coordinating Gender Studies, based in PWA-Gaza.

Further, the PWA will be responsible for the Groudwater Quality Monitoring Plan, in liaison with the MoA and FAO, and for the setting-up of a communications protocol to inform WUAs and users about possible water quality hazards. This protocol will be attached to risk mitigation procedures that will include progressive measures, ranging from restriction of use for agriculture to the temporary shutdown of the transfer of water to users and, if necessary, its redirection to the infiltration basins for further filtration and purification until levels of contaminants reach acceptable levels. In case infiltration basins are full or "unavailable" (which is unlikely thanks to the rehabilitation of 7 additionaly basins through this project), an emergency discharge protocol will be triggered by transfer of treated water to Wadi Beit Hanoun.

The PWA/PMU will be assisted in its project management tasks by an international Technical Assistance.

Activities located outside the mandate of the PWA.

For activities related to on-farm activities, the Ministry of Agriculture of the Palestinian Authority will take over the implementation. The Ministry will seek the assistance of the FAO as its Implementing Partner for Outputs 2.2, 3.2 and 3.3 (see **Annex 10**); based on the FAO know-how and previous experience in Gaza, the FAO will engage Civil Society Organizations (CSOs) according to its sets of rules and regulations to implement parts of the tasks within 2.2, 3.2 and 3.3.

Land Rights

Project activities are expected to require minimal land acquisition for the construction of wells, pumping stations, effluent reuse pipelines and storage tanks. The PWA (EE) will adopt a comprehensive avoidance mechanism through the following procedures:

1- Constructing of wells on State owned lands. As such, the first phase of the project caused no impacts pertaining to land acquisition;

2- Selection of less valued land (e.g. that are located far from the main roads);
3- All monitoring wells are installed along the roads to avoid affecting the private lands;
4- Small plots of lands that might result in severe impacts on the affected people are avoided;
5- All physical assets are entirely avoided in order to minimize unfavorable impacts.

Nevertheless, there will be isolated cases of expropriation, for which the World Bank's Operational Procedures (OP) on Involuntary Land Acquisition and Resettlement (OP 4.12) as well as Palestinian Law (Law No. 2 of year 1953 on "Land Expropriation for Public Projects") will be triggered. As a result, a comprehensive Relocation Action Plan (RAP) has been prepared, which details procedures and guidelines for land acquisition.

Governance of the project

A Steering Committee will be established to ensure appropriate coordination between stakeholders of the project (PWA the Chair, EQA, PENRA, Ministry of Finance and Planning – MoFP, Coastal Municipalities Water Utility(CMWU), MoA/FAO, WSRC), to take strategic decisions and to guarantee good information sharing; the Committee will be conveyed twice a year. AFD will be an external observer in this Committee.

This Committee will follow the implementation of the project through the indicators and the logical framework.

The WUA, as soon as it is established, shall also be included as a member of the Committee.

A Technical Committee, limited to Implementing agencies (PWA the Chair, MoA/FAO, WSRC,) shall also be created for more periodical and operational decision making. It will report to the Steering Committee.

The secretariat of the two Committees will be held by the PMU.

AFD supervision of the project

AFD will provide no-objections:

- Prior to the signing of the on-granting agreement with the PWA and the project agreement with FAO;
- On semi-annual technical and financial execution plans;
- On every steps of a tendering process according to its own procedures.

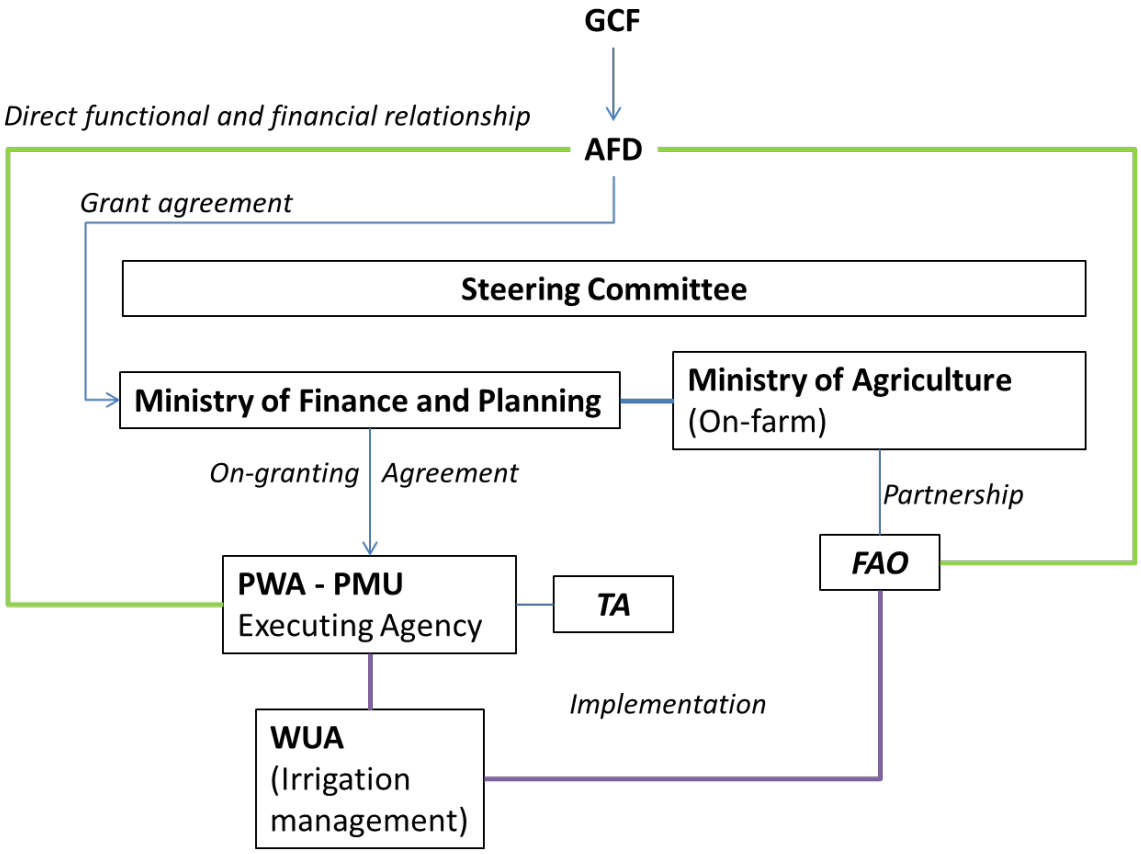
Bi-annual supervisions will take place, including the mobilization of expertise. A gender expert – AFD staff -is assigned for the monitoring of the Gender Action Plan.

Monitoring and evaluation

The PWA-PMU will be in charge of centralizing and managing the monitoring system of the project. In particular, the PMU will be responsible for organizing the Mid-term review, as well as the end-line final evaluation of the project.

AFD will tender and contract the consultancy services for the ex-post evaluation of the project, after full completion of the activities (usually one year after project completion).

The institutional set-up of the project is summarized by the following figure:


GCF
Direct functional and financial relationship
AFD
Grant agreement
Steering Committee
Ministry of Finance and Planning
Ministry of Agriculture
(On-farm)
On-granting
Agreement
Partnership
FAO
PWA - PMU
Executing Agency
TA
Implementation
WUA
(Irrigation
management)

C.8. Timetable of Project/Programme Implementation

	2019		2020				2021				2022				2023				2024			
	S2 - Q1	S2 - Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22
Output 1. Production of additional quantities of water for agricultural use																						
Activity 1.1 An additional water resource is created by Managed Aquifer Recharge	X	X	X	X	Infiltration bassins rehabilitated X	X	X	X	X	X	14 wells delivered X											
Deliverable/Milestone 1.1.1: Rehabilitation of 7 infiltration basins for recharge of the aquifer																						
Deliverable/Milestone 1.1.2: Delivery of the recovery scheme																						
Activity 1.2 Water – Energy Nexus, development of renewable low-emission energy solutions			X	X	X	X	X	Delivery of 1st Tranche (4 MWp) X	X	X	X	Delivery of 2nd Tranche 3 MWp										
Deliverable/Milestone 1.2.1:Delivery of 2 PV schemes to sustain the overall needs of the NGEST scheme																						
Output 2. Development of irrigation, water			X	X	X	X	X	X	X	X	X	X	X	X								

efficiency and climate resilient agriculture																						
Activity 2.1 An improved water service for irrigation is brought to 4 200 beneficiaries serving 1 500 ha			X	X	X	X	X	X	Delivery of 1st tranche of the scheme(500 ha)	X	X	X	X	Delivery of 2nd tranche of the scheme(1 000 ha) X								
Deliverable/Milestone 2.1.1: Delivery of the first tranche of the irrigation scheme, 500 ha																						
Deliverable/Milestone 2.1.2: Delivery of the second tranche of the irrigation scheme, 1 000 ha																						
Activity 2.2. Increased climate resilience of agriculture, adaptation of cropping systems to climate change				X	X	X	X	X	X	Water saving equipment is in place at on famr level	X	X	X	X	X	X	X	New cropping system is in place	X	X	Climate smart agriculture is performed	
Deliverable/Milestone 2.2.1. Inception of services by FAO				X																		
Deliverable/Milestone 2.2.2: Extension services to farmers				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Deliverable/Milestone 2.2.3: Subsidy of on-farm water saving equipment									X	X	X	X	X	X	X	X	X	X				
Deliverable/Milestone 2.2.4: Design of on-farm equipment							X	X	X	X	X											

needs with farmers and WUAs																						
Deliverable/Milestone 2.2.5: Inception and update/adaptation of the GAP change				x	x																	
Deliverable/Milestone 2.2.5: Integration of women in the WUA								x	x	x												
Deliverable/Milestone 2.2.5: Setting-up of women farmer field schools											x	x	x									
Output 3. Management of the water cycle and capacity building of stakeholders																						
Activity 3.1. Strenghtening of PWA capacities in its role of coordination and quality control of the process of reuse of treated waste water		x	x	x	x	Technical Assistance is in place	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	Exit strategy is implemented
Deliverable/Milestone 3.1.1: Technical assistance					x	x																
Deliverable/Milestone 3.1.2: Setting-up of a water quality monitoring and control system						x																
Activity 3.2. Exit Strategy and Transfer of O&M to Water Users				x	x	x	x	x	WUAs are set up	x	x	x	x	x	x	x	x	x	x	x	WUAs are functionnal and autonomous	

Deliverable/Milestone 3.2.1. Identification and establishment of the co-management scheme – Structuring and capacity building of a WUA								x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Deliverable/Milestone 3.2.2. Integration of women in the governance bodies of the WUA											x	x	x	x	x	x	x	x	x	x	x	
Activity 3.3 Communities are empowered and supported, in the context of the conflict in Gaza					x	Community needs are assessed	x	x	x	x	x	x	x	x	x	x	x	x	x	x	Communities are organized for decision making towards resilience	
Deliverable/Milestone 3.3.1: Diagnostic and analysis of the conditions of restoration of unused land within the irrigable area					x	x																
Deliverable/Milestone 3.3.2: Psychosocial support and strengthening of community and household bounds							x	x				x	x					x	x			
Activity 3.4 Capitalization of the outputs/outcomes for replication and upscaling in Palestine														Post mid-term capitalization report							Final capitalization report	
Deliverable/Milestone 3.4.1:									x	x	x	x	x	x	x	x	x	x	x	x	x	

Intellectual services for capitalization																						
	2019		2020				2021				2022				2023				2024			
Reporting	S2 - Q1	S2 - Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22
Inception Report, includung full and detailed Timetable of the Project			X																			
APR							X				X				X				X			
Mi-term Review and evaluation													X									
Final evaluation																						X

D.1.Value Added for GCF Involvement

The GCF involvement is sought at the end line of a relatively long and costly investment starting with the creation of the NGEST WWTP and that will end with the proposed project. Conventional development banks have pushed to the limit the amount of funds dedicated to this endeavor as the Word Bank has delivered its final contribution in 2016 for the first stage of the infiltration and recovery scheme and as AFD will, in 2018, dedicate more than the amount of its country contribution to this project, usually capped at 10 MEUR/year.

This last push from conventional donors to this endeavor cuts short of converting a classical "water and sanitation" project into a low-carbon adaptation to climate change scheme. The GCF funding is sought to cover exactly the incremental costs related to closing the water cycle in order to make use of every drop of the 13 Mm^3 produced yearly by the WWTP to compensate the 30% compounding effect of climate change on agricultural production, access to domestic water and livelihoods in Gaza.

In this rationale, the incremental costs necessary for the completion of each step of the water cycle (infiltration, low-carbon recovery, storage and distribution, efficient irrigation infrastructure) are considered eligible to the GCF financing because only the full completion of the overall scheme will deliver the paradigm shift that is hoped for through the project. Nevertheless, GCF funding has been concentrated on output 1, dedicated to generating (infiltration + recovery) an additional water resource in a context of growing aridity due to climate change, impacting agriculture and availability of resources for domestic use. Costs of output 2, 3 and 4, related to the development of a water-efficient irrigation scheme and to capacity building have been shared with AFD resources, to the full and maximum amount of its possible financial contribution to the project (AFD is limited on its annual contributions to Palestine at 10 MEUR/year; an exceptional effort has been made to bring this contribution to 13 MEUR in order to better match GCF funds and close the financing of this project), singling out and justifying the very incremental nature of the GCF contribution to the project.

This low-carbon (i.e. with mitigation co-benefits) adaptation to climate change investment is the end-line of first phases of investment described above and therefore needs to be looked at through the lens of a holistic approach to solving a water scarcity problem. As such, the AE considers that the climate value for money for GCF funds should be evaluated in light of the financial effort made by conventional donors from the start of the overall investment, i.e. the establishment of the NGEST WWTP, which produces the water used for adaptation to climate change – even though this investment has been delivered and commissioned prior to the present project and is now completed.

Therefore, the value for money of GCF funds sought to co-finance this project is calculated as follows:

Water deficit related investments	Cost (MEUR)	GCF	GCF cofinancing ratio of water deficit related investments
WWTP	43	0	0,0%
Recovery	13,6	7,2	52,9%
Irrigation	18,7	9,4	50,3%
Capacity building water sector	1,85	0,75	40,5%
Total	**77,15**	**17,35**	**22,5%**

CLIMATE VALUE FOR MONEY [Climate vulnerability / Climate financing] Ratio	**131,7%**

It is apparent that the 22,5 % of co-financing of GCF to the global NGEST program is of the same magnitude as the "climate change contribution" of 30% to the growing vulnerability of the Gazan population due to increasing water scarcity(see C.2 and Annex 3), bringing GCF's climate value for money at roughly 130%.

D.2. Exit Strategy

The exit strategy related to the sustainable operation and maintenance of the hydraulic infrastructure is built in the project, in **Activity 3.2**. It relies on the ability of the WUA to buy water from the public supplier, apply a tariff for water services on its users and use the remaining financial resources to operate and maintain de scheme.

E.1. Impact Potential

Potential of the project/programme to contribute to the achievement of the Fund's objectives and result areas

E.1.1. Mitigation / adaptation impact potential

This project is expected to have an important impact on both the adaptation and the mitigation sides. Below is a description of the impact potential, with quantitative indicators where possible and relevant.

Paradigm-shift Objective	***Expected result of the project***
Increased climate-resilient sustainable development	Three adaptation impacts are expected from the project: - Increased resilience of Gazan agriculture through the provision of improved water services for irrigation; - Recharge of the aquifer and improved access to domestic water of 200 000 people exposed to water scarcity; - Depollution and prevention of the aquifer.
Fund-level Impacts	
Tonnes of carbon dioxide equivalent (t CO_2eq) reduced as a result of Fund-funded projects/ programmes Reduced emissions through increased low-emission energy access and power generation	166 858
Total Number of direct and indirect beneficiaries	4 206 beneficiaries (farm owners, permanent and seasonal labor) benefiting from improved access to irrigation water, including 264 female farmers 23 553 people (including the 4 206 farmers) benefiting from enhanced livelihoods, including 11 776 women, are direct beneficiaries 200 000 people with increased access to domestic water, 50% of women, are indirect beneficiaries. Total = 223 553 people
Number of beneficiaries relative to total population	20% of the population of Northern Gaza

Increased resilience and enhanced livelihoods of the most vulnerable people, communities, and regions Number of males and females benefiting from the adoption of diversified, climate-resilient livelihood options (including fisheries, agriculture, tourism, etc.)	23 553 people benefiting from enhanced livelihoods and strengthening adaptive capacity, including 11 776 women
Increased resilience of health and well-being, and food and water security Number of food-secure households (in areas/periods at risk of climate change impacts) Number of males and females with year-round access to reliable and safe water supply despite climate shocks and stresses Area (ha) of agricultural land made more resilient to climate change through agricultural practices (e.g. planting times, new and resilient native varieties, efficient irrigation systems adopted)	4 206 200 000 ; 50% women 1 500 ha
Project/Programme Outcomes	
Number of technologies and innovative solutions transferred or licensed to promote climate resilience as a result of Fund support.	Managed Aquifer Recharge (Infiltration of treated waste water and recovery from the aquifer) rely on technologies developed and transferred from other countries such as the USA, Israel or Jordan. Climate Resilient Agriculture, Precision Agriculture, Drip Irrigation will be transferred to farmers through extension services.
Strengthened institutional and regulatory systems for climate-responsive planning and development Institutional and regulatory systems that improve incentives for climate resilience and their effective implementation.	Improved institutional and regulatory systems for the development of closed water cycles using treated waste water for agriculture. Support to and capacity building of PWA, WUA and WRSC will be crucial in the implementation of the project and its scaling-up.

E.1.2. Key impact potential indicator

Provide specific numerical values for the indicators below.

GCF core indicators	*Expected tonnes of carbon dioxide equivalent (t CO_2 eq) to be reduced or avoided (Mitigation only)*	*Annual*	5 561,95
		Lifetime	166 858,5
	• *Expected total number of direct and indirect beneficiaries, disaggregated by gender (reduced vulnerability or increased resilience);* • *Number of beneficiaries relative to total population, disaggregated by gender (adaptation only)*	*Total*	223 553 people, including 111 776 women
		Percentage (%)	20% of Northern Gaza population
Other relevant indicators	*Examples include:* • *Expected increase in the number of households with access to low-emission energy* • *Expected increase in the number of small, medium and large low-emission power suppliers, and installed effective capacity* • *Expected increase in generation and use of climate information in decision-making* • *Expected strengthening of adaptive capacity and reduced exposure to climate risks* • *Others*		

4 206 beneficiaries (farm owners, permanent and seasonal labor) will benefit from improved access to water, increasing their resilience to Climate Change over the lifespan of the hydraulic infrastructures. Each farmer represents a household containing 5,6 people on average, according to the Palestinian Central Bureau of Statistics which leads to 23 553 people with enhanced livelihoods.

The 13 Mm^3 infiltrated and recovered for agriculture will reduce their exposure to climate risks by alleviating the pressure on the aquifer from agricultural activity. In a context of extreme water scarcity, to cover the domestic needs of the population, it is expected that this additional resource will "free" water otherwise used by agriculture (in the baseline scenario) that will immediately be used to cover the domestic needs of the growing population. Applying the current level of consumption of domestic water ($96m^3$/capita/year), which is extremely low, the project will allow covering the domestic needs of 200 000 people over the lifetime of the infrastructure.

The total impact of the project is therefore of 223 553 people.

Depollution of the aquifer due to infiltration of clean water and dilution of the polluted water plume underground, which will prevent the contamination of municipal wells downstream from the infiltration basins, is an important environmental and public health co-benefit. It translates into reducing climate risks exposure of 200 000 people that will be affected positively by the project, which will improve their access to usable domestic water.

Describe how the project/programme's indicator values compare to the appropriate benchmarks (i.e. the indicator values for a similar project/programme in a comparable context).

The scale of the project in Gaza has no equivalent in Palestine: reuse of TWW schemes exist in Jenin and Nablus, but remain small scale (less than 100 ha) and results are not available yet. Comparing the situations in Israel or Jordan would have little relevance due to the discrepancy in situations: for one thing, it would show that

expected number of beneficiaries, benefits and co-benefits are much higher in Gaza due to the very degraded baseline situation and scenario.

Information and references on other REUSE schemes in Palestine can be found in **Annex 14**.

E.2. Paradigm Shift Potential

Degree to which the proposed activity can catalyze impact beyond a one-off project/programme investment

E.2.1. Potential for scaling up and replication (Provide a numerical multiple and supporting rationale)

Water and sanitation, drinking water and associated sewage networks and waste water treatment plants (WWTP) projects, have multiplied over the years in Palestine, mainly through public and donor funding (KfW, WB, AFD being the main partners of the Palestinian government in this sector), and in the region. In Gaza, the Central WWTP will be operational in 2019 and it is expected that the capacity of the NGEST WWTP be doubled by 2025.

In the context of Palestine, including Gaza, it is a humanitarian and developmental imperative that every drop of water be recycled in order to compensate the effects of climate change on water scarcity and increase the resilience and adaptation capacity of the population.

The NGEST is the only "real scale" reuse of TWW experience in Palestine and it will serve as a model to multiply the experience throughout its territory. At design stage, as an adaptive response, all new sanitation and WWTP projects will include a "REUSE" component for agriculture and associated activities related to on-farm development in order to guarantee and manage the timely delivery of each step of the water cycle from the TP to the irrigation scheme. In addition, climate change co-benefits have been embedded in the very design of the present project by providing low-carbon solutions (bio-digesters + PV schemes).Tested for the first time at this scale, they will also be systematically included in future projects.

The results of the mid-term evaluation of this project will be strategic and timely inputs to ongoing or future REUSE schemes all over Palestine: at the El Bireh WWTP (neighboring Ramallah and projecting to transfer water for the Palestinian agriculture in the Jordan Valley); at the Jericho WWTP to irrigate palm tree groves for date production; at the Nablus WWTP where the German cooperation is supporting a pilot of direct reuse of TWW for agriculture (40 ha). It is also expected from this project to be potentially duplicated to other projects in the region.

E.2.2. Potential for knowledge and learning

The knowledge potential of the project, as the first real scale REUSE by aquifer recharge operation in Palestine, is both huge and highly strategic in order to foster and strengthen the adaptive capacity to climate change of Palestine and its population.

In the current situation, Palestine has no other short term option on the table to start reversing its water deficit than the reuse of TWW.

Nevertheless, up-scaling this effort calls for the mastering of the several dimensions of reuse of TWW:

- Technological: what is the best solution in terms of cost and quality to deliver the best service to end-users?
- Economic, Social and environmental: how do we guarantee quality and stability of the water delivered (do no harm) and the inclusion of the more vulnerable as beneficiaries of the project;
- Sustainability: how do we create and support functional and legitimate users' institutions that take over all or part of the O&M of the infrastructure delivered by the public sector?

These questions are being answered through the ongoing dynamic at NGEST and will need to be documented and analyzed through the present project, its external evaluations and by the mobilization of funds earmarked for intellectual services for capitalization (Activity 3.4). The COSTEA (https://www.comite-costea.fr/), a platform created by AFD and bringing together professionals and researchers in water and irrigation, could be mobilized and could cofinance this work in the amount of 150 000 EUR in addition to the financing of the project. This knowledge will then be used for the next generation of REUSE operations in the region.

E.2.3. Contribution to the creation of an enabling environment

As mentioned above, NGEST is but the first step of a relatively long path to full development of REUSE capacity in Palestine. It is clear that the factors of success of the NGEST project will pave the way to the multiplication of similar projects in other parts of the territories.

In particular, the following aspects of the project will be particularly enabling of this development in the future:

- The setting-up and strengthening of a water quality monitoring and control mechanism, which is paramount to the success of any REUSE project, will allow to fix the standards of all future projects;
- The involvement of the Water Sector Regulatory Council, as an external oversight body, will be essential to limit the risks of such projects and make sure that quality standards are met on a day to day basis;
- The stronger inclusion of on-farm activities, a key aspect of the sustainability of reuse of TWW in agriculture, and the involvement of MoA and FAO will set a precedent to a more holistic approach to the management of the water cycle;
- The creation of the WUA and the importance of women therein, which will lead to a more equitable and gender-balance access and distribution of water.

E.2.4. Contribution to regulatory framework and policies

The reuse of treated waste water is a complex multi-stakeholder endeavor and quality control at each level of the water cycle is paramount to the success of any such project. The Water Sector Regulatory Council serves exactly that purpose and, in the context of Palestine, its strengthening and capacity building is dependent on direct funding from donors.
The main responsibilities of the WSRC as per the water law can be detailed as follows:

- Approval of water tariffs, costs of supply networks and other services required for the delivery of water and wastewater services, as well as review and monitoring of these tariffs to ensure compliance with the policy adopted by the Palestinian Water Authority.
- The issuance of licenses to Regional Water Utilities and any operator that establishes or manages the operation of a facility for the supply, desalination, or treatment of water or the collection and treatment of wastewater, and the levying of license fees.
- The monitoring and inspection of compliance with the terms, requirements and indicators stipulated in licenses and permits.
- The development of performance incentives programs for water service providers.
- Monitoring operation processes related to the production, transport, and distribution of water and operational processes of wastewater management.
- Monitoring water supply agreements.
- Setting quality assurance standards for the provision of technical and administrative services by Service Providers to consumers.
- Monitoring the compliance of the National Water Company and Service Providers with the adopted standards for the provision of water and sanitation services.
- The establishment of a database for technical, financial and statistical information and the publication of this information periodically.
- Addressing complaints of consumers against Service Providers.

The project will integrate the WSRC into the steering and the technical committees in order to allow it to exercise its oversight mandate over the water sector investments of the project and stakeholder mobilization in the context of the creation of a water users association.

E.3. Sustainable Development Potential
Wider benefits and priorities

E.3.1. Environmental, social and economic co-benefits, including gender-sensitive development impact

By embracing several developmental dimensions in the same project, the proposal has a strong potential when it comes to sustainable development.
It is important to recall, before going into the details of the different dimensions of sustainable development, to highlight the following SDGs, which are targeted by this project, namely SDG 1 (no poverty), SDG 2 (zero hunger), SDG 3 (good health and well being), SDG5 (gender equlity), SDG 6 (clean water and sanitation), SDG 7 (affordable and clean energy), SDG 8 (decent work and economic growth), SDG 9 (industry, innovation and Infrastructure), SDG 10 (reduced inequalities), SDG 13 (climate action).

Environmental:
Since 2009, about 30 million cubic meters of untreated water have been infiltrated in the aquifer at the location of NGEST; this has created a pollution plume which is moving towards the West and should reach the proposed location of the recovery wells by 2020 and, further down the Municipal wells by 2022, impacting the drinkability of the water and the health of the population of Gaza City (See Baseline Study On Water Quality &Public Health In The Gaza Strip, 2015, **Annex 3**). The activation of the water cycle downstream from the NGEST WWTP by infiltration and recovery of treated waste water will have two beneficial effects to reduce the pollution and prevent the occurrence of a health crisis in Gaza City: (i) infiltration of treated waste water will dilute the pollution plume (as shown in the extractions of the water model below) (ii) the depression in the aquifer caused by pumping (see image below) will reverse the progression of the pollution plume towards the surrounding wells.

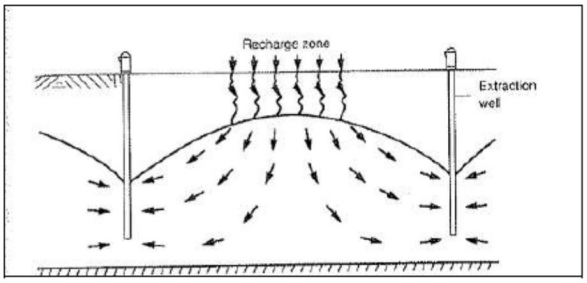


Fig. 4.1: Schematic sketch of Nordic groundwater recharge by surface spreading.

Further infiltration of water in the aquifer after agricultural use will contribute to depolluting the water underground and sustaining its use by the population.
Reduction in Greenhouse Gas (GHG) through the installation of a 8 ha PV scheme is also an environmental co-benefit of the project.
Socioeconomic co-benefits of the project are mainly twofold:
(i) the establishment of a public irrigation scheme and the democratization of daily access to water for all farmers will create more winners than losers with regard to the baseline. Owners of private wells (15 people) will see their business decrease (while benefiting from an improved water service; they will also be targeted by the ESMP to evaluate and compensate their eventual losses), while the rest of the farmers and their families will see their access to irrigation water highly improved: from not at all (20% of the farmers) or once every 10 days (80% of the farmers), all farmers subscribing to the water users association will benefit from daily under pressure water service.

(ii) in a context where every drop of available water is used, the reliance of agriculture on an alternate and non-conventional source of water will free the equivalent quantities for other uses, namely in the context of a fast growing population, which in the baseline scenario would of taken place any further depleting the aquifer and generating health hazards due to bad quality of water. It is estimated that, thanks to the project, 200 000 people

will benefit from improved access to domestic water due to the infiltration of 13 million cubic meters yearly by the NGEST facilities (applying a low 65 m^3/y/capita of domestic water consumption, which is the current situation of domestic water availability in Gaza).

Gender empowerment:
Key Gender issues experienced by women in the project area that were revealed by the gender analysis are as follows:

1) adverse social norms;
2) discriminatory laws and lack of legal protection;
3) the failure to recognize, reduce and redistribute unpaid household work and care; and
4) a lack of access to financial and property assets.

The project's Gender Action Plan (GAP) forms the basis for operationalizing the results and recommendations of the gender analysis prepared during the preparation phase. It ensures effective gender mainstreaming and integration of a consistent gender-perspective in the NGEST project in order to maximize climate and development co-benefits. The aim is to promote opportunities, drivers of change and positive gender dynamics as well as to manage and mitigate potential adverse risks over the duration of the project. The GAP ensures that the project is compliant with GCF's Gender Policy and Action Plan (GCF/B.09/23)[5]. The full GAP is presented in **Annex 12**. The PWA and the GAP Coordinator within the PMU will be supported in its implementation by the provision of specialized Gender expertise through the Technical Assistance services that are funded under the project – the expertise will include provision of training of PWA staff and mainstreaming of gender in relevant PWA technical departments.

The GAP is closely aligned to the outputs of the log frame (see H.1) and planned activities of the recovery scheme from the NGEST project. It complements the Environmental and Social Management Plan (ESMP) that already contains gender-related aspects[6]. In addition to the specific activities and measures of the GAP, the NGEST project will apply more general, systematic measures in accordance with the Palestinian Water sector reform Plan[7] as well as the National Water and Wastewater Strategy for Palestine[8].

The activities of the project and, in particular, the establishment a WUA based on the recently published bylaws promoting inclusiveness of the most vulnerable, is an opportunity to open pathways of change for women. The GAP interventions[9] seek to tackle adverse social norms, reform discriminatory practices, and help women build financial and property assets. Promoting female membership and leadership in the WUA will help to strengthen visibility and local women's collective voice and representation, which should contribute to other ripple effects throughout Gaza of increased female empowerment.

The Ministry of Agriculture and FAO will involve local civil society and women non-governmental organizations. In terms of methodology, the GAP will be implemented using inputs from the FAO (see **Annex 10**) and

[5] https://www.greenclimate.fund/documents/20182/818273/1.8_-_Gender_Policy_and_Action_Plan.pdf/f47842bd-b044-4500-b7ef-099bcf9a6bbe?version=1.1

[6] *Annex 9: Socio Economic Baseline Assessment Willingness Survey Results Cost Analysis and Tariff Surveys Results (2013).*

[7] Palestinian Water Sector Reform Plan (2016-2018). Technical, Planning And Advisory Team in the Water And Sanitation Sector (Tpat) Phase II. http://www.wafainfo.ps/pdf/water_project_2016_.2018.pdf

[8] National Water and Wastewater Strategy for Palestine: Toward Building a Palestinian State from Water Perspective. PALESTINIAN WATER AUTHORITY. July 2013. http://procurement-notices.undp.org/view_file.cfm?doc_id=27192

[9] See the Gender Action Plan, Section 4: Drivers of Change.

particularly from the International Union for Conservation of Nature- **IUCN's training Manual on Gender and Climate Change**[10].

Further, the project will mainstream gender in relation with all expected Outputs of the project – as per the GAP- bust mostly in relation with Outputs 2 and 3, namely through the following inputs:

Input 2.2.3. Gender, land tenure and irrigation – a Gender-responsive approach to agricultural resilience to climate change

Input 3.2.2. Integration of women in the governance bodies of the WUA

Input 3.3.2: Psychosocial support and strengthening of community and household bounds

PWA and the TA (with dedicated staff) will have the responsibility of implementing the GAP, which will be monitored by the Steering Committee.

E.4. Needs of the Recipient

Vulnerability and financing needs of the beneficiary country and population

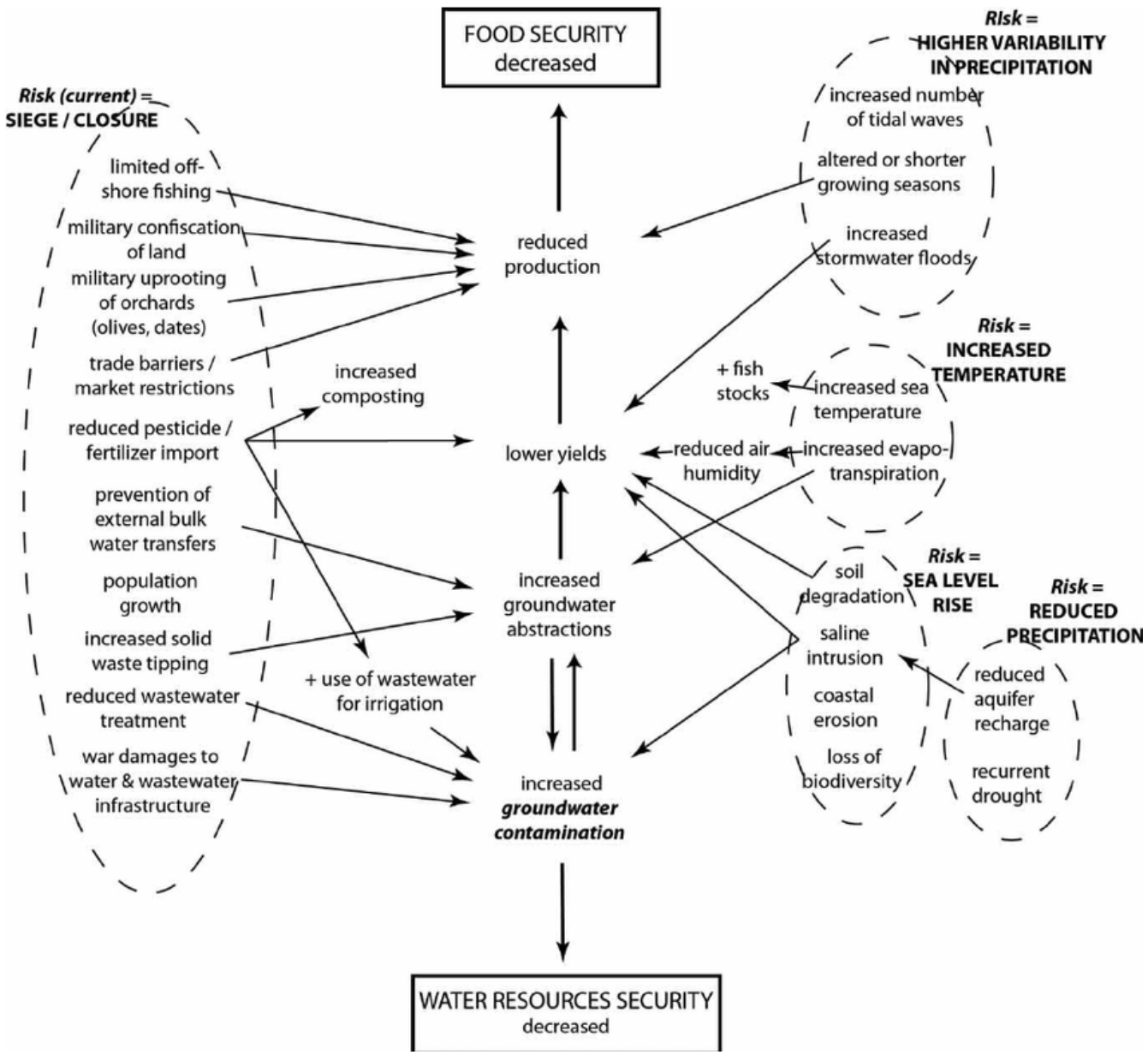
E.4.1. Vulnerability of country and beneficiary groups (Adaptation only)

Conflict and climate vulnerability in Gaza has been extensively studied by Michael MASON from the London School of Economics, who develops a very useful analysis of the two coexisting and combining factors:

"*In societies marred by conflict, the propensity of populations to be harmed by climate hazards is likely to be increased by their exposure to violence and other coercive practices. Stakeholder assessments of climate vulnerability, as reported here for the Gaza Strip, can capture the qualitative experience of harm caused by conflict-related practices as these relate to, and interact with, forecasted climatic risks. The key pathways of climate vulnerability identified by stakeholders in Gaza relate above all to expected impacts on food security and water security. Exploration of these vulnerability pathways reveals conflict-structured non-climatic risks overwhelming forecasted climate risks. The prevalence in Gaza of short-term 'enforced coping' prevents the development of long-term adaptive capacity. Climate vulnerability assessments in (post)conflict environments should acknowledge the methodological and political-policy challenges caused by chronic, non-climatic sources of harm.*" (Michael Mason, Mark Zeitoun & Rebhy El Sheikh (2011): Conflict and social vulnerability to climate change: Lessons from Gaza, Climate and Development, 3:4, 285-297)

The following figure, adapted from the work of M. MASON et al. in Gaza is also included in Palestine-UNDP Adaptation du Climate Change Action Plan (UNDP 2010a, p.36):

[10] https://portals.iucn.org/union/sites/union/files/doc/training_manual_on_gender_and_climate_change.pdf



This analysis, which highlights the food insecurity – water insecurity nexus as the main driver of vulnerability in Gaza, is the backbone of the rationality of the present project. The reuse of treated waste water by recharge of the aquifer and recovery for agriculture, as described at large in the above sections, co-impacts, by nature, both water availability and agricultural resilience.

E.4.2. Financial, economic, social and institutional needs

- *Economic and social development level of the country and the affected population*

Despite its potential, the Palestinian economy is currently heavily distorted and failing to generate the jobs and incomes needed to improve living standards. Restrictions on trade and access to resources, along with a decade long blockade of Gaza have hollowed out the productive base. The share of manufacturing in the economy has halved in the last twenty-five years, while agriculture is only one third its previous size. The economy is import dependent with imports over three times the size of exports and a trade deficit close to 40 percent of GDP (one of the highest in the world), while trade is concentrated with Israel. Investment rates have been low with the bulk channeled into relatively unproductive activities that generate insufficient employment. As a result, growth, which has mainly been driven by consumption, has run out of steam. With a sharp decline because of the 2014 Gaza war and a drop in aid levels, growth in real Gross Domestic Product (GDP) slowed to 2 percent on average between 2013 and 2016, and dropped to a mere 0.7 percent in early 2017. Unemployment remains close to 30 percent on average, with youth unemployment twice as high in Gaza where the humanitarian situation has significantly worsened in recent months following the electricity crisis which has serious implications on the health, water and sanitation sectors as well as business activity (source Economic Monitoring Report to the Ad Hoc Liaison Committee, World Bank, Sep 2017).

Historically, the agriculture sector has been the largest economic sector in the Gaza Strip and still plays an important role in the economy. This role, however, has declined over time in an unsecure context. The contribution of the agriculture sector to GDP declined from 37% at the end of the 1970s, to 22% at the end of 1980s. The contribution to GDP continued declining after the Oslo agreement, reaching 10% in the 1990s. Intensification of restrictions of movement of people and goods affected the marketing and export of agricultural products. This caused further decline in the contribution of the agriculture sector to Gaza's GDP to 7% in 2000, lowering total exports to around 23%, and constituting 14% of the employment. In 2005, Israel withdrew occupation forces and removed settlements from Gaza. In 2006, after the Palestinian elections, a decision was made to introduce a policy of separation between the West Bank (WB) and Gaza Strip. Between 2005 and 2015, after the establishment of the blockade, the contribution of the agriculture sector to Gaza' GDP fluctuated between 5.6% and 8.5%, reaching 5.7% in 2015. The latest Palestinian Central Bureau of Statistics (PCBS) reports indicate that in the third quarter of 2016, only 4.5% of total workers in the Gaza Strip work in agriculture and fishing, and the agriculture sector recorded the lowest average daily wage at 22 NIS (6 USD).

With regard to the beneficiary population, the following exert of the Poverty Profile of Palestine (full document in **Annex 15**) illustrates the situation of the beneficiary population:

"*Two poverty lines have been developed according to actual spending patterns of Palestinian households. The first, termed "deep poverty line," which was calculated to reflect a budget for food, clothing and housing. The second line adds other necessities including health care, education, transportation, personal care, and housekeeping supplies. The two lines have been adjusted to reflect the different consumption needs of households based on their composition (household size and the number of children). In 2017, the poverty line and deep poverty line for a reference household of five individuals (2 adults and 3 children) were, respectively, NIS 2,470 (~692 USD) and NIS 1,974 (~553 USD). 53 percent of individuals in Gaza Strip found to be poor in 2017, the poverty rate for Gaza Strip was more than four times higher than of the West Bank rate of 13.9 percent. Moreover, is the fact that 33.7 percent of individuals living in Gaza Strip were suffering from deep poverty compared with 5.8 percent of the West Bank; (which means that they are unable to meet the minimum required for food, clothing and housing).*"

Absence of alternative sources of financing (e.g. fiscal or balance of payment gap that prevents from addressing the needs of the country; and lack of depth and history in the local capital market)

Palestine has no credit record or capacity and is entirely dependent on concessional foreign aid to implement public investments as described in this project. Further, the magnitude of these investments combined with the high level of vulnerability of the population in Gaza does not allow private sector involvement.

- *Need for strengthening institutions and implementation capacity.*

The PWA is the lead agency for the water sector in Palestine; AFD has a long history of cooperation with this institution which shows a high level of capacity. Nevertheless, given the complexity of the project, combining different types of infrastructure, including irrigation for which PWA has limited experience, and the need for a robust quality control mechanism, PWA has requested for support in terms of the overall coordination and management of the project (implementation capacity), as well as institutional and technical strengthening for the management of the water quality monitoring system.
On the other hand, the ministry of agriculture, in charge of the on-farm development activities has limited resources and capacities to invest in their implementation. Therefore, the Food and Agriculture Organization of the UN will act as its Implementing Partner. Funds from co-financiers of this project will be channeled directly to the FAO in exchange of the implementation of the agricultural activities of the project and capacity building of the ministry of agriculture and the water users association.

E.5.1. Existence of a national climate strategy and coherence with existing plans and policies, including NAMAs, NAPAs and NAPs

On the 17th of March 2016, Palestine officially became the 197th party to the UNFCCC. It also ratified the Paris Agreement on the 22nd of April, 2016 and was one of the first countries to do so. Few months after joining the UNFCCC Palestine was able to submit its Initial National Communication Report (INCR) and the National Adaptation Plan (NAP) and became the sixth country in the world that submitted their NAP to the UNFCCC, which reflects the very high priority given to adaptation to climate change by the Palestinian Authority.

The INCR, which was developed in accordance with the recommended and applicable guidelines, highlights the key outcomes on Greenhouse Gas (GHG) emission inventories, analysis of mitigation and adaptation potentials, making it a vital source of information on GHGs emissions, the measures to be taken to mitigate GHGs and to adapt to the adverse effect of climate change.

The Nationally Determined Contribution (NDC) was build up upon the INCR and NAP and in line with the National Development Plan. Recently, Palestine formulated the National Policy Agenda (2017-2022), the highest policy paper which clearly indicates that climate change and efficient response to its impact as a priority. Palestine has developed 18 sectoral strategies and 3 cross sectoral strategies to achieve sustainable economic development in a manner that takes climate change into consideration. In this document could be found Water Sector Strategy, Agriculture Sector Strategy and Environment Cross Sectors Strategy which include goals linked to climate change mitigation and/or adaptation.

Palestine together with AE have prepared this project based on key adaptation actions prioritized in the NAP: **"Enhance the use of additional and alternative water resources for nondomestic purposes"**. The activities of this project aims to reduce the vulnerability, enhance resilience to climate change and increase adaptive capacity in 12 sectors including: water, wastewater, health and others. It clearly improves water security by creating new and additional resources to the country which is greatly suffering from lack of water resources and allows enhanced aquifer management to respond to climate change challenges.

The gender responsive technology road map formulation, which will identify relevant mitigation and adaptation technologies to achieve the Palestine's climate change action plans as defined it its INCR, NAP and NDC, is currently ongoing. Although the development of the technology road map is still at an early stage, stakeholders have already identified a number of priority technologies which are in line and linked with the technologies involved in the project. This include technologies related to efficient irrigation, water harvesting, climate smart agriculture, water resource monitoring technologies, and the treatment and reuse of wastewater. The roadmap will further explore financing

sources available for each technology and the required measures for their introduction. The technology roadmap will therefore clearly show linkages between ongoing proposals such as this project, and the technologies prioritized.

A key point to emphasise is that Palestine's NAP (and associated NDC conditional actions) is being used as a common foundation by:

- This funding proposal ;
- the current work on the Technology Roadmap;
- the ongoing development of a GCF country programme and
- the continuing development of NDC implementation plans for the Agriculture (and Energy) sector (including its nexus with other sectors – Food security, Water, Waste and wastewater, Coastal and marine).

This foundation logically ensures that they will be systematically aligned, feed into each other and focus requests for support on conditional actions that are Palestine's domestic priorities, as set out in the NAP, and where their implementation is dependent on provision of international funding, as noted in the NDC.

UNEP and UNDP consultants are engaging all stakeholders in the development of their work to maintain the common understanding and commitment that evolved during development of the NAP (and subsequent NDC).

Notably, Palestine was one of the first six countries globally to develop a NAP and it remains one of only a dozen uploaded to UNFCCC NAP Central. The NAP was developed systematically, building upon the UNFCCC's Technical Guidance for the NAP process. In doing so, it involved more than 300 stakeholders from across 12 themes (not only including Agriculture and Gender but also Coastal and marine, Energy, Food security, Health, Industry, Terrestrial ecosystems, Tourism, Urban and infrastructure, Waste and wastewater, and Water) over a period of 18 months. In accordance with the IPCC 5th Assessment Report definitions, vulnerabilities were prioritised for the NAP in relation to climate sensitivities and adaptive capacities. Adaptation options were then identified that address each of the highly vulnerable issues and these options were prioritised for the NAP in relation to a range of criteria (impact, efficacy, timing/urgency, social acceptance, technology, knowledge/skills, costs, and co-benefits for adaptation and mitigation). The resultant NAP was endorsed by all six relevant ministries.

A recent review of the priority of NDC conditional actions with stakeholders from across the Agriculture sector in relation to Government support, adaptation benefits, mitigation benefits, capacity available and technology available was performed. This process has reconfirmed the importance of the NDC actions, in particular the ones that are the basis of this project.

E.5.2. Capacity of accredited entities and executing entities to deliver

Please describe experience and track record of the accredited entity and executing entities with respect to the activities that they are expected to undertake in the proposed project/programme.

AFD and Climate Change

AFD was one of the first international donors to integrate the fight against climate change into its practices. This approach, initiated more than a decade ago, is based on the principle that the fight against climate change is inextricably linked to the trajectory and development policies of countries, in terms of opportunities and threats, as well as the involvement of economic, institutional and civil society actors. AFD's first climate strategy dates from 2005.

Since then and in line with its national positioning and its involvement in ecological and climate diplomacy, France has devoted a large part of its official development assistance to climate finance. The AFD Group has thoroughly adjusted its intervention strategy and committed more than EUR 29 billion between 2005 and 2017 to projects and programmes designed to provide climate co-benefits.

AFD's climate strategy has thus become a strong marker of its identity, with three main aspects: (i) systematically measuring the carbon footprint of the operations financed (carbon balance) and assessing their potential benefits in terms of adaptation to the effects of climate change, (ii) an ambitious quantitative commitment to financing 50% of projects with climate co-benefits, and (iii) selectivity of projects in terms of impact on climate, taking into account the level of development of the countries concerned. This strategy has profoundly transformed AFD's portfolio and methods, far beyond the operational sphere, and has also shaped its partnership strategy.

This strong position has contributed to the AFD Group's significant visibility on climate issues at both national and international levels. It is actively involved in most major initiatives undertaken with its peers and civil society actors. AFD was particularly involved in issues of accounting and deployment of climate finance, metrics in terms of impact, risk approaches, economic modelling, and issues of strategic integration of climate dimensions by financial actors.

The new international momentum, transcribed in the SDGs and the Paris Agreement, requires AFD to support fundamental and rapid changes in the development models of countries and economic actors even more ambitiously. Moreover, through the setting up of its Climate Plan in July 2017, the French government wishes to speed up the implementation of the Paris Agreement not only in France but also at the international level. This provides AFD with a framework that extends its mandate by affirming that AFD will become the first development bank with an explicit mandate to implement the Paris Agreement across its entire portfolio. AFD must therefore continue the transformation of its methods and instruments, launched within the framework of its previous climate strategies.

Three strategic challenges have been identified concerning the role and place of AFD in climate action in the years to come: ensuring that the Group's activities are consistent with the Paris Agreement, in support of low-carbon and climate-resilient development and related public policies; maximizing the impact of its actions in this regard, notably in terms of leverage effects; and strengthening AFD's role as a platform for France's international financial commitment to climate and its positioning as a reference on climate and development among international finance institutions.

The new AFD Climate and Development Strategy for 2017–2022 thus proposes four major commitments: (I) ensure activities are 100% Paris Agreement compatible, (II) increase the volume of climate finance, (III) contribute to redirecting finance and investment flows, and (IV) co-build solutions and bring influence to bear on standards.

In terms of parameters and scope, the first commitment entails a fundamental evolution of the AFD Group's approach to climate issues. This involves progressing from an approach mainly based on an assessment of projects' climate benefits towards an approach that includes seeking compliance of all interventions with low-carbon and climate-resilient development pathways.

In terms of volume of climate finance, as characterized by the methodology tested by the previous Climate Change Strategy and shared internationally, the 50% objective of commitments to projects with climate co-benefits is being extended to the entire AFD Group. This will lead to an absolute increase in the volume of such commitments, with a special funding effort for adaptation and the African continent.

The AFD Group operates in the Palestinian Territories since 1998 and has financed, until 2017, about fifty projects, representing a total of more than € 346 million.

AFD operates and supports national strategies in various sectors (Water and Sanitation, local development, private sector, energy, etc.), with a focus on:

- strengthening public institutions and service providers by supporting the development through the implementation of sectoral policies,
- maintain and improve the living conditions of the Palestinian population,
- support economic actors in the private sector
- Supporting the modernization of SMEs;
- Development of rural territories including transportation and solid waste management, etc;
- Management of natural resources in the context of climate change;
- Promoting renewable energy and energy efficiency.

The water and sanitation sector has been AFD's priority intervention sector, with 13 water and sanitation investment programs financed in the Palestinian Territories for a total amount of nearly € 106 million (excluding funds delegated to AFD by other financing partners such as the EU). According to our estimates, these projects have enabled 800,000 people to gain access to drinking water and/or to benefit from improvement drinking water services.

The modalities of intervention of AFD in the sector have evolved from projects focusing on production and transfer of drinking water to broader sectoral interventions:

- Supporting the sector reform: establishment of joint service councils to rationalize the service delivery, supporting the new water law established in 2014 that led to the creation of the Water Sector Regulatory Council (WSRC), supporting the establishment of a National Water Company to manage the conventional and un-conventional water resources. Currently AFD's new intervention, the Nexus North project, committed in 2017 is part of the new water law by placing the distribution operators in their role as project owners and by focusing on their empowerment;
- The field of sanitation: construction of large-scale wastewater treatment plants in the northern Gaza Strip and Hebron, construction of a wastewater treatment plant in Missilya. A new project is under study by AFD for the construction of a sewage treatment plant in Bethlehem.
- The reuse of treated wastewater for agricultural purposes is always an integral part of investments programs to maximize the benefit from water resources in a water scarcity environment.

The three above-mentioned themes, targeted by AFD, are at the heart of the Palestinian Authority's sectoral priorities:

- Effective implementation of the water sector reform initiated in 2014.
- The treatment of the 100% of the wastewater flowing from the Palestinian Territories to Israel today, with the aim of reducing the net-lending bill (the Israelis treat the effluents arriving on their territories and charge this treatment to Palestinians) that reached 35MUSD in 2017.
- Achievement of 100% REUSE: reuse of all treated wastewater for agricultural purposes. The agriculture sector is currently consuming around 80% of available fresh water.

E.5.3. Engagement with NDAs, civil society organizations and other relevant stakeholders

The ground water recovery and irrigation schemes at the North Gaza WWTP are part of the wastewater management system for North Gaza and are based on several studies commissioned by the PWA. The Palestinian Environment Quality Authority, NDA for GCF, in cooperation with PWA have included this project in the National Adaptation Plan to Climate Change 2016 as an adaptation option for the Gaza Strip to enhance the use of alternative water resources for non-domestic purposes. The PWA commissioned a feasibility study for the irrigation scheme in 2017 (funded by AFD) and in parallel executed the first phase of the water recovery scheme through a World Bank funded contract. Since July 2017, AFD has identified this project as an essential intervention, in light of the water crisis in the Gaza Strip; the PWA and the EQA were actively involved in every step of the project formulation that can be itemized as follows:

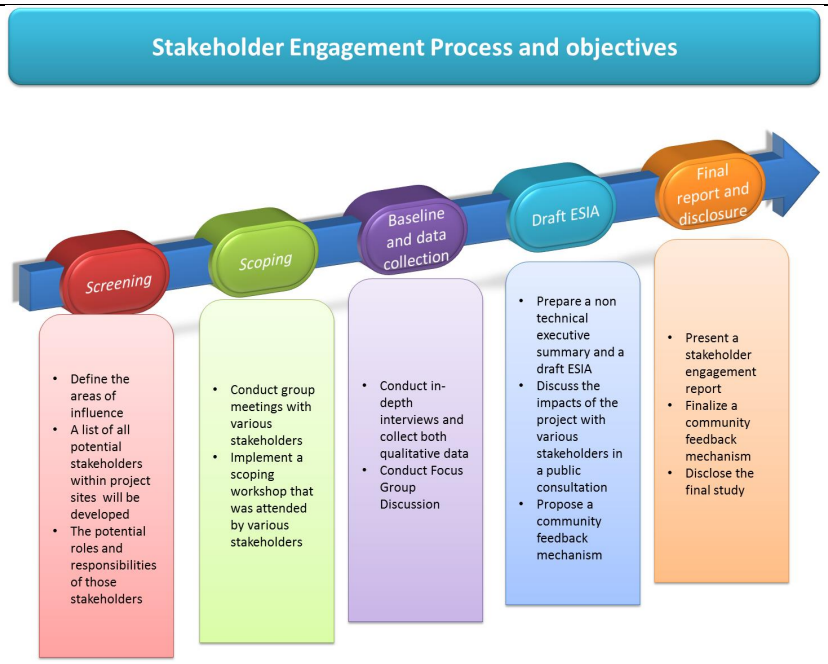
- PWA participated to all the identification and appraisal meetings that were performed through 2 missions from AFD headquarters. Consultations took place with several Palestinian stakeholders; such as Ministry of Agriculture, Ministry of Finance and Planning,
- Assessing the studies that required updates (i.e. irrigation scheme design update based on the feasibility study findings, the EIA update, gender analysis and action plan)
- 3 consultations were organized during the preparation phase of the project with the North Gaza population of the area that included, but not limited to, the final beneficiaries of the irrigation schemes (the farmers).
- The PWA have pushed forward in April 2018, after 2 years of consultations, the approval of the WUA bylaws by the Palestinian Council of Ministers that will provide the legal framework for the public irrigation networks management.

It is important to highlight PWA insisted on the financial sustainability of the project outputs reducing the public subsidies for the O&M of the irrigation scheme to the minimum during the transitional period.

Please also specify the multi-stakeholder engagement plan and the consultations that were conducted when this proposal was developed.

During the preparation of this project, multi-dimensional consultation activities have been conducted to enable the marginalized, voiceless, youth and women to gain information about the project in order to gain information about their concerns and worries regarding the project during various implementation phases.
Following are the main consultation activities to date conducted as a basis for the elaboration of the Multi-stakeholder Engagement Plan presented in full in **Annex 11**:

- The study team visited the project area in order to define various stakeholders during April 2018
- Meetings were conducted during April 2018 in order to develop an engagement plan that is locally tailored for the residential communities along with the study team members
- Based on the identification of stakeholders, various questionnaires and guidelines were prepared in order to engage: i) the residents in the project areas, ii) Governmental municipalities, iii) the Community Based Organizations (CBOs), iv) health facility, v) Ministry of Endowment and Ministry of Agriculture , vi) the EQA
- As shown in the scheme below, the study team divided various engagement activities of the project to:
    a. Screening
    b. Scoping phase and data collection phase and,
    c. Public consultation phase.
    d. Final report disclosure



E.6. Efficiency and Effectiveness

Economic and, if appropriate, financial soundness of the project/programme

E.6.1. Cost-effectiveness and efficiency

Describe how the financial structure is adequate and reasonable in order to achieve the proposal's objectives, including addressing existing bottlenecks and/or barriers; providing the least concessionality; and without crowding out private and other public investment.

As mentioned earlier on in the proposal, conventional donors have exhausted their capacity to finance the end line investments allowing the completion of the full water cycle delivering adaptation to climate change impacts, as well as social, economic and environmental co-benefits. The World Bank has provided its last contribution in 2017 and AFD has pledged more than its annual 10 MEUR commitment in 2018, in order to maximize its contribution to the project, alongside the GCF.

The situation in Gaza, the urgency of the intervention and the high social and environmental co-benefits sought by the project call for the highest level of concessionality. Though there is an economic component to the expected impacts of the project, the current level of poverty and vulnerability of the beneficiaries (see Poverty profile in **Annex 15**), as well as the level of risk related to agricultural investments in the area (where climatic and geopolitical risks are compounded) make it impossible to envisage lending for such large scale investments.

Please describe the efficiency and effectiveness, taking into account the total project financing and the mitigation/ adaptation impact that the project/programme aims to achieve, and explain how this compares to an appropriate benchmark. For mitigation, please make a reference to E.6.5 (core indicator for the cost per tCO2eq).

As described earlier in the proposal there is a good level of correspondence between the level of financial contribution by the GCF and the level of climate change effects the beneficiary population will need to adapt to.

In terms of benchmarking, this project will be the first large scale Managed Aquifer Recharge in Palestine and, in particular, in Gaza, where conditions are very much specific. Comparing the project's costs with those of similar

operations elsewhere, reveals a 15 to 20% increase in Gaza, due to the high dependency on import, the complexity of border crossing and, overall, the translation into financial terms of the overall risks in the area.

Furthermore, the project has a "no regrets" approach. In the context of Gaza and its exceptional level of water scarcity, all solutions for the production of additional non-conventional water resources should be pursued. Desalinisation capacities will be installed in Gaza in the medium term, but this does not affect the necessity to pursue other options available, amongst which MAR. In terms of recycling the water produced by the WWTP –otherwise lost in the sea- the alternative to MAR is the direct reuse of the water for agricultural purposes. This approach is less efficient because it would need to rely on an installed and therefore energy consuming tertiary treatment (which is performed by the process of infiltration itself in the case of MAR), and because the water directly transferred to farmers would be less acceptable socially when coming directly from the WWTP.

E.6.2. Co-financing, leveraging and mobilized long-term investments (mitigation only)

Please provide the co-financing ratio (total amount of co-financing divided by the Fund's investment in the project/programme) and/or the potential to catalyze indirect/long-term low emission investment.

Please make a reference to E.6.5 (core indicator for the expected volume of finance to be leveraged).

The co-financing ratio for this project is 1.875.

As mentioned above, there is a potential to replicate this kind of technology and project not only in Palestine, but also in the region.

E.6.3. Financial viability

Please specify the expected economic and financial rate of return with and without the Fund's support, based on the analysis conducted in F.1.

The feasibility study does contemplate, in Outputs 4 and 6, the economic and financial profitability acquired through an improved access to water showing, in an ideal scenario, that improved access to water and improved cropping systems lead to relatively high Internal Rate of Returns (IRR), making us believe that the project may create an island of prosperity in its area of intervention.

The reality of water deficit in Palestine and its particular acuteness in Gaza is such that every cubic meter added to the water balance has immediate and multiple knock-on effects on every dimension of vulnerability and survival of the Gazan population. In other words, the alternate scenario of not delivering the adaptation and water supply infrastructure to the area is certain rupture of the hydraulic, economic and social systems, with drastic geopolitical consequences.

Over the lifespan of the infrastructure, i.e. 30 years, the AE is confident that in the context of extreme vulnerability of the population and the accelerating effects of climate change of an already dire scenario, the economic rate of return of a non-ruptured system is extremely high. Conversely, not maximizing the infiltration and recovery power of the hydraulic system financed by the project increases drastically the probability of rupture and the IRR becomes zero.

Reasoning in terms of water-flow rather than in cash-flow – the actualization of which over time is a mere theoretical calculation – the project will allow the aquifer to sustain the livelihoods and associated economic activity of an additional 200 000 people at the current level of access to water over the lifetime of the financed infrastructure. In the baseline scenario, this additional population –resulting of the demographic growth- will find itself, all things being equal, with no access to water or depleting the last resources for the following generations. Without the GCF support, we remain in the baseline scenario.

Please describe financial viability in the long run beyond the Fund intervention.

Operation and maintenance of the full NGEST scheme is expected to be highly subsidized by Palestine in the medium term, until the co-management of the scheme is effective and part of the costs are covered by the users themselves,

through the Water Users Association. The costs incurred by Palestine will amount to more than 4 MUSD annually. Financial resources of Palestine being extremely low in the current situation, these costs will be covered through direct budgetary support provided in particular by the WB.

E.6.4. Application of best practices

Please explain how best available technologies and practices are considered and applied. If applicable, specify the innovations/modifications/adjustments that are made based on industry best practices.

The technology applied in this project is referred to as Water Banking (because of the role of the aquifer as storage and buffer) or Managed Aquifer Recharge (MAR). It is extensively studied and described by the scientific community (for example: Multi-Objective Optimization of Managed Aquifer Recharge, Aybulat Fatkhutdinov et al., April 2018) and considered as an effective approach to adaptation to climate change, namely in semi-arid areas of the world (https://www.soas.ac.uk/ledc/events/groundwater-and-climate-change-2015/file104580.pdf), in particular in the neighboring Jordan:

"*Jordan like many other semi-arid countries in the world is highly dependent on groundwater resources and face increasing demand and decreasing supply leading to groundwater level declines and potentially salinisation of groundwater resources. Managed aquifer recharge (MAR) could support an increase in water resources and is defined as the intentional recharge of groundwater for recovery or environmental purposes and includes the monitoring of recharge water quality and resulting impacts. It has been applied successfully internationally and its importance is increasing as a tool for adaptation to climate change.*"(https://www.bgr.bund.de/EN/Themen/Wasser/Projekte/abgeschlossen/TZ/Jordanien/mar_fb_en.html)

E.6.5. Key efficiency and effectiveness indicators

GCF core indicators

Estimated cost per t CO_2eq, defined as total investment cost / expected lifetime emission reductions (mitigation only)

(a) Total project financing	MEUR 44.709782
(b) Requested GCF amount	MEUR 23.709782
(c) Expected lifetime emission reductions overtime	166 858,6 tCO_2eq
(d) Estimated cost per tCO_2eq (d = a / c)	**EUR 267_____/ tCO_2eq**
(e) Estimated GCF cost per tCO_2eqremoved (e = b / c)	**EUR 142_____/ tCO_2eq**

Describe the detailed methodology used for calculating the indicators (d) and (e) above.

Please describe how the indicator values compare to the appropriate benchmarks established in a comparable context.

Expected volume of finance to be leveraged by the proposed project/programme and as a result of the Fund's financing, disaggregated by public and private sources (mitigation only)

	Describe the detailed methodology used for calculating the indicators above. *Please describe how the indicator values compare to the appropriate benchmarks established in a comparable context.*
Other relevant indicators (e.g. estimated cost per co-benefit generated as a result of the project/programme)	

F.1. Economic and Financial Analysis

Please provide the narrative and rationale for the detailed economic and financial analysis(including the financial model, taking into consideration the information provided in sectionE.6.3).

Climate vulnerability and climate risks in Palestine and Gaza are a humanitarian threat, placing the Palestinians within the policy realm of disaster risk management and emergency response operations. Economic and financial analyses at micro level are nevertheless available in Outputs 4 and 6 of the feasibility study.

Based on the above analysis, please provide economic and financial justification (both qualitative and quantitative) for the concessionality that GCF provides, with a reference to the financial structure proposed in section B.2.

The Gazan population presents an extremely high level of vulnerability and of uncertainty with regard to the future. The important climate vulnerability, in addition to the demographic growth in Gaza and its consequences on the water resources, the emergency of the situation, the humanitarian rationale of adaptation to climate change in the context of Gaza, the insolvability of Palestine and of the farmers (in a very high risk environment) calls for the highest level of concessionality for the delivery of infrastructure, dedicated to recharging the aquifer, which is considered a public good. On-farm equipment will be advanced by the project but reimbursed by the farmers to create an O&M fund for the irrigation scheme, managed by the WUA, which will be key factor for long run viability of the project.

F.2. Technical Evaluation

Water banking or MAR is a technological approach to artificial aquifer recharge in contexts where water scarcity calls for recycling of all possible sources of water. In the case of Gaza recycling of treated waste water is one of only two short/medium term solutions to alleviate pressure on the aquifer and maintain minimal access to agricultural and domestic water for the population – the other one being massive desalinization of sea water (representing much more costly, highly emissive and complex investments). The sandiness of the soil in Gaza makes it a particularly adapted location to perform MAR, due to the high infiltration capacity of such soil.

Further, the MAR scheme proposed in this project includes an off-grid solar energy production field and a net metering contract with the electricity company, allowing the storage of energy on the local grid. This is a response to the third element of the vulnerability nexus in Gaza: energy insecurity.

Finally, the proposed approach, through MAR in Gaza, will generate an important climate co-benefit, as well as in environmental terms: the activation of the water cycle at NGEST will act as a clean “washing machine” depolluting the aquifer and preventing a health crisis in the downstream Gaza City.

F.3. Environmental, Social Assessment, including Gender Considerations

Describe the main outcome of the environment and social impact assessment. Specify the Environmental and Social Management Plan, and how the project/programme will avoid or mitigate negative impacts at each stage (e.g. preparation, implementation and operation), in accordance with the Fund's Environmental and Social Safeguard (ESS) standard. Also describe how the gender aspect is considered in accordance with the Fund's Gender Policy and Action Plan.

Environmental Methodology

Hydro Model Update and for Groundwater Analyses Verification and Modeling

The most updated data provided by the client, up to year 2017, was used to update the model, accounting for the following:

- The actual infiltrated partially treated wastewater quantities and rates from 2012 to 2017 (15,000 – 20,000 m^3/day).
- The updated locations and numbers of the recovery wells.
- The actual design of the first stage of the recovery wells (14 wells) that were constructed by the end of year 2017.
- The updated time schedule for the operation of the treatment plant and the two stages of the recovery wells.

The assessment of the impacts on groundwater considered the abstraction rates of the recovery wells, the possible recharge in the agricultural lands and different scenarios for project implementation. Two scenarios are considered in the current impact assessment:

1. Without the implementation of recovery scheme.
2. With the implementation of recovery scheme. 27 recovery wells will be implemented on two stages; 14 wells that already constructed and to be operated by the end of 2019 and 13 wells to be operated by the end of 2021.

Both scenarios took into account the operation of the WWTP by the beginning of 2018. It is important to note that partially treated wastewater continued to be infiltrated until the beginning of 2018. Since the beginning of 2018, only treated wastewater is infiltrated and will reach its full capacity of 35,600 m3/day of treated wastewater by June 2018.

Important Environmental Outcomes and Considerations

1. No significant changes have occurred in any of the physical or biological environment of the project areas since 2013. The main physical and biological characteristics of the environment in the vicinity of the project area therefore remain unchanged.

2. Recent monitoring results reveal nitrate concentrations ranging from 20mg/l to 70 mg/l in 2017, both in the monitoring wells and in the recovery wells, indicating an increase in nitrate concentrations since 2012. These numbers far exceed the WHO standards that indicate a maximum value of 55 mg/l for nitrate, and, other Jordanian standards, Palestinian standards, Egyptian standards and Palestinian standards.

3. Pathogenic bacteria was also found in the groundwater in monitoring wells in close proximity to the infiltration basin, since partially treated sewage has been infiltrating the aquifer for 9 years.

4. Heavy metals were analyzed in the same wells close to the infiltration by PWA in mid of year 2016. The heavy metals concentrations in all analyzed wells were less than the Palestinian standard values for irrigation. While trace elements were found occasionally in slightly higher levels than indicated in standards, this was only the case in very few monitoring wells and would therefore not limit the use in irrigation as a general

rule. It is only recommended that these elements are continuously monitored to avoid water use where limits are exceeded.

5. All results of major water parameters monitored in first stage recovery wells such as Acidity (PH), E.C., T.D.S, T.A., B.O.D., SO4, and K have been found to be compliant with Palestinian standards.
6. Water in monitoring wells meets most quality parameters limits set by international and local standards for **unrestricted use in irrigation** with the exception of the high nitrate levels.

   As a temporary condition (until the washing out of the plume), high nitrogen levels may be beneficial during early growth stages but may cause yield losses during the later flowering and fruiting stages. High nitrogen water can be used as a fertilizer early in the season. However, as the nitrogen needs of the crop diminish later in the growing season, the nitrogen applied to the crop must be substantially reduced. Blending or changing supplies during the later more critical growth stages would be helpful. Another option is to plant less sensitive crops, which can utilize the nitrogen from the irrigation water more effectively. Also, the rates of nitrogen fertilizer supplied to the crop should be reduced by an amount very nearly equal to that available from the water supply for crops irrigated with water containing nitrogen. Crop rotations can be planned to utilize residual nitrogen in the soil during the non-irrigation season.

   According to modelling results, the situation is expected to be greatly improved after the operation of the recovery wells and nitrate levels will be reduced to internationally and locally acceptable irrigation limits, causing no need for concern.
7. The current water table elevation in the area around the basins is 2 m above mean sea level. After the operation of the first stage of recovery wells by the end of year 2019, about 20,000 m3/day of groundwater will be recovered (abstracted). This result in lowering the groundwater table elevation after two years of operation of the first stage of recovery wells. In 2030, the model estimated that the water table elevation, in the area around the basins, will be between 2 m and 4 m below mean sea level if the second stage of recovery wells is not implemented. While, in the same area, the water table elevation will be between 4 m and 6 m below mean sea level if the second stage is implemented; as about 18,000 m3/day of groundwater will be abstracted through 13 recovery wells. This will prevent the vertical building up of the water table, which without recovery will have a negative impact on current land use.

Social Consultation Methodology and Activities

The research team for this study has adopted multi-dimensional consultation activities that enable the marginalized, voiceless, youth and women to gain information about the project. As well as gaining information about their concerns and worries regarding the project during various implementation phases.

Following are the main consultation activities performed until June 2018 (additional engagement activities will take place until mid-July):

1. Field visit to define various stakeholders during April 2018;
2. Meetings were conducted during April 2018 in order to develop an engagement plan that is locally tailored for the residential communities;
3. Based on the identification of stakeholders, various questionnaires and guidelines were prepared in order to engage: i) the residents in the project areas, ii) Governmental municipalities , iii) the CBOs, iv) health facility, v) Ministry of Endowment and Ministry of Agriculture, vi) the EQA

Important Social Outcomes and Considerations

The general outcomes and recommendations of the social part include:

1. Importance of engaging stakeholders, including persons or groups who are directly or indirectly affected by a project, as well as those who may have interest in the project and/or those who have the ability to influence its outcome, either positively or negatively taking their comments, ideas and concerns into consideration;
2. Communicating and implementing a viable community grievance mechanism;
3. Municipalities should be involved, engaged and consulted in the process of land acquisition and compensation to contribute in resolving disputes;
4. Land acquisition should be appropriately handled and addressed as suggested in the RAP. Project affected people (private well owners and operators) should be compensated, to account for both property and job losses in a fair and timely manner;
5. Importance of the institutional framework as it is the basis for the operation and success of this project.

Needed improvements of ESIA/RAP and update during inception phase:

In the process of project preparation and, in particular, through interaction with the GCF Secretariat, several lines of improvement of the ESIA and RAP have been identified, in order to best reflect the final implementation set-up of the project. Introdution of these improvements in the ESS Documents –and others that may appear during inception- will be the responsibility of the consultants that elaborated the first versions of ESIA and RAP. AFD will allocate the necessary funds on its own budget to ensure the update is performed by the initial consultancy team (if possible), in the first weeks of project inception.

Improvement of the ESIA and RAP will include, among others:

- Integration of the discussion on the consideration of alternatives;
- Integration of the Contingency Plan, with particular and explicit measures to deal with contingencies affecting quality of water to be infiltrated in the aquifer or distributed in the irrigation scheme;
- Integration of analysis of compliance and performance of existing assets gathered in monthly reports of the monitoring and water quality control system.
- Integration of an updated institutional arrangements for ESMP implementation;

Furthermore, the final project set-up (e.g. hire an Environmental Manager and a Social Development Officer in the PMU) as well as the terms of reference for the Technical Assistance are now fully consistent with the ESIA recommandations, which can be found in the Environmental and Social Commitment Plan (ESCP) attached to the AFD Contribution Financing Agreement with Palestine. A revised and comprehensive Contingency Plan for the whole NGEST system will also be produced during inception of the project, based on the existing version elaborated by PWA.

F.4. Financial Management and Procurement

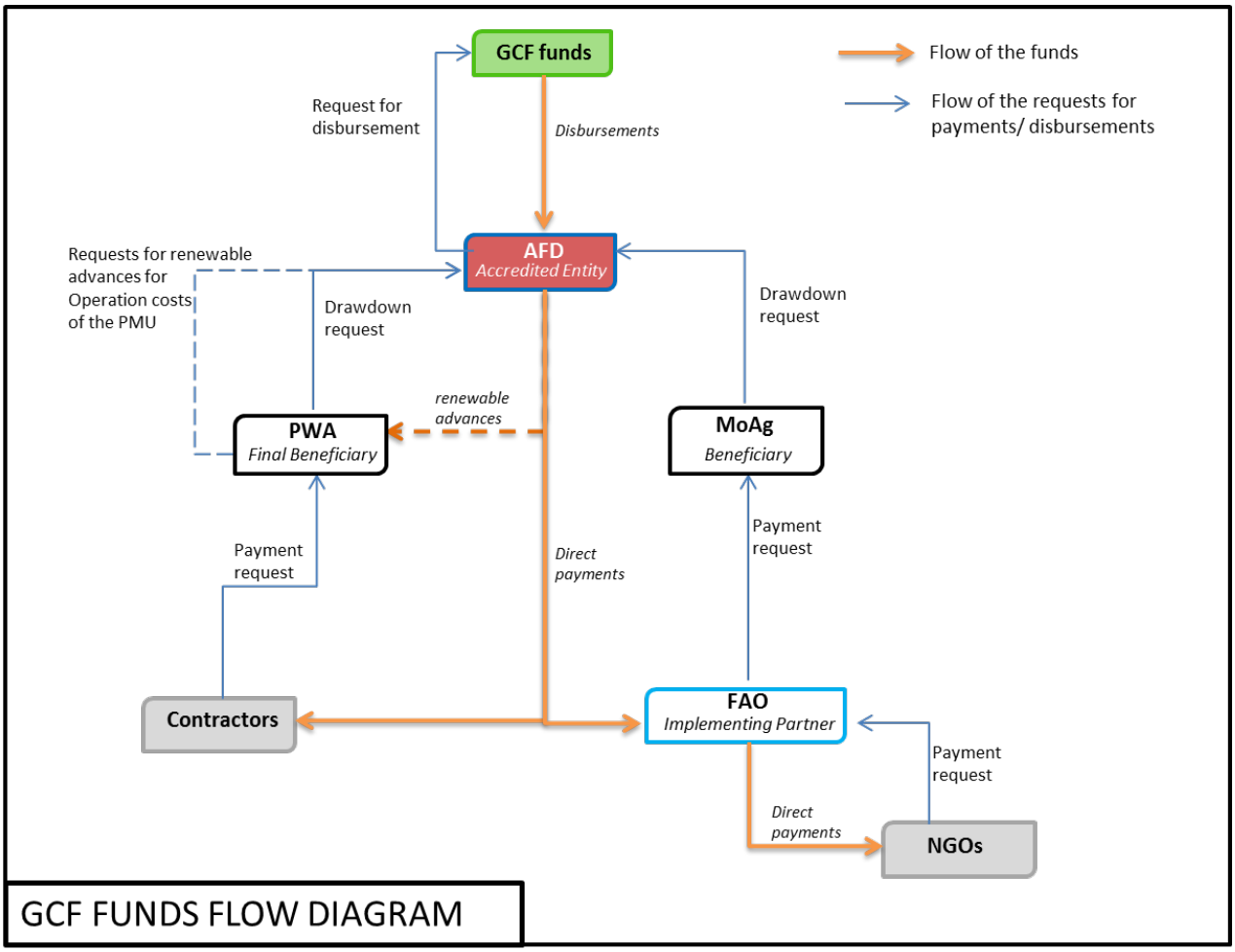
Describe the project/programme's financial management and procurement, including financial accounting, disbursement methods and auditing.

Procurement will be managed by the Central Tendering Department attached to the Ministry of Public Goods and Housing.

AFD, as the AE, will be responsible for the project implementation and activities carried out by EEs:

AFD will provide oversight of procurement function, prior review and approval, as detailed in the AMA. Procurement activities and processes will follow AFD procurement policy and standards, as detailed in the AMA.

Most disbursements will take the form of direct payments to firms contracted for works, supply of goods or services.



GCF FUNDS FLOW DIAGRAM

A special account will be opened at PWA for day to day small scale operational expenses as well as payment of salaries of PMU staff, where advance payment will be made in the maximum amount of a cumulated EUR 1 085 982. This account will be audited annually by a private firm accredited to international standards.

G.1. Risk Assessment Summary

Please provide a summary of main risk factors. Detailed description of risk factors and mitigation measures can be elaborated in G.2.

Main risk factors are related to:

Management of water quality for agriculture: a monitoring system will be set up by the project and managed by PWA in coordination with EQA to perform day to day control of the quality of the water injected in the distribution scheme. The ESIA and ESMP detail the functioning and means of the monitoring system.

Energy needs of the Managed Aquifer Recharge scheme: the project includes alternate sources of energy (than the grid and generators) through solar panels and a bio-digester.

Acceptance of treated wastewater: in general, social acceptance can be a problem, especially in Muslim countries; in the case of MAR, the fact that the reuse is not operated directly from the WWTP strongly mitigates the social risk presented above. There will nevertheless be a need to communicate adequately on this aspect and make sure there is no confusion and residual reluctance to using the water (it will also depend on the quality of the water delivered).

G.2. Risk Factors and Mitigation Measures

Please describe financial, technical and operational, social and environmental and other risks that might prevent the project/programme objectives from being achieved. Also describe the proposed risk mitigation measures.

Selected Risk Factor 1

Description	Risk category	Level of impact	Probability of risk occurring
The water in the aquifer is not depolluted fast enough	Social and environmental	Medium (5.1-20% of project value)	Low

Mitigation Measure(s)

The NGEST WWTP provides a high quality secondary treatment. Infiltration through 60 meters of sand completes the secondary treatment to a point that the water, when it enters the aquifer, is considered clean. It will nevertheless be mixed with relatively polluted water, residual from past infiltration of non-treated water and will therefore not be drinkable. Modeling of the aquifer and initial tests implemented by the PWA confirm it will be usable for agriculture when recovered by the wells installed by the project.

It is therefore crucial that the water cycle through the activation of the recovery wells is initiated as soon as possible, in order to stop the progression of the pollution plume and guarantee that uses of the underground water will be concentrated in agriculture.

The PWA, through the project, will enhance its monitoring and quality control mechanisms in order to generate real time information regarding the quality of water extracted from the aquifer and delivered to farmers. Communication and awareness raising of the population and farmers – also included in this project- will be a crucial element in the capacity of the implementing agency to mitigate this risk.

Selected Risk Factor 2			
Description	Risk category	Level of impact	Probability of risk occurring
Lack of energy to run the system	Technical and operational	Medium (5.1-20% of project value)	Medium
Mitigation Measure(s)			
The negotiation between Palestine and Israel for access to electricity of the Gaza Strip has been going on for years and is part of a political discussion. At this stage Palestine and the local authorities in Gaza have secured an average of 16 hours per day of electricity from the grid for the NGEST WWTP, which is enough to run the plant. Nevertheless, in general, access to energy in Gaza, as described above, is problematic due to its fuel dependency. In this context, the project has taken every possible step to mitigate the energy insecurity in Gaza by diversifying, as much as possible, the energy mix of the overall MAR scheme: energy from the grid; cogeneration using byproducts of the WWTP; and, in particular, climate friendly off-grid solar energy production over 8,5 ha.			
Selected Risk Factor 3			
Description	Risk category	Level of impact	Probability of risk occurring
Social acceptation of TWW	Social and environmental	High (>20% of project value)	Low
Mitigation Measure(s)			
In theory, the use of TWW in Muslim countries poses acceptance issues by the population, namely for religious reasons. In growing aridity situations, as in Tunisia for instance, these social barriers can be overcome with growing awareness by the population. In the case of this project and, in general with MAR, the TWW is infiltrated in the aquifer, blended with underground water and recovered as such by the wells. It is not direct reuse of TWW – for which the social and cultural issues mentioned above can arise - and the water distributed to farmers is therefore quasi-conventional. Awareness raising on this issue will nevertheless be necessary due to the proximity of the recovery wells from the WWTP; monitoring of the quality of recovered water and communication with users will be crucial in establishing their trust with the provider. This is part of the FAO assignment which has deep know how and experiences with MoA in Palestine on this topic.			

** Please expand this sub-section when needed to address all potential material and relevant risks.*

H.1. Logic Framework.

Please specify the logic framework in accordance with the GCF's Performance Measurement Framework under the Results Management Framework.

H.1.1. Paradigm Shift Objectives and Impacts at the Fund level[11]

Paradigm shift objectives						
Shift to low-emission sustainable development pathways	Mitigation objective : Reinforce the sustainability of the Water-Energy nexus for the NGEST system. The project will show how emergency solutions related to survival of a whole population in the context of Gaza, can be thought and designed along low emission and sustainable pathways, the cobenefits of which are an increased resilience to shocks and an increased efficiency with regard to operation and maintenance costs.					
Increased climate-resilient sustainable development	Three climate-resilient co-benefits are expected from the project: - Increased resilience of Gazan agriculture through the provision of improved water services for irrigation; - Recharge of the aquifer and improved access to domestic water of 200 000 people exposed to water scarcity; - Depollution and preservation of the aquifer. As a result of achieving these objectives, the process of pollution and overexploitation of the aquifer will be stopped before they reach an irreversible status.					
Expected Result	**Indicator**	**Means of Verification (MoV)**	**Baseline**	**Target**		**Assumptions**
				Mid-term (if applicable)	Final	
Fund-level impacts						
	Tonnes of carbon dioxide equivalent (t CO2eq) reduced as a result of Fund-funded projects/ programmes	Measurement of the total solar power distributed to the NGEST system	0	0	316 125	
	Cost per tCO2eq decreased for all Fund-funded mitigation	Mid-term and final evaluations	N.A.	0,1 EUR/kWh	0,08 EUR/kWh	

[11] Information on the Fund's expected results and indicators can be found in its Performance Measurement Frameworks available at the following link (Please note that some indicators are under refinement):
http://www.greenclimate.fund/documents/20182/239759/5.3_-_Performance_Measurement_Frameworks__PMF_.pdf/60941cef-7c87-475f-809e-4ebf1acbb3f4

	projects/programmes					
	Volume of finance leveraged by Fund funding	Decisions by other financial organizations	0	8 000 000 EUR	8 000 000 EUR	Additional funding obtained by the Irish Government
	Total Number of direct and indirect beneficiaries; Number of beneficiaries relative to total population	Palestinian Authority Statistics+ project information	0	100 000	223 553 (20% of Northern Gaza population)	
M1.0 Reduced emissions through increased low-emission energy access and power generation	M1.1 *Tonnes of carbon dioxide equivalent (t CO2eq) reduced or avoided as a result of Fund-funded projects/programmes	Reviews by third party GHG auditors, etc.	0	40 000	166 858	
A1.0 Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions	A1.1 Change in expected losses of lives and economic assets (US$) due to the impact of extreme climate-related disasters in the geographic area of the GCF intervention	Government / PWA – Gaza City Municipality data	18 = actual loss of lives as a consequence of previous waste water disaster (flooding) due to lack of treatment and MAR No information lavailabl	0	0	In the baseline "scenario" (no project), the pollution of the aquifer would continue and more losses of lives due to unavailability of drinkable water would be expected (a negative figure – representing avoided losses of lives- could be introduced at mid-terme and endline)

			e on loss of economic assets			
	A.1.2 Number of males and females benefiting from the adoption of diversified, climate-resilient livelihood options (including fisheries, agriculture, tourism, etc.)	Data from the Ministry of Agriculture, and FAO. Assessment by the Water Sector Regulatory Council (independent body)	0 males 0 females	1 600 males 400 females	3 306 males 900 females	Farmers in baseline depend on private wells delivering low quality water, unsustainably extracted from the aquifer
A2.0 Increased resilience of health and well-being, and food and water security	A.2.2 Number of food-secure households (in areas/periods at risk of climate change impacts)	Assessments by the FAO and WSRC	0	1 000	3 000	It is expected that not all farms will reach food security after gaining increased access to water, due mainly to other factors at play. Food security levels will be measured using FAO methodologies and standards.

	A.2.3 Number of males and females with year-round access to reliable and safe water supply despite climate shocks and stresses	National statistics / Gaza City Municipality data	0 male 0 female	50 000 male 50 000 female	100 000 male 100 000 female	The water infiltrated in the aquifer in substitution to water extracted for agricultural purposes will serve the domestic needs of 200 000 people that will appear due to demographic growth and that would otherwise not have access to sufficient quantities of water (safety of water will be closely monitored by the PWA, in accordance to Palestinian Water Law).

A3.0 Increased resilience of intrastructure and the built environment to climate change	A.3.1 Number and value of physical assets made more resilient to climate variability and change, considering human benefits (reported where applicable)	Environmental Quality Agency (EQA) assessment	0 0 EUR	0 0 EUR	2 Value = 85 MEUR)	Assumptions of the value of assets: - The NGEST WWTP made more resilient by the Water-Energy nexus (60 MEUR) + - The irrigation scheme made more resilient through an improved water service (25 MEUR in value))

H.1.2. Outcomes, Outputs, Activities and Inputs at Project/Programme level						
Expected Result	**Indicator**	**Means of Verification (MoV)**	**Baseline**	**Target**		**Assumptions**
				Mid-term(if applicable)	Final	
Project/programme outcomes	**Outcomes that contribute to Fund-level impacts**					
	Number of technologies and innovative solutions transferred or licensed to support low-emission development as a result of Fund support. (mitigation)	Final evaluation and EQA – PENRA assessment	0	2	3	Design and adoption of a complex and innovative Water – Energy nexus, including solar and biogas generation, as well as a net-metering system with the grid
	Number of technologies and innovative solutions transferred or licensed to promote climate resilience as a result of Fund support. (adaptation)	Final evaluation and EQA assessment	0	0	1	Design and transfer of an Managed Aquifer Recharge scheme
M.5.0 Strengthening institutional and regulatory systems for low-emission planning and development	M.5.1 Institutional and regulatory systems that improve incentives for low-emission planning and development and	EQA and PENRA assessment	No such system in N. Gaza	System partially functioning	System functionning	Implementation of the Water – Energy Nexus and in particular effectivity of the Net metering system (in order to maximize use of solar energy)

	their effective implementation					
M6.0 Increased number of small, medium and large low-emission power suppliers	M6.1 Proportion of low-emission power supply in a jurisdiction or market	EQA and PENRA assessment and data	0	0	40%	
	M.6.3 MWs of low-emission energy capacity installed, generated and/or rehabilitated as a result of GCF support	EQA – PENRA assessment and data	0	4 MWp	8 MWp	
A5.0 Strengthened institutional and regulatory systems for climate-responsive planning and development	A.5.1 Institutional and regulatory systems that improve incentives for climate resilience and their effective implementation	Level of funding and autonomy / power of WSRC	Low to inexistant funding and autonomy	Funding directed to WSRC	WSRC performing its regulatory role with funds and independance	The Water Sector Regulatory Council (WSRC) acts as an effective regulator of the Water Sector in order to improve planning and allocation of investments to reduce water scarcity and promote co-management of the resource between users and government (as per the Water Law)
A7.0 Strengthened adaptive capacity and reduced exposure to climate risks	A7.1 Use by vulnerable households, communities, businesses and public-sector services of Fund-supported tools, instruments, strategies and	Water metering system co-managed by the WUA and PWA at the entry point of the irrigation scheme and at farm	0	5 m^3 of water from the recovery scheme every year	13 m^3/year	The Fund-supported tool considered is the water recovery scheme and its use by farmers for irrigation.

	activities to respond to climate change and variability	gate. Independent assessment from the WSRC				
A.8.0 Strengthened awareness of climate threats and risk-reduction processes.	A8.1 Number of males and females made aware of climate threats and related appropriate response.	WSRC independent assessment	Male: 0 Female: 0	Male:500 Female: 100	Male: 1 000 Female: 200	Farmers (men and women) are made aware of the effects of climate change on water scarcity anf means of increased efficiency in use of agricultural water.
Project/programme outputs	**Outputs that contribute to outcomes**					
1. Production of additional quantities of water for agricultural use	Quantity of "usable" water available (in Mm^3)	Measurement at infiltration point and field surveys amongst farmers and surrounding urban population (measurments in quantity will be implemented by independent lab in Ramallah, in accordance with national	0	26	26	The WWTP functions at capacity

		standards – Warer Law)				
	Decrease in direct pumping in the aquifer by the farmers	WSRC assessment	13 000 000m^3	6 000 000m^3	0	
	Increased quality of water	Measurement of nitrate containts (mg/l)	100	75	50	
2. Development of irrigation, water efficiency and climate resilient agriculture	Number of hectares benefiting from the project	Field survey/satellite images	0	500	1 200	Farmers are willing to pay for the water service New cropping patterns are introduced by the FAO and adopted by the farmers
	Change in agricultural practices and cropping patterns	FAO assessment	Mostly horticultural crops	Inception of drip irrigation agriculture	Mostly trees cropping and rotations on high value crops under drip irrigation	
3. Management of the water cycle and capacity building of stakeholders	Number of people trained and members of community empowered as well as uptake of capacity building	Counting of trainees and scoring of the level of intake (performed by the TA)	0	2 500 people, with 60% uptake	5 000 with 75% uptake	TA and NGO's are mobilized for the community work.

	Capacity of the WUAs and involvement of women in decision making	Scoring of WUAs for governance, administrative and financial management, quality of services	0	Poor to medium score	High score	

Activities	Description	Inputs	Description
1.1. An additional water resource is created by Managed Aquifer Recharge	Rehabilitation of 7 infiltration basins for recharge of the aquifer Implementation of the recovery scheme (14 wells and 1 reservoir)	Works Tendering of equipments and goods	Cleaning of the infiltration basins ; drilling of wells and construction of a new reservoir.
1.2. Water – Energy Nexus, development of renewable low-emission energy solutions	Delivery of 2 PV schemes to sustain the overall needs of the NGEST scheme for a total of 7,5 MWp	Works Tendering of equipments and goods Consultancy services for supervision of works	Delivery and installation of solar panels
2.1. An improved water service for irrigation is brought to 4 200 beneficiaries over 1 500 ha	Development of the irrigation scheme bringing the water from the recovery scheme to the farms	Works Tendering of equipments and goods Consultancy services for supervision of works Supervision by FAO	Construction of an irrigation scheme
2.2. Increased climate resilience of agriculture, adaptation of cropping systems to climate change	Extension services to farmers Subsidy of on-farm water saving equipment Gender, land tenure and irrigation – a Gender-responsive approach to agricultural resilience to climate change	Extension services by FAO and MoA staff Consultancy services Tendering of equipments and goods	Provision of technical and economical services to farmers to improve productivity Equipment of beneficiary farms with localized irrigation systems (e.g drip irrigation) Support to land owning women; empowerment of communities to increase their gender sensitivity in agriculture; training and capacity building of women in agriculture.

3.1. Strengthening of PWA capacities in its role of coordination and quality control of the process of reuse of treated waste water	cycle Technical assistance Setting-up of a water quality monitoring and control system	Consultancy services	Support to the PWA for implementation and coordination of the project
3.2. Exit Strategy and Transfer of O&M to Water Users	Identification and establishment of the co-management scheme – Structuring and capacity building of a WUA Integration of women in the governance bodies of the WUA	Support by FAO	The FAO and MoA will support farmers in organizing within the WUA in order to manage the irrigation scheme. Particular attention will be given to the participation of women in the decision making processes.
3.3. Communities are empowered and supported, in the context of the conflict in Gaza	Support to communities and farmers to increase resilience and develop coping mechanisms in the face of further crises. Diagnostic and analysis of the conditions of recovery and restoration of unused land within the irrigable area Psychosocial support and strengthening of community and household bounds	Consultancy services, NGOS and FAO support	A set of actions will be implemented in order to increase the resilience of the population in the face of climate change.
3.4. Capitalization of the outputs/outcomes for replication and upscaling in Palestine	Knowledge building. Intellectual services for capitalization	Consultancy services	The scaling-up and replication of the project's key outputs will take place through a capitalization

			process that will involve independent expertise.

H.2. Arrangements for Monitoring, Reporting and Evaluation

Besides the arrangements (e.g. semi-annual performance reports) laid out in AMA, please provide project/programme specific institutional setting and implementation arrangements for monitoring and reporting and evaluation. Please indicate how the interim/mid-term and final evaluations will be organized, including the timing.

The project will have a specific and institutionalized approach to oversight, monitor and evaluate. Apart from the necessary monitoring and evaluation tools the PMU will indeed develop with the assistance of the Technical Assistance, the institutional framework of the project includes the Water Sector Regulatory Council as an external body in charge of independently monitoring and evaluating the project's achievements, as per the Palestinian Water Law requirements and standards.

Roles and responsibilities of the WSRC in the project need to be detailed further at inception report stage. Indeed, the reform of the water sector is not yet completed and more specifically, the independency of WSRC is unfortunately not yet formally agreed and approved.

In this context, the PWA-PMU will be in charge of centralizing and managing the monitoring system of the project. In particular, the PMU will be responsible for co-organizing the Mid-term review, as well as the end-line final evaluation of the project, in line with the incoming GCF guidelines.

AFD will tender and contract the consultancy services for the ex-post evaluation of the project, after full completion of the activities (usually one year after project completion).

Please provide methodologies for monitoring and reporting of the key outcomes of the project/programme.

PWA will be in charge of semi-annually reporting on hydraulic activities of the project, whereas the MoA-FAO will report semi-annually as well on on-farm, agricultural activities. Independent data sources will be mobilized and used for the mid-term and final evaluations.

For both PWA and FAO, an M&E specialist will be involved in gathering data in order to update indicators of key outcomes of the project. All inputs under each activity are designed in order to contribute the key outcomes of the project. As presented in the Logframe, it is expected that most of the project outcomes will be reached after project completion. Periodic reporting will then present what has been completed on the path towards the outcomes.

I. Supporting Documents for Funding Proposal

- ☒ NDA No-objection Letter
- ☒ Feasibility Study
- ☒ Integrated Financial Model that provides sensitivity analysis of critical elements (xls format, if applicable)
- ☒ Confirmation letter or letter of commitment for co-financing commitment (If applicable)
- ☒ Project/Programme Confirmation/Term Sheet (including cost/budget breakdown, disbursement schedule, etc.) – *see the Accreditation Master Agreement, Annex I*
- ☒ Environmental and Social Impact Assessment (ESIA) or Environmental and Social Management Plan (If applicable)
- ☒ Appraisal Report or Due Diligence Report with recommendations(If applicable)
- ☒ Evaluation Report of the baseline project(If applicable)
- ☒ Map indicating the location of the project/programme
- ☒ Timetable of project/programme implementation

** Please note that a funding proposal will be considered complete only upon receipt of all the applicable supporting documents.*