Contents

1 INSTITUTIONAL FRAMEWORK

1.1 Overview

The institutions most likely to be involved in the implementation and oversight of the NGEST irrigation system consist of the following:

- PWA and MoAg will cooperate to set up WUAs. Both PWA and MoAg will monitor the project's implementation.
- IAS will manage the NGEST recovery and reuse schemes and be responsible for O&M of the network. WUAs will be part of the IAS so that they are fully involved with the project management. Until the IAS and WUAs are created, CMWU should operate and manage the network.
- EQA will monitor the work to ensure it does not cause environmental harm and will cooperate with PWU in setting any water quality/use standards.
- MoLG will coordinate with municipalities, the CMWU, the WUAs and other stakeholders in the water distribution system.
- MoH will monitor the work to ensure it does not cause harm to human health and will cooperate with PWU in setting any water quality/use standards.

1.2 Institutional Framework Under the New Water Law

The water sector reform process currently underway in Palestine began in earnest in 2009, with the endorsement of the "Action Plan for Reform" by the Cabinet of Ministers, which led to the definition and implementation of a comprehensive program of institutional and legislative reforms, culminating in the passage of a new water law in 2014. The new law "aims to develop and manage the Water Resources in Palestine, to increase their capacity, to improve their quality, to preserve and protect them from pollution and depletion, and to improve the level of water services through the implementation of integrated and sustainable water resources management principles". Of particular importance, the law identifies the roles and relations among the various water sector institutions.

Perhaps the most significant institutional change brought about by the new water law is that the Palestinian Water Authority's (PWA) role of regulating service providers has been given to a new independent entity, the Water Sector Regulatory Council (WSRC), which was established in late 2014. Its objective, as defined by the law, is to "monitor all matters related to the operation of water Service Providers including production, transportation, distribution, consumption and wastewater management, with the aim of ensuring water and waste water service quality and efficiency to consumers in Palestine at affordable prices."

In addition to measuring the efficiency and performance of the service providers, WSRC is mandated with economic regulations regarding tariffs and cost of development and supply of water, including:

- Approval of water prices, costs of supply networks and other services required for the delivery of water and waste water services;

- 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;
- Monitoring operation processes related to the production, transport, and distribution of water and operational processes of wastewater management; and
- Monitoring the compliance of the National Water Company and Service Providers with the adopted standards for the provision of water and sanitation services. Monitoring water supply agreements.

Furthermore, WSRC can conduct inquiries, investigations and inspections, but does not impose fines or other financial sanctions. The powers of WSRC to enforce compliance with regulation (for instance enforcing the water quality standards) are not defined in its mandate.

Another major institution created by the new water law is the National Water Company (NWC). The existing West Bank Water Department (WBWD) will undergo a transitional period of financial and management upgrade to be followed by the establishment of the NWC, which will be a publically owned water company to cover the Gaza Strip and the West Bank.

The NWC will oversee supply and sale of bulk water to water undertakings, local authorities, joint water councils and associations. It extracts or develops any resource and transmits it in bulk based on a license issued by PWA. Points of delivery of the bulk water are Regional Utilities for all water users (other than for irrigation) and Water Users Associations (WUA) for irrigation water.

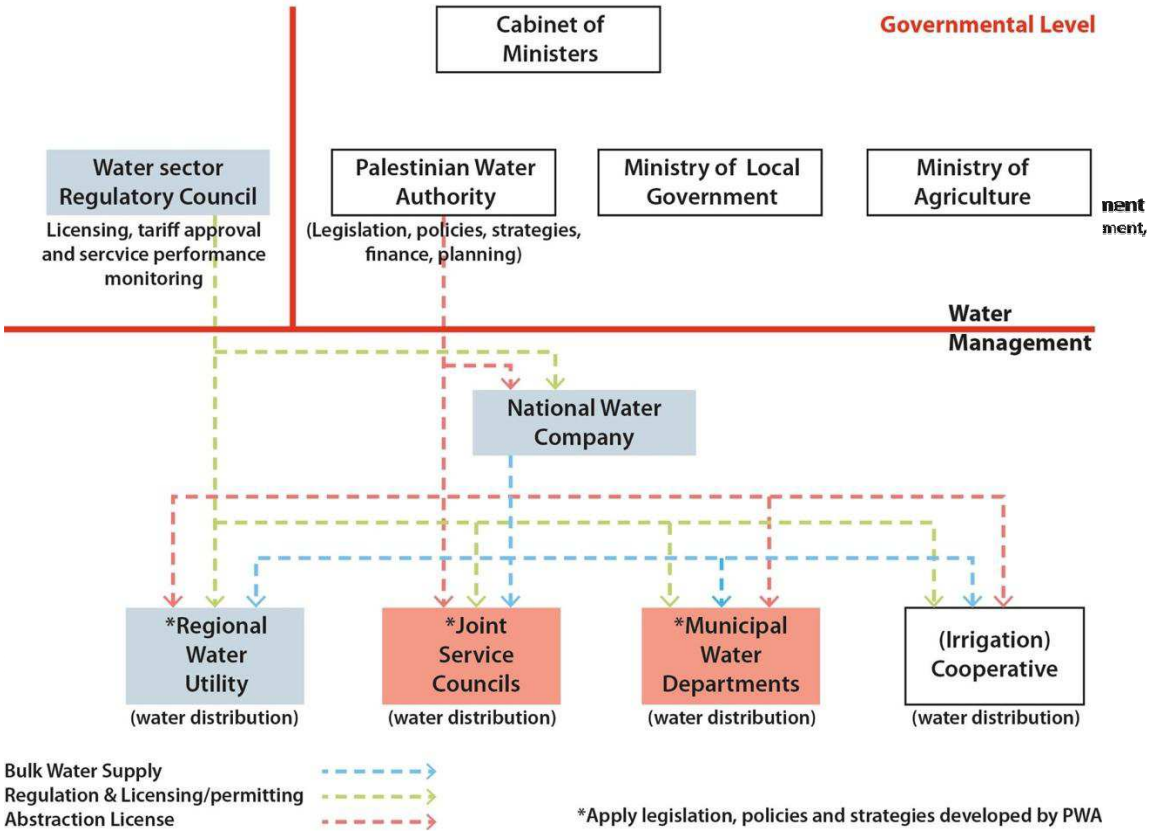
The water sector is centralised in terms of strategy, policies, project development and identification of bulk water supply, yet decentralised to the point of fragmentation among municipalities in the provision of services. Customer water services are currently provided by 300 water service operators across the country. Most of them (> 90%) are not independent water companies, but rather small technical branches of municipalities (PWA, 2003). Many of these municipal branches have very low levels of financial autonomy and suffer from both a lack of technical skills and political interference.

In order to improve efficiency in the provision of services and achieve economies of scale, the new water law seeks the creation of Regional Utilities and WUAs for water distribution. Individual water departments in the municipalities will first consolidate to form Joint Services Councils and eventually amalgamate even more to form the Regional Utilities (RU), ideally four: three in North, Center, and South of the West Bank; and the fourth in Gaza. The Gaza structure is nearly completed as the Coastal Municipal Water Utility (CMWU). Irrigation water services will be administered through Water User Associations (WUA), which are to be established according to a regulation that will be proposed jointly between the PWA and the Ministry of Agriculture (MoAG). According to the Water Sector Reform Plan 2016□2018 and confirmed by representatives of PWA in May 2017, a by□law on WUAs is currently under review by the Cabinet of Ministers.

The figures below depict the institutional framework before and after the law. Table 6 and Table 7 identify the new roles and inter□related responsibilities of the various entities. Annex 1 further elaborates on these relationships.

Water Sector Framework
(Before signing the NEW Water Law)

Water Sector Framework
(Medium-Long Term)



*Apply legislation, policies and strategies developed by PWA

Table 1: Institutional mapping of roles and responsibilities in the water sector at central government level according to the new water law. *Allocation of roles across ministries and public agencies*

AREA	ES	Domestic	Agriculture	Industry	Treatment
Strategy, priority setting and planning includin , g infrastructure	PWA	PWA	PWA	PWA	PWA, MOH, EQA
Policy Making	PWA	PWA	PWA	PWA	PWA, EQA, MOH
Information, monitoring and evalutation	PWA EQA, envt condition MOH, health qlty	WSRC EQA MOH	WSRC EQA MOH	WSRC EQA MOH	PWA, EQA, WRSC, MOH
Stakeholders engagement, citizen's awareness	PWA EQA MOLG MOH	PWA MOLG MOH	PWA MOA MOH	PWA MOH	PWA EQA MOH

Table 2: Institutional mapping of roles and responsibilities in the water sector at central government level according to the new water law. Institutional mapping for qualty standards and regulation

AREA	RESOURCES	Domestic	Agriculture	Industry	Treatment
Allocation of uses	PWA	PWA	PWA	PWA	PWA, MOH, EQA
Quality standards	PWA, MOH	PWA, MOH	PWA, MOH, MOA	PWA, MOH	PWA, EQA, MOH, MOA
Compilance of service deliverys	WSRC	WSRC	WSRC	WSRC	WSRC
Economic regulations (tariffs)	PWA	PWA	PWA	PWA	PWA
Environmental regulation	PWA, EQA	PWA, EQA	PWA, EQA, MOA	PWA, EQA	PWA, EQA

The above list is not comprehensive as it does not include, for example, the Ministry of Finance.[2] It is also important to note that the Water Law of 2002 called for the establishment of the National Water Council, to be made up of representatives from several ministries. Though established, the Council was never effective.[3] The new Law of 2014 does not refer to the Council so it is presumably defunct.

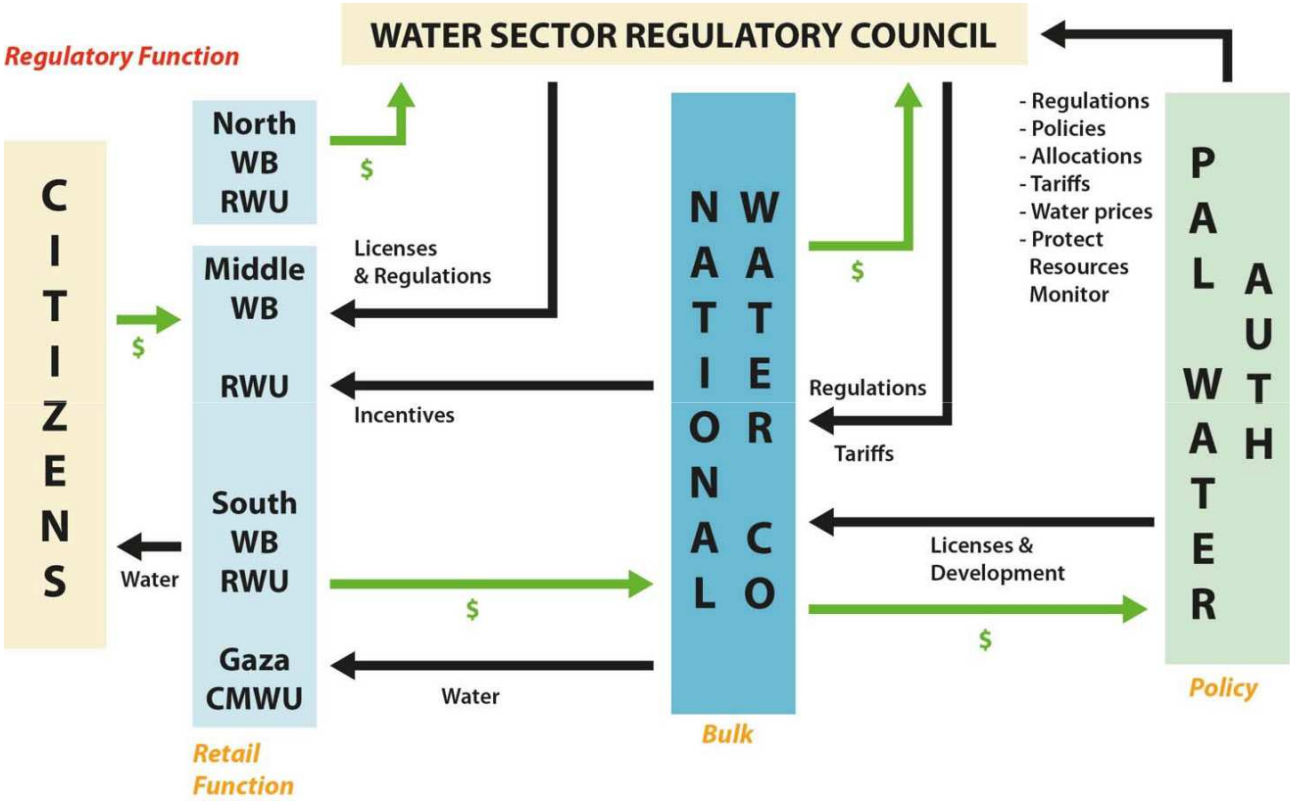


Figure 2: Water Sector Regulatory Council Functional Structure

The figure above illustrates the functional structure of the water sector entities according the 2014 Water Law. Arrows in black are functions whereas arrows in green show the direction of flow of funds. As seen, the consumers (citizens) pay the respective retail unit (CMWU, for example) for the water delivered. The retail unit then pays both the bulk supplier for the water supplied and the regulator for its services such as license fees, whereas the bulk supplier pays the PWA for licenses granted to exploit and develop the supply sources.

1.3 Key Institutions for the NGEST Irrigation Scheme

Various Palestinian institutions will be directly involved with the recovery and reuse scheme of the NGEST Project: PWA; MoAG; CMWU; WSRC; and WUAs. Indirectly, several other ministries are also implicated, including the Environmental Quality Authority (EQA), Ministry of Local Government (MoLG), and Ministry of Health (MoH). Each is briefly considered in turn below.

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[2] The list would also normally include the Ministry of Planning but it was apparently dissolved by Hamas in October 2016.

[3] The NWC has not held a single meeting since its establishment.

PWA and MoAG will need to cooperate with one another in multiple areas for the NGEST irrigation scheme. First, they must work to create WUAs through WUA-specific legislation. Establishing WUAs on the basis of specific legislation means that their purpose can be clearly specified from the outset as can the manner in which they are to be established and operated. It also means that the legislation can take account of the specific nature of WUAs through, for example, the provision of suitable and appropriate governance structures that are designed to promote transparency and effective rule making. There is allegedly a draft by-law on WUAs at the Cabinet. Its contents are unknown to the Consultant.[4]

Additionally, PWA and MoAG will need to jointly monitor the project's implementation, and provide farmers in the project area with support. MoAg will need to closely supervise farmers' activities, irrigation methods and application rates as well as collect sampling and do testing of crops and soils. Local WUAs should also be involved with the system's management and water distribution. PWA, MoAg, and the WUAs efforts may best be organized through an Irrigation Advisory Service (IAS) recommended by this *Report*. The IAS would provide a platform for multi-stakeholder communication and gather the requisite expertise for running the project in one office. Given the multiple ministries responsible for monitoring, the IAS may also serve as the gathering point for monitoring data.

Because the IAS and WUAs do not yet exist, the CMWU is best positioned to run the irrigation scheme in the meantime. The CMWU, as the water utility in the Gaza Strip, currently handles municipal water supply as well as sewerage and WWTPs, including house connections and operation and maintenance, so it already has experience in this area. The existing sewerage fee is charged by the CMUW, so any additional wastewater fee could potentially be added to the same bill of water.

While it manages the system, CMWU would be responsible for the establishment of the conveyance system, metering of farm off-take points, contracting with farmers and tariff collection. It would also be responsible for recharge of the surplus effluent. Until the IAS and WUAs are established, CMWU will be responsible for control of water demand and should work with MoAg to coordinate with farmers to ensure equitable and suitable distribution of recovered water according to crop requirements.

Whatever entity is managing the irrigation network – either CMWU or IAS – that entity will be responsible for the recovered water quality and be subject to audits and check sampling by EQA. EQA will monitor the work to ensure it does not cause environmental harm and will cooperate with PWU in setting any water quality/use standards. Additionally, MoH should be involved in monitoring to ensure the application of recovered water does not cause harm to human health and should cooperate with PWU in setting any water quality/use standards. Finally, MoLG will coordinate with Local Government Units (LGU), municipalities, CMWU, WUAs and other stakeholders in the water distribution system.

In Annex 2, 3 and 4 are presented several case studies of successful institutional set-up (including water users involvement) in irrigation and drainage in developing countries.

[4] The draft by-law as well as several other documents were requested but not received.

1.4 Institutional Capacity Assessment

There are a number of particular skills that need to be developed for the successful implementation of the NGEST project, including management of MAR and sludge as well as the design, operation and maintenance of modern irrigation technologies. There are also a range of specialized technologies that must be mastered, including groundwater modelling and GIS remote sensing. Communication and cooperative approaches should also be fostered through trainings on developing the IAS or community awareness raising to bolster support for the project.

In order to adequately assess the specific capacity development needs for each aspect of the project, this *Report* has interwoven capacity building throughout each section: Managed Aquifer Recharge; Farmer Assistance; IAS; WUAs; and Operation and Maintenance of the Irrigation System. Therefore, although there are recommendations below for Institutional Capacity Building, overall capacity development should be viewed through the context of the entire *Report*.

1.5 Recommendations

A capacity development system for the Water Sector already exists and a substantial amount of resources are being invested to enhance capacities in the water sector in Palestine. (PWA, 2016) Compared to other countries, where capacity development efforts have to be developed from scratch, Palestine boasts a substantial foundation of sufficiently developed institutions and high number of human resources investments. Palestinian Universities, polytechnics, industrial secondary schools and vocational training schools produce a constant inflow of trained professionals for the water sector, and international donors have expended considerable sums for training of water sector stakeholders. See Annex 6 for a list of current capacity development initiatives.

However, there needs to be a better coordination of capacity development initiatives with policies and strategies so that there is a more efficient utilization of resources and the training better meets the needs of the sector. In particular, PWA, WSRC as well as the NWC, RU and WUAs need targeted capacity building to implement the water law, to make effective and efficient use of increased investments, and to maintain the existing and new infrastructure.

In addition to supporting the reform process through capacity development, work needs to be done to create an environment in which skill and knowledge acquisition can take place, including, for example, fostering a professional atmosphere in which technical growth is rewarded and there are incentives for participation, allocating a sufficient budget for on□going development, and ensuring monitoring and follow□ up of capacity development efforts.

Below is a truncated list of institutional capacity building recommendations. As mentioned above, for a more detailed analysis of capacity development needs, see the other relevant sections of this *Report*.

- **Capacity Development Coordination**

There is a need for sector□wide monitoring and evaluation of capacity development interventions. The current lack of the monitoring and evaluation is directly correlated with the need for coordination, but also lends itself to the mismanagement of limited resources, decline in performance and loss of value for money spent. It is expected that the newly created Capacity Development Directorate of PWA will lead this

coordination as well as execute the recommendations contained in PWA's Water Sector Capacity Development Policy and Strategy of 2016.

- **Focus on Practical Skills**

There should be increased focus on the development of practical knowledge and competencies to address existing and emerging water sector challenges, for example negotiation with the Joint Water Committee, and how to build, manage, repair and renew a technical irrigation system.

- **Encourage On□going Capacity Development**

Water professionals need to refresh and expand their knowledge base in a number of training days each year to be able to excel in their work. Organizational Capacity Development (action) plans, covering a 3□5 year period, should be prepared by the relevant units and persons within the respective organizations. These plans should be approved by the organization itself, endorsed at national level, and updates should be made annually.

- **Help Prepare CMWU**

Because CMWU will likely handle the operation and management of the NGEST irrigation scheme until the creation of the IAS and WUAs, the capacity of CMWU should be expanded to provide this service. Additionally, there may be the need to modify the current mandate of the CMWU to reflect this change.

- **Sludge Management**

Training is needed that tackles sludge collection, treatment, or dumping and sludge management. Sludge represents a completely new sector, which should be organized and well regulated in order to benefit from it.

- **MAR Training**

A simplistic view that treating water to near drinking standards before recharge will protect the aquifer and recovered water is incorrect. For example chlorination, to remove pathogens that would be removed in the aquifer anyway can result in water recovered from some aquifers containing excessive chloroform. In some locations, drinking water injected into potable aquifers has resulted in excessive arsenic concentrations on recovery due to reactions between injected water and pyrite containing arsenic. Source water that has been desalinated to a high purity dissolves more minerals within the aquifer than water that has been less treated.

Hence the ministries responsible for the MAR scheme need to understand how this aquifer will interact with the recharged water. More specifically, they should have hydrogeological and geotechnical knowledge, as well as knowledge on water storage and treatment design, water quality management, hydrology and modelling, monitoring and reporting. They need to understand d pathogen inactivation and biodegradation. The response of an aquifer to any water quality hazard depends on specific conditions within the aquifer, including temperature, presence of oxygen, nitrate, organic carbon and other nutrients and minerals, and prior exposure to the hazard, so the ministries should receive adequate training on these subjects.

Additionally, EQA and PWA (and any other ministry that will regulate the MAR scheme) should acquire basic stratigraphic and hydrogeological information for each well drilled. This information should be stored in departmental data bases, which would ideally be publically accessible on the web.

- **Create a MAR Unit**

The human resources at PWA are limited as the number of staff is already not sufficient to perform all needed tasks (e.g. data evaluation, quality control) let alone to fulfil new tasks related to MAR. If MAR activities are to be pursued, it is highly recommended to create a MAR unit with competent staff to be able to perform the additional work load either within PWA, EQA, or as a sub committee within the IAS. It is recommended that strategic planning and the development of a regulatory framework as well as the oversight of MAR activities should be undertaken by the PWA/EQA. Any future technical cooperation on MAR should clearly define responsibilities and objectives of both partners and allow sufficient time for a successful cooperation.

2 PROJECT ECONOMICS AND FINANCIAL SUSTAINABILITY

2.1 Micro-Economic Conditions

The micro-economic analysis of this project looks at the costs and revenues associated with the introduction a new cropping pattern and the modernization of irrigation methods at the farm level where several investments are required to improve productivity and profitability. Within the project area, there exists various current conditions: some farms are cultivated but rely only on rain-fed irrigation; some farms are already cultivated but water is drawn only from wells; large swaths of land are not currently farmed and land levelling and full reclamation might be required.

This section of the *Report* assesses what the net income for farmers would be with and without the project and assesses the availability in the farmers' budget to pay for water.

2.1.1 Evolution of the Cropping Pattern

The analysis assumes that famers will be able to fully implement the proposed cropping pattern and irrigation methods over a period of four years. These changes, changing the existing land use and planting trees and vegetables, are expected to increase land productivity.

The analysis of the value chain has shown that some crops such as fresh fruit (peaches, apricots, plums) are scarcely produced and often imported goods. Olive, as a crop to produce olive oil, is often sold at a low price and profitability might be improved by nearly 50% if olives, especially the better-preserved ones of the right variety, are processed into eatable olives. The new cropping pattern also includes almond as a profitable and long-lasting, easy to preserve, type of crop.

The newly proposed cropping pattern cannot produce the desired increase in production and profits unless farmers are extensively trained (see above for specific recommendations on capacity building for water user associations and farmers). Furthermore, It would be desirable for farmers to unite in associations or cooperatives to jointly handle the supply chain through the use, for example, of refrigeration storage facilities that allow the consumption of perishable products over a longer period of time.

Table 3: Evolution of the Cropping Pattern

					Land Development Over Time (Years)			
	BEFORE		AFTER		Y1	Y2	Y3	Y4
Crops and crop groups[6]	%	du	%	du	du	du	du	du
Citrus	5	603	22	2,655	1,116	1,629	2,142	2,655
Olive	8	930	23	2,776	1,392	1,853	2,314	2,776
Almond	2	272	10	1,207	506	739	973	1,207
Peaches	5	587	7	845	652	716	780	845

[6] Crops marked in red are those that, in future conditions, will occupy less land if compared to present conditions

Other fruit tree crops	5	544	3	362	499	453	408	362
Grains*	31	3.684	12	1,448	3,125	2,566	2,007	1,448
Winter vegs	13	1.603	4	483	1,323	1,043	763	483
Winter vegs (tomato in greenhouse)	1	121	3	362	181	241	302	362
Summer vegs	8	1.009	6	724	938	867	795	724
Alfalfa (green fodder)	4	509	10	1,207	684	858	1,032	1,207
Uncultivated	18	2.205	0	0	1,654	1,102	551	□
Total	**100**	**12.068**	**100**	**12,068**	**12,068**	**12,068**	**12,068**	**12,068**
* grains: wheat + barley								

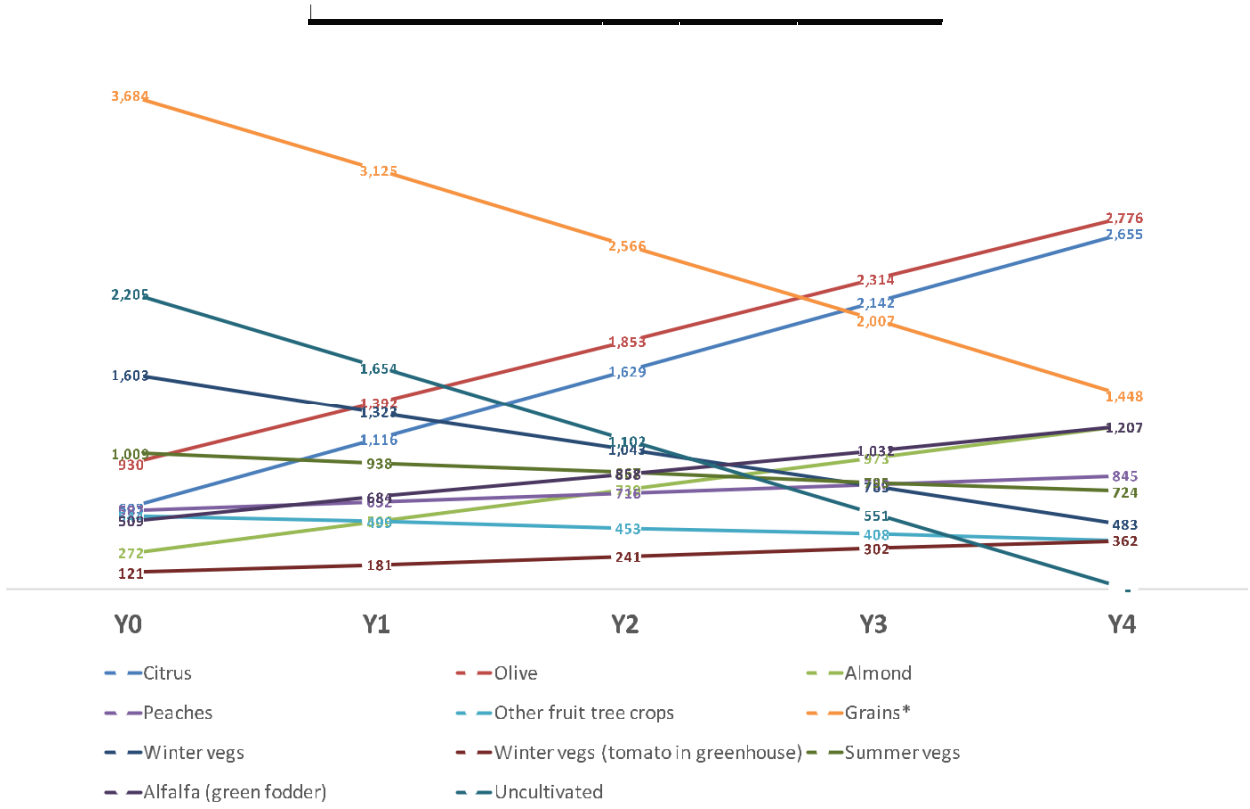

Figure 3: Evolution of the cropping pattern over land [du] over time [years]

2.1.2 Farm□Level Investments

Investments at the farm level would be largely spent on an increase in tree plantations and greenhouses placed in areas located away from the border with Israel.

The following table summarizes investments, expressed in Israeli New Shekel (ILS) per dunum (du) by type of crop and by type of material / activity required to produce such crop.

Table 4: Farm□level Investment [ILS] per dunum [du]

Crops and crop groups	Farm□level Investment [ILS/du]						
	Green house	*Trees*	*Irrigation grid*	*Labour*	*Machinery*	*Inputs*	*Total*
Citrus		400	380	400	0	200	1,380
Olive		800	380	400	0	200	1,780
Almond		1,20	380	400	0	200	2,180
Peaches		1,00	380	400	0	200	1,980
Other fruit tree crops							□
Grains*							□
Winter vegs							□
Winter vegs (tomato in greenhouse)	37,500		492				37,992
Summer vegs							□
Alfalfa (green fodder)			1,080	80	0	200	1,360
Uncultivated							

Considering the evolution of the cropping pattern, total investments at farm level are provided in the following Table 15.

Table 5: Farm□level investments evolution during four years of full stage

	Farm□level Investment at (ILS x 1,000)			
Crops and crop groups	Y1	Y2	Y3	Y4
Citrus	708	708	708	708
Olive	821	821	821	821
Almond	509	509	509	509
Peach	128	128	128	128
Other fruit tree crops				
Grains*				
Winter vegs				
Winter vegs (tomato in greenhouse)	2,292	2,292	2,292	2,292
Summer vegs				
Alfalfa (green fodder)	237	237	237	237
Total ILS x 1,000	**4,695**	**4,695**	**4,695**	**4,695**

Based on the new cropping pattern, balance sheet statements have been re□calculated by considering:

a new cultural organization;

more modern and efficient farming practices due to training activities and better extensions services;

better and more effective phytosanitary defense;

a more rational distribution of the irrigation network of the farm; a
sizable reduction in net irrigation water demand;
a higher production, especially of the tree plants due to increased attention to thinning, correct ripening and fruit calibration;

a water tariff based on the 0,63 ILS/m^3.

2.1.3 Water Tariff

The water tariff has been prudently calculated including the effect of climate change, system losses, unexpected events due to pipe breaks, possible defects and/or breaks of the water metering system, possible reading errors of the water metering system and considering a margin of tariff increase of about 40%.

The balance sheet was calculated on the basis of a ILS/m^3 fee of 0.63 derived from the following calculation:

Annual Cost for O&M and WUAs/IAS [ILS/year]	Gross Water Requirements [m^3/year]	Net Irrigation Water Requirements [m^3/year]	Tariff ILS/m^3
4,956,799.90[7]	11,110,000	7,833,484	**0,63**

The details of the number presented above are given in the following Table 16:

Table 6: Gross and Net Irrigation Water Requirements at farm level and excluding industries

Type of Crop	Net Irrigation Water Demand	Gross Irrigation Water Demand
Crop	**m^3/year**	**m^3/year**
Citrus	2,196,183	3,114,835
Olive	1,957,104	2.775,750
Peaches	531,016	753,138
Grains	448,785	636,509
Other fruit	225,297	319,538
Summer vegetables	470,724	667,626
Winter vegetables	141,871	201,216
winter tomato greenhouses	51,337	72,811
Almond p	750,992	1,065,128
alpha□alpha p	1,060,174	1,503,639
Total m^3/year	**7,833,484**	**11,110,191**

[7] The annual cost of the WUAs is assumed to be 300,000 ILS and added to the O&M costs.

2.1.4 Breakeven Point of Water Tariff

In order to better qualify how the balance sheet of each individual crop changes by changing the water tariff, the break□even point between costs and revenues was estimated for each crop. The results, displayed in the following table, show that a large part of the crops have the costs and revenues balance between a tariff of 0,90 ILS/$m^3$and of 2,49 ILS/m^3.

Water price sensitivity is lower in summer and winter vegetables, while only vegetables grown in the greenhouse can withstand a high cost per cubic meter of water.

Table 7: Water tariff that involve zero net margin

Crops	olive	citrus	peaches	grain	other fruit crop	summer vegetable	winter vegetables	winter greenhouses	almond	alpha alpha
water tariff ILS/m^3	1.00	1.63	2.49	□0.89	1.76	3.31	6.56	42.51	0.90	1.14

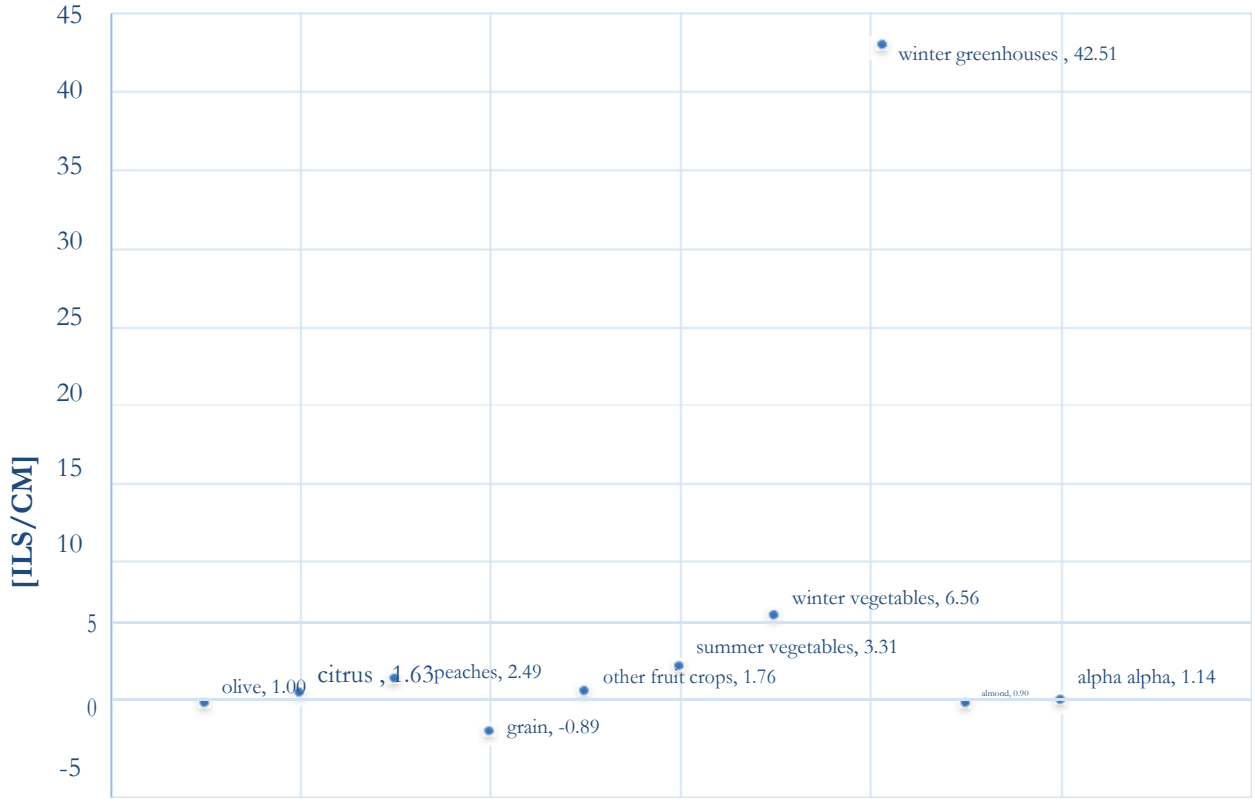

Figure 23: Water tariff that involve zero net margin

It is assumed that the following costs will be paid by the farmers: the Operation & Maintenance (O&M) costs of the irrigation network inside the farms; and the costs for training and operation of the Irrigation Advisory Services (IAS) and Water User Associations (WUA). The farmers would be charged based on the actual water they consume. Water consumption is measured by a water meter installed at the manhole located at the farm gate.

2.1.5 Balance Sheet for the Cropping Pattern

A summary and detailed analysis for both costs and revenues associated with each crop as suggested by the newly proposed cropping pattern is provided in the following series of tables.

Table 8: Summary of the Financial Costs [ILS x 1,000]

Crops	Y1	Y2	Y3	Y4
Citrus	2,493	3,639	4,784	5,930
Olive	2,253	2,999	3,746	4,493
Peaches	995	1,094	1,192	1,291
Grains	3,584	2,943	2,302	1,661
Other fruit crops	857	779	701	622
Summer vegetables	2,118	1,957	1,796	1,635
Winter vegetables	2,854	2,250	1,646	1,042
winter tomato greenhouses	486	648	810	972
Almond	599	875	1,152	1,429
alpha□alpha	777	975	1,173	1,371
Total for the Financial Costs [ILS x 1,000]	**17,016**	**18,159**	**19,302**	**20,445**

Table 9: Summary of the Financial Revenues [ILS x 1,000]

	Y1	Y2	Y3	Y4
Citrus	3,456	5,044	6,632	8,220
Olive	2,672	3,558	4,444	5,329
Peaches	1,792	1,969	2,146	2,323
Grains	2,109	1,732	1,355	978
Other fruit crops	1,253	1,139	1,024	910
Summer vegetables	3,751	3,466	3,181	2,896
Winter vegetables	5,158	4,066	2,975	1,883
winter tomato greenhouses	1,901	2,534	3,168	3,801
Almond	728	1,065	1,401	1,738
alpha□alpha	1,077	1,351	1,626	1,901
Total for the Financial Revenues [ILS x 1,000]	**23,898**	**25,924**	**27,951**	**29,978**

The detailed balance sheet for each crop are provided as follows:

Table 10: Balance sheet for Citrus

Citrus p	Revenues	Q.ty kg/du	ILS/kg	ILS/du	*Margin*
		1,800.00	1.72	*3,096.00*	
	Costs	**Q,ty/du**	**ILS/unit.**	**ILS/dun**	
Tillage	n.	1.50	100.00	150.00	
Chemical Fertilizers	kg.	80.00	5.00	400.00	
Organic Fertilizers	kg.	400.00	0.50	200.00	
Soil Disinfection	kg.			□	
Plant Protection*	kg.	4.00	100.00	400.00	
irrigation	m3	827.20	0.63	523.43	
Harvesting □ Labour	dd	14.00	40.00	560.00	
Harvesting □ machinery	h			□	
Depreciation of the plant	**1,380**	duration years	35.00	39.43	
TOTAL				*2,272.86*	***823.14***

Labour & Enterprise					1,383.14
***aver. q.ty*aver. Prices**					

Table 11: Balance sheet for Olive

	Revenues	Q.ty kg/du	ILS/kg	ILS/du	*Margin*
olive oil 50%		45.00	16.00		
tables olive %		300.00	4.00	***1,920.00***	
	Costs	**Q,ty/du**	**ILS/unit.**	**ILS/dun**	
Tillage	n.	2.00	60.00	120.00	
Chemical Fertilizers	kg.	40.00	5.00	200.00	
Organic Fertilizers	kg.	450.00	0.50	225.00	
Soil Disinfection	kg.			□	
Plant Protection	kg.	3.00	40.00	120.00	
irrigation	m3	705.10	0.63	446.17	
Harvesting □ Labour	dd	8.00	40.00	320.00	
Harvesting □ machinery	h	5.00	6.00	30.00	
Olive's milling	kg.	45.00	3.50	157.50	
Depreciation of the plant	**1,780**	duration yrs	40.00	44.50	
TOTAL				***1,663.17***	***256.83***
Labour & Enterprise					576.83

Table 12: Balance sheet for Peaches

	Revenues	Q.ty kg/du	ILS/kg	ILS/du	*Margin*
		1,100.00	2.50	***2,750.00***	
	Costs	**Q,ty/du**	**ILS/unit.**	**ILS/dun**	
Tillage	n.	2.00	60.00	120.00	
Chemical Fertilizers	kg.	60.00	5.00	300.00	
Organic Fertilizers	kg.	300.00	0.50	150.00	
Soil Disinfection	kg.			□	
Plant Protection	kg.	5.00	80.00	400.00	
irrigation	m3	628.60	0.63	397.76	
Harvesting □ Labour	dd	4.00	40.00	160.00	
Harvesting □ machinery	h			□	
Depreciation of the plant	1,980.00	duration yrs	35.00	56.57	
TOTAL				***1,584.33***	***1,165.67***
Labour & Enterprise					*1,325.67*

Table 13: Balance sheet for Grains

	Revenues	Q.ty kg/du	ILS/kg	ILS/du	*Margin*
		450.00	1.50	***675.00***	
	Costs	**Q,ty/du**	**ILS/unit.**	**ILS/dun**	
Tillage	n.	1.33	60.00	79.80	
Chemical Fertilizers	kg.	40.00	5.00	200.00	
Organic Fertilizers	kg.	100.00	0.50	50.00	
Irrigation pipes (/5 y)	ml	1400.00	0.70	196.00	
Plant Protection	kg.	4.00	15.00	60.00	
irrigation	m3	309.90	0.63	196.10	
Harvesting Labour	dd	8.00	40.00	320.00	
Harvesting machinery	h				
Seedings	kg.	20.00	2.25	45.00	
TOTAL				***1,146.90***	***(471.90)***
Labour & Enterprise					*(151.90)*

Table 14: Balance sheet for Other fruit crop

	Revenues	Q.ty kg/du	ILS/kg	ILS/du	*Margin*
		750.00	3.35	***2,512.50***	
	Costs	**Q,ty/du**	**ILS/unit.**	**ILS/dun**	
Tillage	n.	2.50	60.00	150.00	
Chemical Fertilizers	kg.	60.00	5.00	300.00	
Organic Fertilizers	kg.	250.00	0.50	125.00	
Soil Disinfection	kg.				
Plant Protection	kg.	5.00	80.00	400.00	
irrigation	m3	622.30	0.63	393.77	
Harvesting Labour	dd	8.00	40.00	320.00	
Harvesting machinery	h	5.00	6.00	30.00	
Depreciation of the plant	1,800.00	duration yrs	20.00	90.00	
TOTAL				***1,808.77***	**703.73**
Labour & Enterprise					**1,023.73**

Table 15: Balance sheet for Summer vegetables

	Revenues	Q.ty kg/du	ILS/kg	ILS/du	*Margin*
		5,000.00	0.80	***4,000.00***	

	Costs	Q,ty/du	ILS/unit.	ILS/dun	
Tillage	n.	1.50	100.00	150.00	
Chemical Fertilizers	kg.	40.00	5.00	200.00	
Organic Fertilizers	kg.	500.00	0.50	250.00	
Soil Disinfection	kg.	1.00	100.00	100.00	
Plant Protection	kg.	15.00	25.00	375.00	
irrigation	m3	650.10	0.63	411.36	
Harvesting Labour	dd	15.00	40.00	600.00	
Irrigation pipes (/5 y)	ml	800.00	0.70	112.00	
Seedings	kg.	1.00	60.00	60.00	
TOTAL				***2,258.36***	***1,741.64***
Labour & Enterprise					***2,341.64***

Table 16: Balance sheet for winter vegetables

	Revenues	Q.ty kg/du	ILS/kg	ILS/du	*Margin*
		3,000.00	1.30	***3,900.00***	
	Costs	**Q,ty/du**	**ILS/unit.**	**ILS/dun**	
Tillage	n.	1.50	100.00	150.00	
Chemical Fertilizers	kg.	50.00	5.00	250.00	
Organic Fertilizers	kg.	400.00	0.50	200.00	
Soil Disinfection	kg.	1.00	100.00	100.00	
Plant Protection	kg.	12.00	25.00	300.00	
irrigation	kg.	293.90	0.63	185.97	
Harvesting Labour	dd	20.00	40.00	800.00	
Irrigation pipes (/5 y)	ml	800.00	0.70	112.00	
Seedings	kg.	1.00	60.00	60.00	
TOTAL				***2,157.97***	***1,742.03***
Labour & Enterprise					2,542.03

Table 17: Balance sheet for winter tomato greenhouses

	Revenues	Q.ty kg/du	ILS/kg	ILS/du	*Margin*
		7,000.00	1.50	***10,500.00***	
	Costs	**Q,ty/du**	**ILS/unit.**	**ILS/dun**	
Tillage	n.	1.50	100.00	150.00	

Chemical Fertilizers	kg.	40.00	5.00	200.00	
Organic Fertilizers	kg.	400.00	0.50	200.00	
Soil Disinfection	kg.	1.00	100.00	100.00	
Plant Protection	kg.	25.00	25.00	625.00	
irrigation	m3	141.80	0.63	89.73	
Harvesting Labour	dd	30.00	40.00	1,200.00	
Harvesting machinery	h				
Seedings	kg.	0.02	8,000.00	120.00	
Depreciation of greenhouse	mq	750.00	50.00	1,875.00	** 20 year*
TOTAL				***4,559.73***	***5,940.27***
Labour & Enterprise					7,140.27

Table 18: Balance sheet for Almond

	Revenues	Q.ty kg/du	ILS/kg	ILS/du	*Margin*
		180.00	8.00	***1,440.00***	
	Costs	**Q,ty/du**	**ILS/unit.**	**ILS/dun**	
Tillage	n.	2.00	60.00	120.00	
Chemical Fertilizers	kg.	40.00	5.00	200.00	
Organic Fertilizers	kg.	300.00	0.50	150.00	
Soil Disinfection	kg.				
Plant Protection	kg.	8.00	25.00	200.00	
irrigation	m3	622.30	0.63	393.77	
Harvesting Labour	dd	3.00	40.00	120.00	
Harvesting machinery	h				
Depreciation of the plant	2,180.00	duration yrs	25.00	87.20	
TOTAL				***1,270.97***	***169.03***
Labour & Enterprise					289.03

Table 19: Balance sheet for Alpha alpha

	Revenues	Q.ty kg/du	ILS/kg	ILS/du	*Margin*
		4,500.00	0.35	***1,575.00***	
	Costs	**Q,ty/du**	**ILS/unit.**	**ILS/dun**	
Tillage	n.	0.00	100.00		
Chemical Fertilizers	kg.	0.00	5.00		
Organic Fertilizers	kg.	0.00	0.50		

Soil Disinfection	kg.			□	
Plant Protection	kg.	0.00	25.00	□	
irrigation	m3	878.50	0.63	555.89	
Harvesting □ Labour	dd	6.00	40.00	240.00	
Harvesting □ machinery	h			□	
Depreciation of the plant	1,360.00	duration yrs	4.00	340.00	
TOTAL				***1,135.89***	***439.11***
Labour & Enterprise					679.11

2.2 Macro□Economic Conditions

2.2.1 Methodology

Cost□benefit analysis (CBA) is a formal analysis technique used in public and private investment projects (Rakhra, 1991) as well as in programs and policies (Stoica, 2005) in order to make a comparative assessment of all the benefits and costs anticipated. It also represents an attempt to measure the costs endured and gains earned by a community or a private company after the project is implemented.

CBA proves its usefulness in feasibility studies (from an economic, environmental, social or technological perspective) by selecting the optimal option for investment projects (Hanley and Spash, 1993). The purpose of using CBA in a sector is to set up pragmatic administrative rules in order to *allocate resources efficiently*.

The use of cost□benefit analysis contributes to determining the financial sustainability as well as profitability of the NGEST water reuse scheme. It also:

a) highlights the economic and financial viability of the NGEST water reuse scheme for different scenarios;
b) enables the identification of possible errors in the design or implementation phase (incorrect information, unrealistic hypotheses, etc.); and
c) enables the correction needed to properly conduct the NGEST water reuse scheme.

2.2.2 General Project Assumptions

Within the CBA, costs are presented in terms of capital investments and operation and maintenance (O&M); the first being a one□time cost and the second being a recurring, yearly, cost.

The entire water recovery and re□use scheme requires capital investments to be implemented over time to provide water in two separate areas (Phase I for 500 ha and Phase II for 1,000 ha). The implementation of each phase has been subdivided into two separate tendering packages. The details are provided in the following Table 30.

Table 20: Investment required for the implementation of the recovery and irrigation schemes

Phase	Package	Description	Cost US$	Cost ILS x 1,000
I	1	Supply and install 15 recovery wells and concerned connection pipes, the civil works within the booster pumping station, five boosters □pumps, one 4,000 m^3 water tank and 5 monitoring wells	$8,449,164	30,518
	2	Small works related to the procurement and construction of the irrigation network for an area of 500 ha (5,000 du)	$6,015,625	21,728
II	1	Supply and install 12 recovery wells and concerned connection pipes, the remaining civil works within the booster pumping station, five booster pumps, a second 4,000 m^3 water tank and 5 monitoring wells	$5,830,333	21,059
	2	Small works related to the procurement and construction of the irrigation network for an area of 1,000 ha (10,000 du)	$15,984,375	57,736
			$36,279,497	**131,042**

A distribution of the capital investments over time for each phase and for each tender package is provided in the following Table 31 where costs are expressed in ILS per 1,000.

Table 21: Phase I and Phase II implementation stage

Phase	Package	Description	Phase 1	Phase 2	Y1	Y2	Y3
			ILS x 1,000		*ILS x 1,000*		
I	1	Supply and install 15 recovery wells and concerned connection pipes, the civil works within the booster pumping station, five boosters □pumps, one 4,000 m^3 water tank and 5 monitoring wells	30.518		30.518		
	2	Small works related to the procurement and construction of the irrigation network for an area of 500 ha (5,000 du)		21.728		21.728	
II	1	Supply and install 12 recovery wells and concerned connection pipes, the remaining civil works within the booster pumping station, five booster pumps, a second 4,000 m^3 water tank and 5 monitoring wells	21.059			21.059	
	2	Small works related to the procurement and construction of the irrigation network for an area of 1,000 ha (10,000 du)		57.736			57.736
		TOTAL [ILS x 1,000]	**51.578**	**79.464**	**30.518**	**42.788**	**57.736**

The O&M cost are provided in the following Table 32.

Table 22: Annual O&M costs (US$)

Operation and Maintenance Cost		Phase I	Phase II
Description	**USD**	**USD**	**USD**
Manpower	150,000	90,000.00	60,000.00
Power consumption	978,953	326,317.56	652,635.11
Maintenance and repair works	83,345	27,781.67	55,563.33
Consumables & Miscellaneous	76,960	25,653.33	51,306.67
Total O&M cost USD/year	**1,289,258**	**469,752.56**	**819,505.11**

Table 23: Annual O&M costs (ILS)

Operation and Maintenance Cost		Phase I	Phase II
Description	**ILS**	**ILS**	**ILS**
Manpower	541,800.00	325,080.00	216,720.00
Power consumption	3,535,977.04	1,178,659.01	2,357,318.03
Maintenance and repair works	301,042.14	100,347.38	200,694.76
Consumables & Miscellaneous	277,979.52	92,659.84	185,319.68
Total O&M cost USD/year	**4,656,798.70**	**1,696,746.23**	**2,960,052.47**

Other costs that are included in this CBA are the water tariff, assumed to be 0.63 ILS/m^3, and the investments required at the farm level to support the introduction of the proposed cropping pattern as detailed in the Micro□Economic Conditions section.

Costs for supporting and training the Irrigation Advisory Services (IAS) and Water User Association (WUA) are assumed to cost 3,000,000 ILS, divided in 2,000,000 ILS for the first year and 1,000,000 ILS for the second year.

2.2.3 Financial Analysis

The financial analysis indicates whether the project will generate a positive net cash flow during the evaluation period (profitability) and whether the cumulative cash flow from the start of investment until the final prediction is negative (sustainability).

The analysis of the investment project's cash flow includes both the evaluation of the cash outflows (investment costs as well as and costs at farm level) and cash inflows (revenues at farm level, industries, grant and subsidies). As opposed to the economic analysis, in the financial analysis the cash flow does not include amortization, reserves and other accounting items.

From this perspective, the financial analysis was conducted with the following steps:

1. Estimating revenues and costs of the NGEST area farms and assessing the implications of these parameters on cash flow;
2. Defining the financing sources of investment and analysing the financial profitability.
3. Determining the funding gap in achieving the investment project and identifying the best mechanisms to attract funding;

4. Checking whether the estimated cash flow could ensure the proper operation of the NGEST project. The investment project is financially sustainable if there is no risk of running out of cash during the operation.

For the financial analysis, the following costs and revenues were taken into account:

Cash Outflows (Costs)

Capital cost – recovery wells, farm investment

Costs related to the IAS and WUA operation and training

Operation Costs at farm level including water tariff

Cash Inflows (Revenues)

Revenues at farm level derived from the new cropping pattern

Water tariff paid by Industry based on 1 ILS/m^3 per 70,000 m^3 /year

Reduction of time spent in management of private wells

Investments paid by Government/Donors

Public Subsidies based on farm water tariff of 0.63 ILS/m^3

The financial analysis carried out as part of the project's CBA uses market prices (which include VAT and indirect taxes) to check the balance of the investment and the sustainability of the project.

The cash flows accumulated in different years during the evaluation period (25 years) require a fair discount rate. The financial discount rate allows to account for the influence of time on the value of money and reflects the opportunity cost of the investor's capital.

In general, it is recommended to use a discount rate of 5%, but the model also used 2 more points (7%) and less (3%) to evaluate the sensitivity of the net present value.

2.2.3.1 Scenarios

Five scenarios involving donors, government and farmers have been suggested to evaluate possible project implementation and financing opportunities based on the following elements of the project:

(1) Capital Investment for the Water Recovery Scheme;

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

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

(4) O&M Costs for the Water Reuse (irrigation) Scheme; (5)

Capital Investments for Farm's Development.

The five scenarios are defined as follows

Scenario 1 □ Full Costs (1 + 2 + 3 + 4 + 5) for Phase I + Phase II. Under such scenario farmers would pay back the full cost for the construction of both the water recovery and the water reuse schemes for both phases of the project. On top of that, farmers would cover operation and maintenance costs for the whole system while covering investments and operating costs necessary for the development of their own farms;

Scenario 2 □ Full Costs (1 + 2 + 3 + 4 + 5) only for Phase I (Phase II will not be built). This scenario is identical to Scenario 1 except that only Phase I of the project will be built and paid by the farmers;

Scenario 3 □ Capital Subsidies (consider only costs 3 + 4 + 5) for Phase I + Phase II. Construction costs would be paid by the government and not charged back to the farmers. This scenario assumes that the capital investments necessary to build both Phase I and Phase II of the water recovery and water reuse schemes would be paid by the government or by a donor whereas every other cost would be paid by the farmer;

Scenario 4 □ Capital and O&M Subsidies: this scenario considers only cost (1) and (2) for Phase II and costs (4) and (5) for both Phase I and II. Cost (3) is subsidized by the Government/Donors for several years so that farmers can pay back costs (1), (2) and (3) for Phase II. This scenario assumes that farmers will have to pay back the cost for the construction of Phase II of both the recovery and the reuse scheme. Government/Donors would cover the cost for the construction of Phase I. Farmers would pay for the development and O&M of their own farm. The cost for the O&M of the recovery and reuse schemes (Phase I + II) would be covered by the Government/Donors for the number of years required for the farmers to pay back the construction of Phase II.

Scenario 5 □ Capital and O&M Subsidies: considers costs (1), (2), (3) and (4) paid by the government/donors. Costs (3) and (4) are subsidized by the Government 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 as many years as it takes for the farmers to be able to pay back for the improvement of their own farm. After that point, farmers will be responsible for paying O&M costs for the whole system.

A schematic representation of the five scenarios is provided in the following Table 34.

Table 24: Project Scenarios

Scenario	Description	Cost Paid by the Farmers					Construction Phase to be Paid by the Farmers	
		(1) Capital Investment for the Recovery System	(2) Capital Investment for the Irrigation System up to the Farm's Gate	(3) O&M Cost for Recovery System and Irrigation System	(4) O&M Costs at Farm Level	(5) Capital Investments for Farm's Development	(Phase I)	(Phase II)
1	Full Costs (1 + 2 + 3 + 4 + 5) for Phase I + Phase II;	x	x	x	x	x	x	x
2	Full Costs (1 + 2 + 3 + 4 + 5) only for Phase I (Phase II will not be built);	x	x	x	x	x	x	Not Built
3	Capital Subsidies (consider only costs 3 and 4 and 5) for Phase I + Phase II. Construction costs will be paid by the government and not charged back to the farmers;	Paid by the Government and not charged to the Farmers		x	x	x	Paid by the Government and not charged to Farmers	
4	Capital and O&M Subsidies: consider only cost (1) and (2) for Phase II and costs (4) and (5) for both Phase I and II. Cost (3) is subsidized by the Government/Donors for several years so that farmers can pay back costs (1), (2) and (3) for Phase II.	x	x	Subsidized by Donors/Government until Farmers have paid back the Construction of Phase II	x	x	Paid by the Government and not charged to Farmers	x
5	Capital and O&M Subsidies: considers costs (1), (2), (3) and (4) paid by the government/donors. Costs (3) and (4) are subsidized by the Government until Farmers have paid back Cost (5).	Paid by the Government and not charged to the Farmers		Subsidized by Donors/Government until Farmers have paid back Cost (5) and are able to paid for O&M (3) + (4)		x	Paid by the Government and not charged to Farmers	

2.2.3.2 Financial Sustainability of the Investment Project

The Government's ability to paid for the set up and operation of the NGEST Irrigation Project during the next 25 years (the so called 'Reference Period') is critical to the success of the investment and for achieving the overall objectives of this supplementary phase. From this perspective, the investment project should be financially sustainable without any difficulties regarding the fulfilment of its financial obligations during the reference period.

The financial sustainability involves having a cumulative positive cash flow for each year of the projections. Therefore, there should be enough cash for smooth running of operations every year (without the risk of lacking liquidity). Demonstrating the financial sustainability of the project makes it necessary to weigh cash inflows with cash outflows for the entire reference period of the project.

In order to determine the profitability of the investment project, it is necessary to calculate the financial performance indicators for the overall investment, as well as the capital invested. The financial performance indicators of the investment project are Financial Net Present Value (FNPV) and Financial Internal Rate of Return (FIRR).

FNPV represents the amount calculated when the estimated investments and operating costs of the project are deducted from the present value of the projected revenues. The investment project is profitable in the financial sense if FNPV has a positive value.

FIRR represents the discount rate for which FNPV is zero or which equals the present value of the financial cash flows projected for the reference period. If this indicator is less than the cost of the capital, the project is not profitable. When it is higher than the cost of capital, the project is acceptable because it will generate a positive FNPV.

The profitability indicators are calculated considering all the investment costs of the project, regardless of its sources of funding. If FNPV is positive and FIRR is higher than the discount rate, the project is profitable. If FNPV is negative and FIRR is lower than the discount rate, the project is not profitable and therefore it needs financial support.

6.2.4 Main Results of Financial Analysis

Table 25: Main Results of the Financial Analysis

Scenario discounted rate	Net Present Value (NPV) [ILS x 1,000]			Benefit Cost Ratio (BCR)			Internal Rate of Return (IRR)	Note
	3%	**5%**	**7%**	**3%**	**5%**	**7%**		
1	30.551	2.574	□16.780	1,062	1,006	0,954	5,23%	
2	12.959	718	□7.908	1,064	1,004	0,947	5,14%	
3	149.706	114.653	88.791	1,304	1,274	1,244	31,02%	
4	127.456	88.722	60.582	1,259	1,212	1,167	16,07%	17 years of subsidies to repay the phase II investment.
5	155.425	119.953	93.715	1,316	1,286	1,258	33,54%	5 years of subsidies to repay the investment at farm level

2.2.4 Economic Analysis

An economic analysis for major investment projects determines if the project contributes significantly to total economic welfare. It measures the project benefits depending on the following: the costs avoided due to project implementation and the external benefits arising from the implementation, which are not included in the financial analysis.

In this analysis, the benefits should be seen from the perspective of two key issues. First, the revenues identified in the financial analysis will be corrected by applying a conversion factor. This factor allows the conversion between the economic and the financial prices. Secondly, the attention should focus on the positive externalities arising from compliance with environmental standards. These externalities should be given a monetary equivalent.

In the economic CBA, some cost/benefits cannot be expressed in monetary units but only in qualitative terms. These costs/benefits are:

- Preservation and improvement of the quality of space for human life, as in the case of water pollution when human settlements located near water lose their basic quality.
- Prevention of flora and fauna destruction.
- Maintenance of natural system which will have a positive effect on people, like better mental condition and richer intellectual activities.

Benefits that cannot be expressed in monetary value are also called “intangible” benefits. Those benefits have been ignored in the cost□benefit analysis of the project. The reason is that these benefits cannot be assessed, and their detailed qualitative effects can be better described in an environmental impact assessment.

In the economic cost□benefit analysis the costs are expressed in accounting prices, and are measured in terms of 'resource' cost or 'opportunity' costs.

The economic analysis could be briefly described with the following steps:

Conversion of market prices into accounting prices;

Update the estimated costs and benefits;

Calculation of economic performance indicators (Economic Net Present Value, Economic Rate of Return, benefit/cost ratio).

The corrections to be considered in the economic analysis are the following:

Fiscal Corrections. Fiscal Corrections are necessary because some transfers from one agent to another should be seen as pure transfers, without having an economic impact. For example, the subsidies provided by the government to those who want to invest in the NGEST Irrigation Project represent a pure transfer offering advantages to the beneficiaries, but not creating economic value. The fiscal corrections are made for indirect taxes (VAT), subsidies and pure transfer payments (employer's obligation to pay social security contributions) which are generally included in the eligible costs and/or operating or maintenance costs. However, the prices should also include direct taxes. In addition, if certain indirect taxes/subsidies are aimed at correcting externalities, then they will be included in the analysis. In order to assess the project's economic impact, information on the tax system in the West Bank and Gaza, as calculated by World Bank, was used as presented in the following Table 36.

Table 26: Direct and indirect taxation in Gaza and West Bank

Tax or Mandatory Contribution	Payment (number)	Notes on Payments	Time (hours)	Statutory Tax Rate	Tax Base	Total Tax Rate (% of Profit)	Notes on TTR
Corporate Income Tax	2		18	15% □ 20%	Taxable Profit	14.23	
Capital Gain Tax	1			15% □ 20%	Capital Gains	0.76	
Municipal Business Tax	1			17%	Rental Value of Building	0.28	
Employee Paid □ Personal Income Tax	12		96	5% □ 20%	Taxable Salaries	0	withheld
Irrecoverable VAT (on fuel)	0			15%	Fuel Consumption	0	
Value Added Tax (VAT)	12		48	16%	Value Added	0	not included
Totals	28		48			15.27	

Correction of labour cost from financial to economic. The correction of financial costs to economic costs of the price of labour has been made. The coefficient used to correct the financial value was 0.3 to consider taxation and social charges.

To carry out a neutral evaluation, positive and negative externalities of the project were not considered.

Based on the consideration presented above, the main results of the economic cost benefit analysis are presented in the following Table 37.

Table 27: Main Results of the Economic Cost Benefit Analysis

Scenario discounted rate	Net Present Value (NPV) [ILS x 1,000]			Benefit Cost Ratio (BCR)			Internal Rate of Return (IRR)
	3%	**5%**	**7%**	**3%**	**5%**	**7%**	
1	124.102	82.112	52.243	1,252	1,196	1,144	13,72%
2	51.291	33.420	20.586	1,254	1,194	1,137	12,62%
3	132.443	89.958	59.633	1,511	1,482	1,454	15,17%
4	130.885	88.143	57.658	1,462	1,416	1,371	14,64%
5	132.843	90.329	59.978	1,523	1,496	1,469	15,24%

2.3 General Aspects

2.3.1 Financing Mechanisms

The sources of funding provided by the various scenarios of the project are:

government financial sources
financial sources of international cooperation
private financial sources

While government finance and international cooperation does not have direct impacts on the financial market system, it is necessary to provide support and guarantees to a private financing system. As we know the banking system requires, turning on a loan, guarantees and payment of the price of money (interest).

Farmers will need to have access to a banking system and most of them do not have enough income or capital to finance investment in farms or parts of the project, so it is necessary to provide them with support tools.

First, the government must provide for a national guarantee fund supporting the banking system for when, due to personal problems or because of adverse meteorological conditions or distortions in market prices, the farmer is unable to repay the annual instalment of the loan.
The second important thing is government or donor support for bank interest payments, given the high price of money locally. Farmers can repay the loan principal, but hardly the interest portion.

2.3.2 6.3.2 Job Impacts

The project in its full version creates new employment, the estimate of the level of direct employment is about 150 new employees and the job security for current employees.

Table 28: Job Created

Job created				**days/year**
job days created at Farm level				**23.741**
job days created WUAs				**4.400**
Job days created O&M				**4.840**
total job days created				**32.981**
Incremental labour	dd	32981	+ 34%	
	n.people	150		

The government may provide for subsidies for young farmers who undertake to work on the farm in order to reduce youth unemployment.

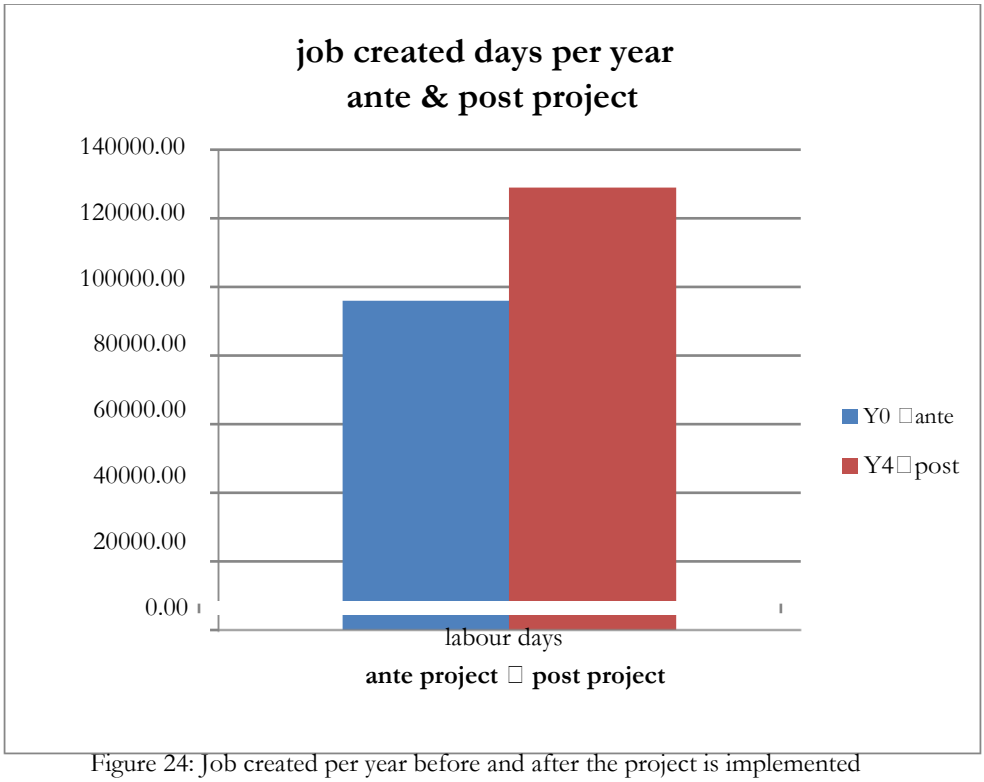

Figure 24: Job created per year before and after the project is implemented