Appendix A

REQUEST FOR PROJECT/PROGRAMME FUNDING FROM ADAPTATION FUND

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project/programme must be fully prepared (i.e., fully appraised for feasibility) when the request is submitted. The final project/programme document resulting from the appraisal process should be attached to this request for funding.

Complete documentation should be sent to

The Adaptation Fund Board Secretariat

Email: secretariat@adaptation-fund.org

DATE OF RECEIPT:

ADAPTATION FUND

PROJECT/PROGRAMME ID:

(For Adaptation Fund Board Secretariat UseOnly)

PROJECT/PROGRAMME PROPOSAL

PART I: PROJECT/ PROGRAMME INFORMATION

PROJECT/ PROGRAMME CATEGORY: **REGULAR PROJECT/ PROGRAMME**

COUNTRY/IES: **Jordan**

SECTOR/S: **Agriculture &Water**

TITLE OF PROJECT/PROGRAMME: "**Increasing the resilience of poor and vulnerable communities to climate change impacts in Jordan through Implementing Innovative projects in water and agriculture in support of adaptation to climate change".**

TYPE OF IMPLEMENTING ENTITY: Government Entity (Ministry)

IMPLEMENTING ENTITY: **Ministry of Planning and International Cooperation (MOPIC)/ Enhanced Social & Economic Productivity Program** (**EPP**)

EXECUTING ENTITY/IES:

Jordan Valley Authority (JVA) /Water Authority of Jordan (WAJ)

Ministry of Water and Irrigation (MWI)

The Petra Development Tourism Region Authority (PDTRA)

Ministry of Environment (MOE)

Ministry of Agriculture (MOA)

National Center for Agricultural Research & Extension (NCARE)

The Royal Scientific Society (RSS)

Jordan Food & Drug Administration (JFDA)

Department of Meteorology

Jordan Standards & Metrology Organization (JSMO)

AMOUNT OF FINANCING REQUESTED: **(U.S Dollars 9,226,000)**

LIST OFABBREVIATIONS

AFD	French Development Agency
EPP	Enhanced Social & Economic Productivity Program
GDP	Gross Domestic Product
GoJ	Government of Jordan
Ha	Hectare
HDPE	High-density polyethylene
JFDA	Jordan Food & Drug Administration
JSMO	Jordan Standards & Metrology Organization
JRV	Jordan Rift Valley
JVA	Jordan Valley Authority
KAC	King Abdullah Canal
MCM	Million cubic meters
MDG	Millennium Development Goal
MENA	Middle East and North Africa
MoA	Ministry of Agriculture
MoEnv	Ministry of Environment
MOU	Memorandum of Understanding
MWI	Ministry of Water and Irrigation
NCARE	National Center for Agricultural Research & Extension
PDTRA	The Petra Tourism &Development Region Authority
RIAL	Reuse for Industry Agriculture & Landscaping
RSS	The Royal Scientific Society
SNC	Jordan’s Second National Communication to the UNFCCC
TNC	Jordan’s Third National Communication to the UNFCCC
UPVC	un-plasticized polyvinyl chloride
USAID	United states agency for International Development
WAJ	Water Authority of Jordan
WUA	Water Users Association
WWTP	Waste Water Treatment Plant

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PROJECT/ PROGRAMMEBACKGROUND AND CONTEXT

Provide brief information on the problem the proposed project/ programme is aiming to solve. Outline relevant climate change scenarios according to best available scientific information. Outline the economic social, development and environmental context in which the project/ programme would operate.

Brief Information on the Problem the Proposed Project/ Programme is Aiming to Solve

Jordan is one of the top five driest countries in the world with demand exceeding available water resources. Access to a safe water supply is an essential requirement for all sectors; however, some sectors have excessive claims on the available water resources. Jordan, with a total area of about 88 780 km², lies to the east of the Jordan River and is divided into twelve administrative governorates: Amman, Zarqa, Irbid, Mafraq, Ajloun, Balqa, Madaba, Karak, Tafileh, Ma'an and Aqaba. It is bordered to the northby the Syrian Arab Republic, to the northeast by Iraq, to the southeast and south by Saudi Arabia, to the far southwest by the Gulf of Aqaba (northern shore of the Red Sea) and to the west by Israel and the West Bank.

The country can be divided into four physiographic regions:

- The Jordan Rift Valley (JRV) along the western border of the country, with a total area of around 5 000 km2, starts at Lake Tiberias in the north (212 m below sea level) and continues south through the Jordan Valley into the Dead Sea on the Israeli–Jordanian border (417 m below sea level). From the Dead Sea southwards, the Rift is occupied by the Wadi Araba, then the Gulf of Aqaba, and then the Red Sea.
- The Highlands to the east of JRV, with a total area of around 5 000 km², run from north to south. They consist of ranges of mountains and plains at an altitude between 600 and 1 600 m above sea level and numerous side wadis sloping towards the JRV.
- The plains, with a total area of around 10 000 km², extend from north to south along the western borders of the Al-Badiah desert region.
- Al-Badia desert region in the east, with a total area of around 69 000 km², is an extension of the Arabian Desert.

FIGURE 1: JORDAN GEOGRAPHICAL MAP

The land suitable for cultivation is around 886 400 ha, or around 10 percent of the total area of the country. In 2005, the total cultivated area was estimated at 270 000 ha, of which 184 000 ha consisted of annual crops and 86 000 ha of permanent crops. However, occasionally half of the rainfed land is left fallow in a year due to fluctuating and unevenly distributed annual rainfall. For instance, the harvested annual crops area was 168 435 ha in 2003 and 76 266 ha in 2004. Moreover, it is estimated that between 1975 and 2000 around 88 400 ha of good rainfed land was lost due to urban expansion. Data for the last three decades show an increase in irrigated land and in land planted with permanent crops, mainly in rainfed land of the Highlands (DIC, 2004;MOA, 2005; DPI, 2005).

The climate of Jordan is semitropical in the JRV, Mediterranean in the Highlands and with continental influence in the eastern desert and plains region. Winter is the rainy season and is warm in the JRV, moderate to cool in the Highlands and extremely cold and dry in the desert land, whereas the summer is hot in the JRV, moderate in the Highlands and hot in the plains and the desert.

Groundwater abstraction takes place at more than twice its recharge rate. Annual per capita water availability has declined from 3,600 m3/year in 1946 to less than 145m3/year today. The population has recently grown from about 5.87 million in 2008 to almost more that10 million in FY 2014 with a projected water demand of about 1,673 MCM in 2020. Irrigation water demand was 71% in 2007 with a 64% of the total supply. Capping irrigation demand is necessary to satisfy municipal, industrial and tourism water demands. (National Water Strategy -Water for All 2008-2022).

Jordan water is derived from surface and underground sources. Developed surface water in Jordan is estimated at 295 MCM in 2007 at approximately 37 percent of Jordan's total water supply. The contribution of the groundwater is estimated at 54 percent of the water supply. Other water sources include treated wastewater which is used for irrigation in addition to desalinated water from some springs (Royal Commission on Water 2009). The Kingdom has been facing a chronic imbalance in the water resources equation and according to the national water strategy, irrigated agriculture covered around 33 percent of the cultivated area in 2010.

Rainfall varies considerably with location, mainly due to the country's topography.It usually occurs between October and May. Annual rainfall ranges between 50 mm in the eastern and southern desert regions to 650 mm in the northern Highlands. Over91 percent of the country receives less than 200 mm of rainfall per year. On average, Jordan receives about 8,500 million cubic meters (MCM) of rainfall per year. Over 90% of this water evaporates leaving 505 MCM that is used as surface water and another 275 MCM that recharges ground water aquifers. Reuse of treated wastewater provides about 70 MCM per year.

The largest source of external surface water is the Yarmouk River, which enters from the Syrian Arab Republic after first forming the border with it. It then joins the Jordan River coming from Israel, taking its name. The natural annual flow of the Yarmouk River is estimated at about 400 million m3, of which about 100 million m3 are withdrawn by Israel. However, the total actual flow is much lower at present as a result of the drought and the upstream Syrian development works of the 1980s. The Yarmouk River is the main source of water for the King Abdullah Canal (KAC) and is thus considered to be the backbone of development in the Jordan Valley. A main tributary of the Jordan River, controlled by the King Talal Dam and also feeding the KAC, is the Zarqa River. Jordan's surface water flow is supplemented by smaller rivers known as side wadis. Most of these side wadis originate in the Jordanian highlands and flow westward, toward the Jordan Valley. There are nine perennial side wadis that contribute to the catchment. This has been heavily requested by the Southern Jordan Valley farmers in Ghourfifa, Mazra' and Hadeetha.

Adaptation to Climate Change in the Jordan Valley

The limited fresh water resources in Jordan are used in municipal, tourist, industry, and agriculture sectors. Increasing demand in domestic water use, tourism and intensification in

agriculture requires more water in the future. Agriculture consumes about 67% of the available water resources while 30% is for domestic use. In order to protect the groundwater aquifers, new water resources, such as but not limited to treated wastewater, must be explored that will augment the available water supplies.

Outline of relevant climate change scenarios according to best available scientific information

Climate Change Scenarios

Because of the huge imbalance in the population-water resources equation, the treated wastewater effluent is added to the water stock for use in irrigated agriculture. It will constitute a substantial percentage of the irrigation water in future years. The National Environmental and Economic Development Study (NEEDS) for Climate Change report (JUST 2010) stated that Jordan is a vulnerable country in terms of climate change impact. Climate change is expected to affect the quantity and quality of the country's water resources, it will also result in reduced agricultural productivity due to more erratic rainfall patterns, reduced freshwater resources and increased temperatures. Only 4% of the country's total area receives more than 300mm/year of rain (the highlands). That's why Jordan is ranked among the ten driest countries in the world as on the basis of per capita water availability, the annual per capita water availability has declined from 3,600 m3 in 1946 to 145 m3 today. Demand for water exceeds Jordan's available water resources. The population was expected to grow from about 5.87 million in 2008 to over 7.80 million by the year 2022 with an average annual population growth of 2.9%, this in addition to the large influxes of refugees (Iraqis and Syrians in the last couple of years) have also contributed to a tripling of municipal wastewater generation that is available for reuse.

As a result severe natural (driven by climate change and forced by the influx of Syrian and Iraqi refugees coupled with natural population growth) water shortages have forced the government to impose a rationing program, whereby domestic water supply is pumped only twice a week during summer months, consequently many people have limited access and intermittent supply of clean water and are not connected to the public network specially the remote poor communities in Jordan Valley and the Highlands.

Under the Third National Communication (TNC) to UNFCC released November 2104, Adaptation strategies and measures suggested for the water sector are:

- Rainwater harvesting
- Wastewater treatment
- Desalination
- Increasing Efficiency of irrigation technologies
- Grey water Reuse
- Public awareness

Where for the Agriculture Sector: Poor in rural areas in Jordan are expected to face the most severe consequences of climate change through disruption of livelihood options that depend on natural resources management. The expected impacts of climate change, particularly reduced agricultural productivity and water availability threatens livelihoods and keeps vulnerable people insecure. Poor families and households are the most vulnerable group to the impacts of climate change and deserve the priority the in design of appropriate adaptive measures.

The major climate exposure risks associated with agriculture in Jordan were identified as: 1) Temperature increase, 2) Rainfall decrease 3) Droughts and 4) Shift in rainy season. The major sectors of high climate sensitivities were 1) cropping systems, 2) livestock production and 3) livelihood and food security.

The key adaptation measure to climate change is setting and implementing a sustainable agriculture policy. Adaptation measures vary horizontally according to the agricultural subsectors and their vulnerability to climate change. These measures vary vertically according to the different actors involved in the development and implementation of this policy.

The Adaptation strategies to a changing climate include:

- Agronomic and crop strategies that are intended to offset either partially or completely the loss of productivity caused by climate change through the application of defense tools with different temporal scales, e.g. short term adjustments and long term national level adaptation; and
- Socio-economic strategies intended to meet the agricultural costs of climate change. Generally, the most important adaptation measures in agriculture are: modification of cropping pattern, modification of crop calendar including planting and harvesting dates, implementation of supplemental irrigation and water harvesting techniques, improve water use efficiency, use of different crops varieties and modification of policies and implementation of action plans.

Most of the interventions recommended this proposed project come in line with the TNC in relation to supplementing irrigated and rainfed agriculture which can be cost-effective in farming systems, especially where irrigated agriculture is not feasible. For example, supplemental irrigation (the watering of rainfed crops with small amounts when rainfall fails to provide sufficient moisture) has proven to be a drought-proof strategy in most areas.

Increase of water available for supplementary irrigation can be achieved through treated wastewater reuse, and on-farm rainwater harvesting and management system, i.e. small farm ponds for micro-irrigation using drip or sprinkler irrigation systems. Larger rainwater storage structures can also be constructed to provide supplementary irrigation water to a number of small farms or fields by using the micro-dams.

Conservation agriculture, on the other hand is very efficient, leading to increased crop yield. In this adaptation measure, several techniques are used to enhance soil water storage. Water conservation is usually enhanced through mulching and crop residue retention through zero or minimum tillage, stubble mulch tillage, strip tillage and crop rotation. Conservation agriculture, however, requires extension programs such as training and provision of equipment.

Economic Status

Agriculture accounted for 2.9 percent of GDP in FY 2011 as per the TNC, compared with 6 percent in 1992. In JRV around 350 000 people are the main beneficiaries of irrigated agriculture and women form an important component of the labour force.

Permanent crops represent 56 percent of harvested irrigated area and 78 percent of the harvested rainfed area. They consist of citrus, bananas, olives and vineyards. The main annual crops are vegetables, potatoes and cereals (wheat and barley). Besides the climate (drought, fluctuating rainfall and hot winds) while the main difficulties for rainfed agriculture are the fragmentation of farm holdings and the erosion of top soils in the steep slopes, while the constraints for irrigated agriculture are the limited available water resources, overexploitation of groundwater, wastewater used in irrigation, silting of dams, and agricultural production marketing problems.

In spite of the low contribution of agriculture to GDP, both rainfed and irrigated agriculture are vital socioeconomic activities in the country. They are the source of fresh vegetables all year round, they play an important role in the national economy and they provide demographic stability in the rural communities and in the JRV region. The agricultural sector is subjected to strong competition from other sectors and receives few national or international investments in comparison with other economic activities.

On a socio-economic level, budgetary outlays for water shortage and health will need to increase. Costs of doing business as usual will rise, affecting the competitiveness of Jordan's economy. The poor and lower classes are the first to feel the impact of water shortages and poor water quality. These impacts are already being felt today and expected to worsen in the coming years. Jordan is in need for capacity development at systemic and institutional levels for establishing and operating economic tools and incentives for various stakeholders in climate change dimensions. *(Jordan Valley Authority, JVA).*

Water is a primary commodity which directly impacts small farmers competitiveness and agribusiness processors throughout the country and which has a significant effect in the country's ability to realize sustainable and socially-shared economic growth. Furthermore, water is closely linked to food, energy and urban development. Yet, the collision of massive economic and demographic pressures coupled with climate and environmental forces are leading to a crisis like none before. The declining water supply in the country is in great part due to a lack of a clear and efficient regulatory system for water and lack of coordination on foundational factors for competitiveness of the agribusiness sector. Current arrangements to provide water to farmers are unsustainable because they are jockeyed with governance issues. Jordan is in a strong position to leverage its competitive advantages in agriculture, a strategic sector which contributed to 4.4% of GDP in 2011, while accounting for 15.3% of export earnings. Jordan banks on a favorable climate, a geographical location at the heart of the Middle East, a skilled agricultural workforce, and good trading relations with a number of countries. The agricultural sector is the major source of food items especially fruits and vegetables but also an important source of hard currencies originated from exports.

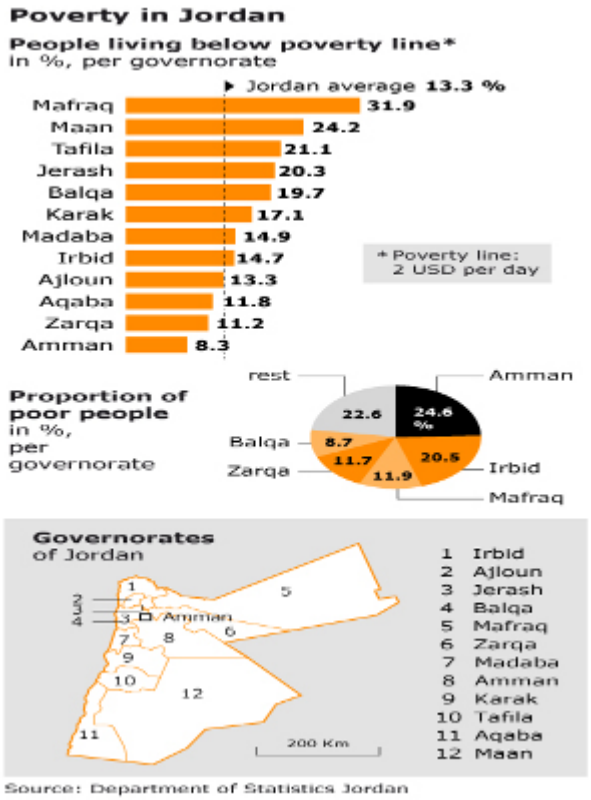


FIGURE 2: POVERTY IN JORDAN

Reference (http://fanack.com/countries/jordan/economy/regional-development/)

Jordan's economic challenges were made even more salient as the Arab Spring unfolded across the region. Job creation and economic inclusion are key priorities for Jordan today—these goals will be advanced by enhancing sectoral competitiveness, and fostering sustainable, private-sector led growth.

In the tense Arab Spring climate, appropriate solutions to water conservation, distribution and even commercialization could only be envisaged without the risk of social flare-up if a multi-stakeholder approach is applied. Such an approach needs to focus on the inclusion of the relevant stakeholders in the policy-making process, in order for those stakeholders to collaborate to enhance the environment for agribusiness competitiveness, fairness in the distribution of water, and accountability through the establishment of clear actions on regulation, skills, financing, innovation, and infrastructure. (THE COMPETITIVE INDUSTRIES & INNOVATION PROGRAM)

Environmental Status

The production of food in semi-arid countries like Jordan is hardly possible without irrigation. The irrigated areas are located in the Jordan Valley (some 33,000 hectares), and in the Plateau (some 44,100 hectares). About 8,000 more hectares of arable land in the Jordan Valley remains to be irrigated north of the Dead Sea, and some 2,000 hectares south of the Dead Sea. Some 400,000 hectares are fit for dry land farming, but it is practiced on half of this potential area because of the insecurity associated with erratic rainfall and other reasons. Irrigated agriculture, however, provides most of the agricultural production in the Kingdom and offers the higher percentage of agricultural and other jobs in support services.

Treated Wastewater Reuse

The Ministry of Water and Irrigation (MWI) adopted a National Water Strategy 2008-2022 that aims to increase the volume of recycled wastewater more than fourfold to 256 MCM/year by 2022.

Climate change induced impacts include (drought, fluctuating rainfall and hot winds) and amongst the main difficulties facing irrigated agriculture in the valley causing constraints for irrigated agriculture are the limited available water resources, overexploitation of groundwater, wastewater used in irrigation, silting of dams, the fragmentation of farm holdings and agricultural production marketing problems. There is a lack of sewage water networks in towns and villages in the JRV and other irrigated areas. Houses depend on septic tanks to handle sewage water.

Much of Amman's wastewater treated effluent is discharged in the Zarqa River and is impounded by the King Talal Dam, where it is blended with fresh floodwater and subsequently released for irrigation use in the Jordan Valley. Irrigated agriculture covers around 33 percent of the cultivated area. Permanent crops represent 56 percent of harvested irrigated area and 78 percent of the harvested rain fed area. They consist of citrus, bananas, olives and vineyards.

Over the last three decades sewage water networks have been constructed in cities and towns to serve around 70 percent of the population in Jordan. Twenty-nine wastewater treatment plants are in operation and the treated wastewater is used in irrigation. Jordan's current agricultural marketing practices and agricultural exports have fluctuated over the past decades. Despite tremendous government and private sector efforts in the last decade to develop new markets, the Arab countries remain Jordan's major agricultural export market. Arab countries account for 98.9percent of total vegetable exports. The balance was exported to the West and Eastern Europe.

A survey of the existing status of the 29 Wastewater Treatment Plants in Jordan to assess their treatment efficiencies and the potential for reuse of the treated wastewater showed that the crops being grown with reclaimed water include fodder, cereals, and tree crops. None of the fruits or vegetables grown in Jordan for the fresh market are directly irrigated with reclaimed water. However, effluent produced at As-Samra WWTP flows into King Talal Reservoir, where it is mixed with surface water to be used in irrigation in the middle Jordan Valley irrigation schemes (this involves 78 percent of the treated wastewater. The blended water is used for the irrigation of crops in two zones accounting for 26 percent of the exports from the Jordan Valley. With More than 90 percent of sewage water of the Greater Municipality of Amman is treated

and then released into the Zarqa River. Treated wastewater from the other plants is used around the plants and/or mixed with surface water to irrigate areas in the side wadis (valleys).

The primary market opportunity identified for crops irrigated with reclaimed water is to meet the fodder requirements of milk cows, sheep, and goats. The national demand to meet the fodder requirements of milk cows alone is 830,000 tons annually. The huge gap is filled by importing dry hay or by substitution with other kinds of feed, such as barley. The demand for fodder is expected to increase in the future to meet the growth in Jordan's needs for dairy products.

The key element in the strategy for climate change adaptation through wastewater reuse and marketing crops grown with reclaimed water is through a public awareness and education program linked to the water reuse demonstration projects. The information developed by the demonstration projects, analytical samples managed by national food safety labs supported by donor agencies as well as experience gained in other countries in terms of using reclaimed water to adapt to climate change and increasing demand for water supplies for irrigation, provide compelling evidence of the safety of consuming the crops and animal products being produced by direct irrigation with reclaimed water. Efforts are needed to organize public awareness campaigns at different levels, starting with farmers, to overcome the negative image of using reclaimed water for irrigation.

Project/ Programme Objectives:

List the main objectives of the project/ programme.

Overall Objective:

Adapt the agricultural sector in Jordan to climate change induced water shortages and stresses on food security through piloting innovative technology transfer, policy support linked to community livelihoods & resilience.

COMPONENT 1: Climate Change Adaptation of Agricultural & Water Sector Through Technology Transfer (the Use of Non-Conventional Water Resources (Reuse of Wastewater, Rainwater Harvesting & Permaculture).

OBJECTIVES:

- Providing a unique, efficient, simple and cost effective climate change adaptation systems to people in arid regions who suffer from water scarcity, and food insecurity.
- Deployment of advanced innovative irrigation methods such as drip, spray and micro-sprinkler irrigation.
- Limit the impact of climate change on water supplies of Jordan by reusing treated wastewater and rainwater harvesting and thereby reducing the consumption of the scarce ground water.
- To implement a holistic approach for integrated water management in remote arid regions.
- Releasing fresh water sources for potable water supplies and other priority uses and replacing it with treated wastewater for irrigation purposes.
- Assessing the vulnerability of vulnerable communities and ecosystems and planning food security programs
- Enhance water distribution services and increase irrigation network efficiency.
- To implement low-cost, low-technology yet sustainable and practical water collection and reuse programs for rural community livelihoods.

COMPONENT 2: Capacity Building at Both the National and Local/ Community Levels Respectively, Knowledge Dissemination, Policy and Legislation Mainstreaming.

OBJECTIVES:

- Strengthened ability of remote poor communities to make informed decisions about climate change-driven hazards affecting their specific locations.
- Involve and educate the engaged local community in all the phases of the project.
- Reduce the health risks associated with irrigation practices.
- To motivate the targeted communities to work, cooperate and support each other.
- Reinforce the concept of participatory water & agriculture development and management approach that involves users, planners and policy makers at all levels.
- Enhance the quality of life and food security in arid regions and contribute to climate change adaptation.
- Developing a competitive, inclusive and sustainable agribusiness industry.

Project/ Prorgramme Components and financing:

Fill in the table presenting the relationships among project/ programme components, activities, expected concrete outputs, and the corresponding budgets. If necessary, please refer to the attached instructions for a detailed description of each term.

For the case of a programme, individual components are likely to refer to specific sub-sets of stakeholders, regions and/or sectors that can be addressed through a set of well defined interventions / projects.

TABLE 1: PROJECT/ PRORGRAMME COMPONENTS AND FINANCING

PROJECT/PROGRAMME COMPONENTS	EXPECTED CONCRETE OUTPUTS &TARGETS	EXPECTED OUTCOMES	AMOUNT (US$)
Component 1: ***CLIMATE CHANGE ADAPTATION OF AGRICULTURAL & WATER SECTOR THROUGH TECHNOLOGY TRANSFER (THE USE OF NON-CONVENTIONAL WATER RESOURCES (REUSE OF WASTEWATER, RAINWATER HARVESTING & PERMACULTURE).*** **Sub-Component (A):** Climate change adaptation of water Sector through "Reuse of treated wastewater" under (subprojects 1.1, 1.2, 1.3, 1.4) with the following objectives ❖ Providing a unique, efficient, simple and cost effective climate change adaptation systems to people in arid regions who suffer from water scarcity, and food insecurity. ❖ Deployment of advanced innovative irrigation methods such as drip, spray and micro-sprinkler irrigation. ❖ Limit the impact of climate change on water supplies of Jordan by reusing treated wastewater and rainwater harvesting and thereby reducing the consumption of the scarce ground water. ❖ To implement a holistic approach for integrated water management in remote arid regions. ❖ Releasing fresh water sources for potable water supplies and other priority uses and replacing it with treated wastewater for irrigation purposes. ❖ See part III: implementation arrangements section E table 1 for details.	❖ Treated wastewater complying with national standards used in irrigated agriculture to augment available fresh water resources available as a means for CC resilience in agriculture **Target**: (22,193,200 M^3/yr) of treated wastewater reused in irrigated agriculture to augment existing irrigation water supply). ❖ WUAs trained on safe handling and use of new irrigation water quality (treated wastewater)in agriculture Target 48 WUAs in JV and 1 WUA in Wadi Mousa ❖ Increased family income of vulnerable groups as a result of enhanced crop production through augmenting irrigation water supply with treated wastewater **Target**:(240) Families with enhanced livelihoods(average family size is 6) "960 males, 480 females"	Increased water availability and efficient use through wastewater reuse Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	**5,900,000**
Component 1: **Sub-Component (B):** Climate change adaptation of Agricultural Sector through *rainwater harvesting& Permaculture, subprojects (1.5,and 1.6)* with the following objectives ❖ To Implement Low-cost, low-technology yet sustainable and practical water collection and reuse programs for rural community livelihoods.	❖ Harvesting rain water through construction of earthen check dams. **Target**: (300,000 m3/Year of rainwater harvested). ❖ Improved community preparedness to CC through farmers adopting permaculture techniques. **Target** (48 farms)	Increased water availability and efficient use through rainwater harvesting Diversified and strengthened livelihoods and sources of income for vulnerable people in	

❖ Enhance water distribution services and increase irrigation network efficiency. ❖ Assessing the vulnerability vulnerable communities and ecosystems and planning food security and programs	❖ Enhanced livelihoods of farming communities through sustainable practices which increase crops productivity **Target**: (410 families with average family size of 6) "3160 male, 1580 females"	targeted areas	
Component 2: ***CAPACITY BUILDING AT BOTH THE NATIONAL AND LOCAL/COMMUNITY LEVELS RESPECTIVELY, KNOWLEDGE DISSEMINATION, POLICY AND LEGISLATION MAINSTREAMING.*** Capacity Building at both the national and local/community levels, knowledge Dissemination, policy and legislation mainstreaming through subprojects (2.1),(2.2),(2.3) with the following objectives **Objectives:** ❖ Strengthened ability of remote poor communities to make informed decisions about climate change-driven hazards affecting their specific locations. ❖ Involve and educate the engaged local community in all the phases of the project. ❖ Reduce the health risks associated with irrigation practices. ❖ To motivate the targeted communities to work, cooperate and support each other. ❖ Reinforce the concept of participatory water & agriculture development and management approach that involves users, planners and policy makers at all levels. ❖ Enhance the quality of life and food security in arid regions and contribute to climate change adaptation. ❖ Developing a competitive, inclusive and sustainable agribusiness industry.	❖ Develop and implement awareness sessions to disseminate knowledge tools to adapt to climate change and of appropriate response measures. **Target**: (6 seminars per year)	Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	**1,900,000**
	❖ Empowering WUAs through developing an early warning system which inform farmers of impeding hazards of cold/ frost fronts and heat waves in the Jordan Valley **Target**: (16 WUAs)	Increased ecosystem resilience in response to climate change and variability-induced stress	
	❖ Creating new micro- enterprises linked to Agribusiness Industries. **Target** : (300 enterprise)		
	❖ Creating new direct& indirect jobs related to agribusiness in Jordan Valley. **Target** (19800 Jobs) aggregated by gender (5400 for Females, 14400 Males)		
6.Project/Programme Execution cost			**703,000**
7. Total Project/Programme Cost			**8,503,000**
8.Project/Programme Cycle Management Fee charged by the Implementing			
Entity (if applicable) (8.5%)			**723,000**
Amount of Financing Requested			**9,226,000**

PROJECT / PROGRAMME RESULTS FRAMEWORK

A results framework for the overall project proposal, including, indicators and sex-disaggregate targets

Table 2: PROJECT / PROGRAMME Results Framework **Project Objective**	**Project Outcomes/ Outputs**	**AF Core Outcome Indicator**	**Target**
Component 1			
❖ Increasing the adaptation capacity to climate change in the water sector	**Outcome 1:** Increased water availability and efficient use through wastewater reuse & Rainwater Harvesting	Number of Beneficiaries	**240 Families** *(Average family size is 6* 2~3 females and 3~4 males*)*
	Output (1) Securing high quality treated wastewater & Rainwater harvested for irrigation purposes in Wadi Musa & Jordan Valley **Output (2)** Improving livelihood strategies & Raising living standards of targeted communities in poverty pockets	%Increase in Income	20%
❖ Building Resilient Food Security Systems through Extending Permaculture Design and Technologies in The Jordan Valley and Beyond	**Outcome 2:** Increased adaptive capacity within relevant development and natural resource sectors	Natural Assets Protected or Rehabilitated	48 Farms
	Output (3): Providing fresh vegetables through sustainable use of soil, water, plants and animals by design.		
Component 2			
❖ Educate & enhance the ability of remote communities (Poverty Pockets) to make informed decisions about climate change-driven hazards	**Outcome 1:** Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level **Output (1):** Number of Targeted population groups aware of Climate change risks on natural resources and the ecosystem.	Number of Beneficiaries aggregated by gender	48 WUAs & 1 WUA in Wadi Mousa *Average family size is 6* 2~3 females and 3~4 males*)*

❖ Reinforce Early Warning System for Drought (Using Climate, Vegetation Cover, Water budget, and Crop Risk information) • Design and produce realistic and implementable solutions to achieve an effective agribusiness management system in Jordan Valley. • Mainstreaming new policies and legislations which incorporate Climate change adaptation measures into local and national strategies & plans	**Output (2):** Targeted population groups covered by adequate risk reduction systems **Output (3):** New micro-enterprises created linked to Agribusiness Industries. **Output (4):** Standards and policies reviewed & amended in support of climate change adaptation	# of Early Warning Systems installed % Increased income # of Standards and policies reviewed & amended	3 Systems 30% income increase 3 Standards and policies reviewed & amended

❖ In order to review the full detailed information on project-level outcomes, outputs and their relevant indicators/ baseline/ milestones & Targets, please refer to section III Part E the Table in Page (136)

PROJECTED CALENDAR:

Indicate the dates of the following milestones for the proposed project/ programme

TABLE 3: PROJECTED CALENDAR

Milestones	Expected Dates
Start of Project/Programme Implementation	June 2015
Mid-term Review (if planned)	June 2017
Project/Programme Closing	April 2019
Terminal Evaluation	May 2019

PART II: PROJECT / PROGRAMME JUSTIFICATION

A. Project / programme components/ adaptation activities

Describe the project/ programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.

Component 1: Climate change adaptation of agricultural & water sector through technology transfer (*The use of non-conventional water resources (reuse of treated wastewater, rainwater harvesting & permaculture).*

Background: As pressures continue to stress fresh water resources, resource managers are more and more frequently turning to secondary quality supplies (seawater, brackish water, treated wastewater) to meet non-potable demands especially in water scarce regions such as the Middle East.

Climate change will exacerbate current aridity and conditions of water shortage. This will directly impact food security, where around 67% of all water withdrawals are for agriculture. Introducing affordable technologies will definitely assist the agriculture sector in reducing water losses which may also benefit from technologies that recycle, harvest and conserve water, thus reliving the saved water for industrial and municipal consumers. Farmers should be encouraged to plant higher-value (cash crops) crops and adopt simple changes in operation and maintenance of on-farm irrigation systems to reduce water consumption.

Sub-Component (A): CLIMATE CHANGE ADAPTATION OF THE WATER SECTORTHROUGH TECHNOLOGY TRANSFER (PROJECTS (1.1, 1.2, 1.3, &1.4)).

PROJECT (1.1): *Reuse of Treated Wastewater for on-farm Agricultural Adaptation as a Tool for Integrated Water Resources Management at Wadi Mousa*

Wastewater reuse is becoming more popular throughout the world, particularly in arid and semi-arid regions. It is also considered one of the main climate change adaptation actions mentioned in Jordan water strategy (2008-2022). Employing reclaimed water to irrigate crops is also considered as one of the efficient methods towards freeing up the freshwater supplies for human consumption. The rationale behind this project, is to encourage and assist governmental and non-governmental agencies and NGOs to implement where feasible direct use of treated effluents from wastewater treatment plants and to demonstrate to decision makers and the public at large that water reuse is an effective climate change adaptation option, that is reliable, commercially viable, environmentally sustainable and safe where this resource is considered as a viable resource if applied under nationally and internationally approved controls for managing Jordan's water extremely scarce and stressed water resources.

Fueling the use of reclaimed water is the advancement of wastewater treatment technologies that can provide good quality water at a reasonable cost (when compared with the value of freshwater). **Four locations are being proposed as pilots for wastewater reuse, one in southern Jordan at Wadi Mousa-Petra Region, at the Northern Jordan Valley where the farming pattern is mainly citrus and vegetables, at North Shouneh in the upper north of the Middle of Jordan Valley &at Tal Al Mantah in Dair Allah District.**

According to the National Strategy, by the year 2020, it is expected that the volume of treated wastewater will reach 220 MCM and will become a significant resource for satisfying the total irrigation demand and assist in agricultural and water sectors adaptation to climate change.

PROJECT DESCRIPTION AND BACKGROUNG

Wadi Mousa is located north of Petra, in the ***Ma'an Governorate***, with a population of approximately 28,000. The area is characterized by hot summers and cold dry winters. Rainfall occurs between November and April in an irregular pattern, and the annual rainfall is less than 200 mm (RIAL Environmental Review, 2006). The infrastructure of the Wadi Mousa pilot includes sand filters and a pump station within the Wadi Mousa WWTP boundary, a reclaimed water transfer main, an irrigation water sub-main with irrigation head units, and farm units. The treatment process includes preliminary treatment (coarse screen and grit removal), secondary biological process, final clarifier, effluent polishing lagoon, chlorination process, sludge holding tank and sludge drying beds (see Figure 3). Odor control units are provided to minimize odor emissions. Design treatment capacity is 3,700m^3/d. As of 2010, Wadi Mousa WWTP was receiving approximately 3,000 m3/d of wastewater and generating over 2,800 m^3/d of reclaimed water. The quality of reclaimed water meets Jordanian standards **(JS 893/2006- refer to Annex 4)** for reuse as irrigation water.

Water Authority of Jordan (WAJ) collects samples for effluent quality analysis from the onsite effluent polishing ponds. Before leaving the site for irrigation, water is routed through sand filters located at the reclaimed water pump station.

The Wadi Musa Demonstration Project, originally established by USAID (1069 dunums), it was decided that the experience gained on irrigation with reclaimed water using special irrigators in

the reuse pilot area has had positive impacts on the direct beneficiaries of the project (the local community) and that it has managed to win the acceptance by the local community as well as receive an IWA international award in 2008 as a supplemental source of irrigation thus there is a need for scaling up that experience to cover an estimated 2,500 dunums in total (where USAID initiated 1069 dunums irrigated with reclaimed water) with the remaining 1331 dunums which are currently irrigated with rain or fresh water in Wadi Mousa. So what is being proposed under this pilot is not similar activities but a continuation of support for on-going activities at the 1069 dunums and expansion of the area to be irrigated area in Wadi Mousa as there are more wastewater that is available from the wastewater treatment plant that is in excess of the current 1069 pilot needs and link both pilots to other income generation activities.

Current Wadi Mousa pilot project components are:

- 34 farm units
- Machinery
- Irrigation system (the filtration unit and irrigation systems)
- Project annexes (one horse and green house)
- The first stage wastewater reuse pilot project consisted of 1069 Dunums, about 700 dunums is used in cultivation of alfalfa and fruit trees and winter fodder crops such as barley, 150 Dunums of these areas is cultivated with Barseem (fodder).

Farmers working at the pilot site are members of the ***Sad Al Ahmar Water Users Association*** (WUA). This association was established in January 2008 to ultimately take over the responsibilities of managing farming issues following the end of the project when capacity building measures are completed. There are 40 farm units within the pilot site, and as of September 2011, out of which 26 farm units were fully utilized. The remaining farm units are partially utilized. The association has 114 members (over 200 people including their families), of which about 40 members are directly engaged with the pilot project with women membership. (***Beneficiaries/ Baseline***)

In addition to the above there are member farmers in the Sad Ahmar WUA Association who are waiting to participate in the project by converting some of the cultivated areas with winter fodder crops to be cultivated with Berseem because it is a cash crop.

It is estimated the land area that can be made available is 100 Dunums, and that what can be available in the pre-dedicated lands for the project. And as a result of increasing the productivity of the WWTP every year, this project will absorb the resultant water quantities.

The **Petra Development Tourism Region Authority's (PDTRA**) orientation is towards expanding into the lands owned by the citizens in the north-east of the project and adjacent to the existing ww reuse site with area of 350 dunums and to be cultivated with fruit trees due to their need for small quantities of irrigation water, thus freeing the remaining quantities for Farmers use in Berseem irrigation.

Need for the project:

- Jordan is considered the fourth most water poor country in the world, so the need to find new water resources arises, and one of the most important water resources is treated wastewater.
- The results of climate change in the area have caused elimination of most of the livestock in the area due to lack of natural pastures and forage.
- Availability of excess amounts of treated wastewater from the WWTP which is currently on continuous rise.
- Forage is a cash crop yet not readily available compounded with its marketing and storage problems (RIAL baseline report, 2004).

PROJECT OBJECTIVES

The main goal of the proposed expansion of the wastewater reuse project at Wadi Mousa is to maximize the reuse of WWTP effluent as a community adaptation method to climate change where the reuse of reclaimed water can be demonstrated to be a productive, economical, reliable, environmentally safe for sustainable irrigated agriculture that can replace the use of fresh water supplies (as ground water aquifers are already under stress in Jordan due to over abstraction).

- The primary aim of this project is to develop the sustainability of ww reuse activities and on-farm integrated agriculture in Wadi Mousa as a mean of CC adaptation.
- Integrate reclaimed water use in fodder production; fodder production will be used as sheep feed. Feedstuff produced from each family holding (alfalfa and fodders) will be utilized to feed the flock.
- Propagation and redistribution of endangered plant species, medical and herbal plants production and beekeeping for honey production. Training selected farm leaders to become experts on beekeeping production and to disseminate their knowledge to the rest of the community.
- Optimize wastewater reuse for irrigated agriculture (alfalfa plantation areas) as a mean of climate change adaptation, install and replace drip GR-lines (useful life 5 years), maximize irrigated area through soil salinity management, and maximize the economic return per m3 of reclaimed water used for irrigation.
- Help establish integrated on-farm agriculture through the introduction of permaculture concept to the farmers.
- Develop effective propagation methods for important endangered and endemic native Jordanian plants and protecting endanger Wadi Mousa native plants.
- Community resilience and adaptation to climate change through improved household generated income of poverty pockets and nomadic local Bedouin communities at Wadi Mousa.

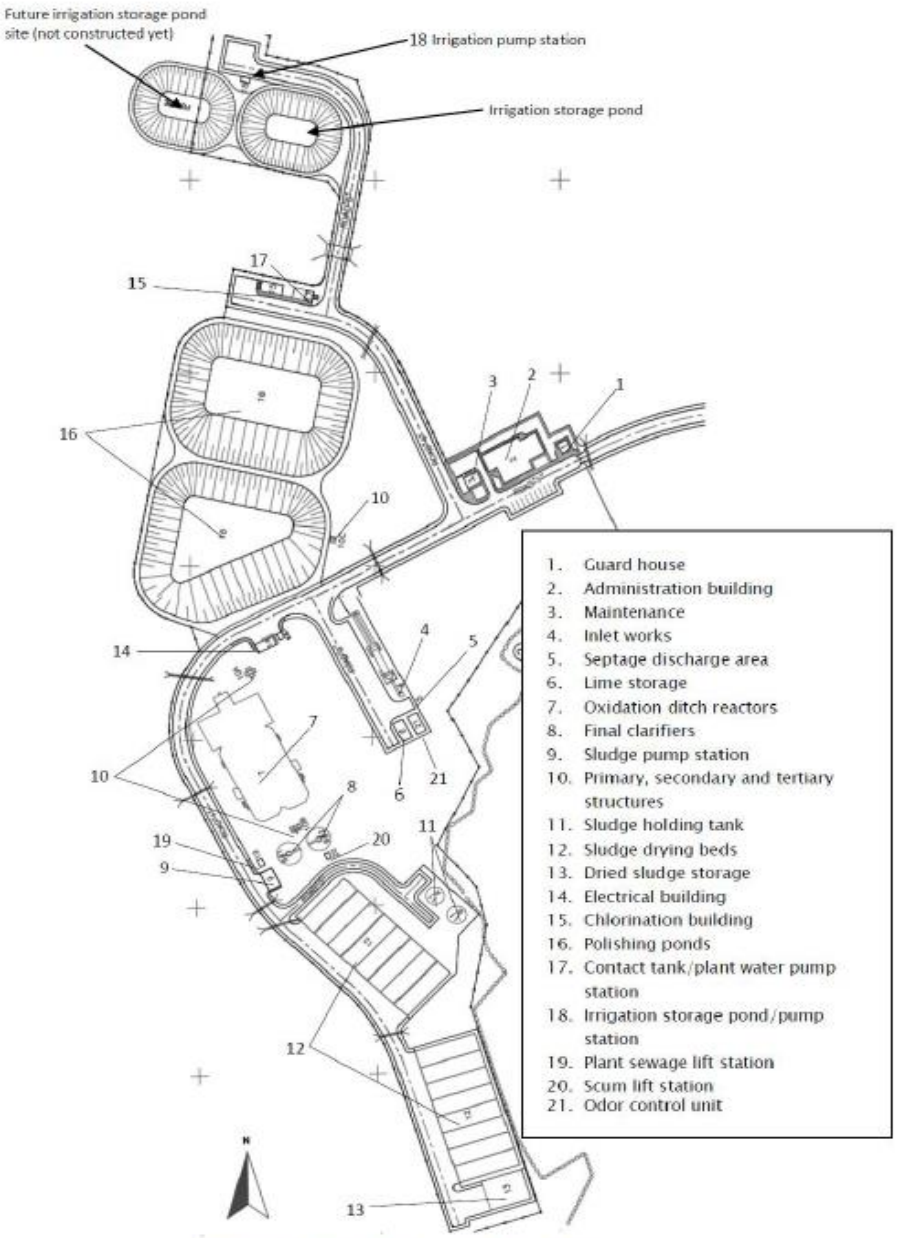


Figure 1: Wadi Mousa WWTP Site Layout

3

FIGURE 3: WADI MOUSA WWTP SITE LAYOUT.

FIGURE 4: PROPOSED LOCATION FOR THE WADI MOUSA REUSE PROJECT

PROJECT ACTIVITIES

- Reuse of reclaimed water in the production of fodder, fruit trees and natural trees
  1. General maintenance work for the site existing pilot in terms of infrastructure
  2. maintenance of 50 Dunums of Barseem in the project
  3. Cultivate additional/new 100 Dunums with Barseem within the land of the first pilot project.
  4. Cultivate of 350 Dunums with fruit trees as a new expansion of the project.
  5. Cultivate length of 2 km with natural trees throughout the road leading to the station.
- Livestock farming
  1. Farming of 200 sheep fed on the fodder produced from the site
  2. Farming of 100 honey bee hives at the site.
- Activation and operation of the Sad Ahmar Revolving Fund to serve farmers.
- Converting project products to easily marketable products:
  1. Converting forage crops (alfalfa, barley, and corn) outputs resulting into pellets (establishment of a plant that converts forage to pellets)
  2. Converting forage outputs (alfalfa barley corn) of the project into silage (Establishment of a plant that converts forage to Silage).
  3. Process milk resulting from sheep to dairy products (through a dairy plant establishment).
  4. Aloe vera plantation and other native medicinal plants.

Refer to annex (1) to view the detailed budgets for different activities.

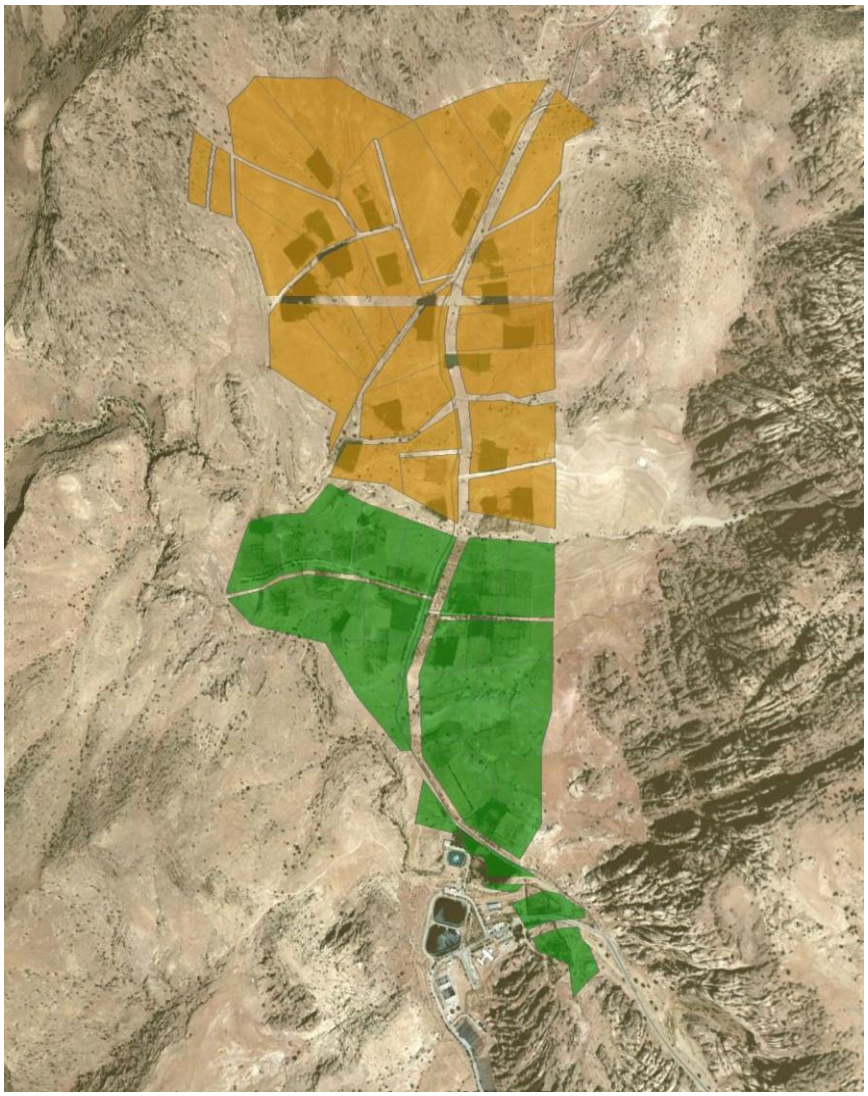


FIGURE 5: THE WADI MOUSA REUSE PROJECT, YELLOW AREA IS THE RIAL PILOT AND GREEN AREA IS THE PROPOSED EXPANSION UNDER THIS PROPOSED PROJECT

Converting the products from the project into easily marketable goods.

- Convert all fodder crops project outputs like: (trefoil , barley and corn) into a pellet
- Build a factory which converts fodder into pellets.
- Convert all fodder crops project outputs like (trefoil , barley and corn) into silage
- Build a factory which converts fodder into silage convert milk from sheep into dairy products: Establish a small diary factory.

Converting produced fodder into feed grains

The current project produces around 1000 tons of green fodder annually; this number can be doubled in case of the upcoming expansion. It was found that the best way to market these products is to convert fodder into another form in which it's easy to store, transfer and sell in the in markets. In order to do this feed products as (trefoil, corn and barley) even grass should be dried and then put it in the machine to grind it after that send it to a mixer with water vapor , and then to another machine that convert the fodder into compressed grains, the product must be cooled and packaged in sealed plastics bags. These plastic bags must be labeled with basic information about this product, where it can be stored for a long time. This factory will contribute in increasing revenues & strengthening the association.

The estimated cost for this factory is 65 000 JD (the installation costs included).

A small factory for converting green fodder into silage:

Silage is one of the most important forage that the Jordanian cow breeders import due to its high nutritional value compared to other products. And this factory will increase the revenues of the association by contributing to:

- Solving farmer's marketing problem.
- Increasing the nutritional value of the feed products.
- Increasing the association's income.
- Employ members of the association in the project.
- Facilitating the storage and transport of these feed products.

This factory will operate on sending the product into machines that cut the feed with a certain rate of humidity, then transfer it to another machine which forms it as compressed oak, weighing up to 50kg for each block then putting it into a plastic packaging machine which empty it from air and close it tightly. The estimated cost for this factory is 38,000 JD.

Dairy Products Plant (small sized)

This Plant connects with the livestock and breeding of 200 sheep mentioned above , as there must be a unit for manufacturing milk products , which is a small (diary) plant. Women will be employed in this plant. Training and education courses will be provided to farmers and women. Total establishment estimated cost~ 100,000 JD/for the first year.

Aloe Vera cultivation and irrigation with reclaimed water

This activity will support the production of aloe vera and other native medicinal plants that will have an excellent potential for generating a new cosmetic market niche and thus boost the socio economic viability of the locals and females as it will create jobs for females integration in agriculture and community socioeconomic enhancements.

PROJECT ACTIVITIES TIMELINE

The timeline for activities of the proposed work plan is presented in the following Table (4)

TABLE 4: PROJECT (1.1) TIMELINE FOR ACTIVITIES

Project (1.1) Activities at Wadi Mousa WWTP	2015			2016				2017				2018				2019
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
1) General infrastructure and Maintenance needs of the WWTP																
2) Maintenance for the existing 50 Dunums cultivated with Barseem																
3) Cultivating 100 new dunums with Berseem inside the lands of the first project																
4) Expansion of the Project Area																
5) Livestock Breeding																
6) Beekeeping and honey production facility																
7) Irrigation System Rehabilitation																
8) Cultivation of Native Trees along the road to the WWTP																
9) Plantation of Medical Plants Aloe Vera & Gel extraction plant																
10) converting green fodder into silage plant																
11) Converting produced fodder into feed grains																
12) Dairy Products Plant small sized																

PROJECT (1.2): *The Northern Jordan Valley Wastewater Reuse Project*

PROJECT DESCRIPTION & BACKGROUND

Northern Jordan Valley is located north of Jordan and it is part of Irbid Governorate, it occupies an area of 183 thousand Dunums. The average rainfall is 300 mm/year people living there depend on agriculture &grazing for their livelihood in addition to governmental jobs and commerce. The poverty rate in the northern Jordan Valley is around (28.6%) compared with the rate of poverty in the governorate of Irbid (7.14%) and in the kingdom (13.3%). Land suitable for cultivation is around 183,000 Dunums where 135,000 dunums is already planted, 100,000 dunums are irrigated and the rest is rain-fed agriculture. The Jordan Valley Authority (JVA) is responsible for the supply of bulk water needed for the irrigation of different crops. Figure (6) shows the locations of the WUA in the Jordan Valley.

The Jordan Valley accounts for at least 25% of the country's overall GDP. In addition to this substantial contribution to the country's economy, the Jordan Valley is one of the primary producers of fruits and vegetables for the entire MENA region. Disruption to irrigation services in the Jordan Valley can have an impact on food security for the region and the timing for the implementation of a collaborative governance mechanism to prioritize and solve issues in the water sector has been ripe. Farmers in northern Jordan Valley are facing lots of challenges, starting from the scarce water supplies, marketing, and the remarkable increase in the costs of agriculture inputs and production compounded with the climate change impacts, all of which is compounded by the high cost of the expatriate labor (manpower costs). Despite the insufficient water, farmers in the Valley show remarkable cooperation, and water users associations were able to distribute irrigation water fairly, raising the slogan of transparency and integrity, but the problem of maintenance continue to constitute a real impediment and challenge for both the JV Authority and WU Associations.

The Northern Jordan Valley Wastewater Reuse Project will utilize treated effluent from three currently being upgraded/constructed wastewater treatment plants in the northern region of Jordan at Irbid, Shalalah, Dogara where the treated effluent as required by Jordan Valley Authority must meet the highest standards before it is offered for irrigation with no potential adverse impacts to the irrigation systems , farmers or public health and when leaving the WWTP must meet and be in compliance with JS 893/2006 (refer to Annex 4) for cooked vegetables (class A). This treated wastewater as a substitute for fresh water supplies is aimed for alleviating the water scarcity aggravated by climate change. On farm application will be of mixed water quality governed by the WHO 2006 “Irrigation Water Quality Guidelines with support for JV from GIZ which refer to unrestricted irrigation and the blending/mixing of irrigation water to achieve these guidelines. The main crops are citrus trees plus other tree crops, bananas and vegetables representing 78% of the total area. There are plans to replace over aged citrus trees in the northern valley with new more productive citrus varieties and citrus/ alfa alfa or citrus /date palm varieties. Vegetables eaten raw will be replaced with those eaten cooked such as potatoes, squash, okra and egg plants which have the same if not better income opportunities and which requires a level of technology not unfamiliar to local farmers.

The total project irrigated area is utilizing 5,394 Hectares. This figure will not change in the future according to JVA while the crop composition will undergo significant changes. The main objective of the anticipated changes to the crop composition is to favor water-effective cropping models that are water conserving and climate change resilient to reduce the total irrigation water demand and alleviate climate change impacts on the crops caused by water scarcity respectively.

PROJECT OBJECTIVES

- To provide treated wastewater effluent for the farming communities and ensure better health & safer environment.
- Support the farmers in the northern Jordan Valley to adapt to new water quality (treated wastewater mixed with fresh surface water from the Yarmouk river) for irrigation of citrus

farms, improve on-farm water management, especially to deal with water quality-related issues.

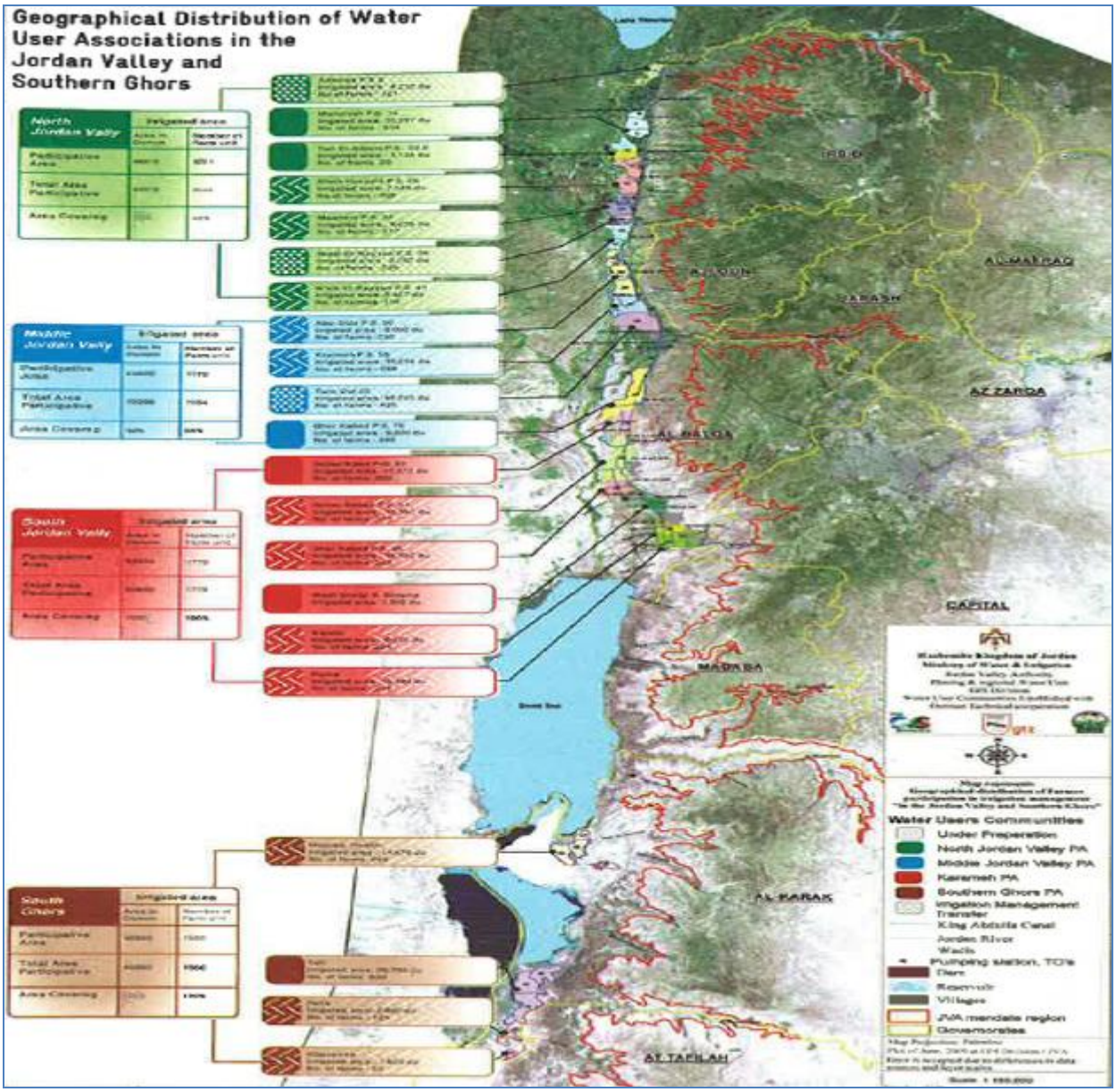


FIGURE 6: MAP OF THE LOCATIONS OF THE WATER USER ASSOCIATIONS (WUA).

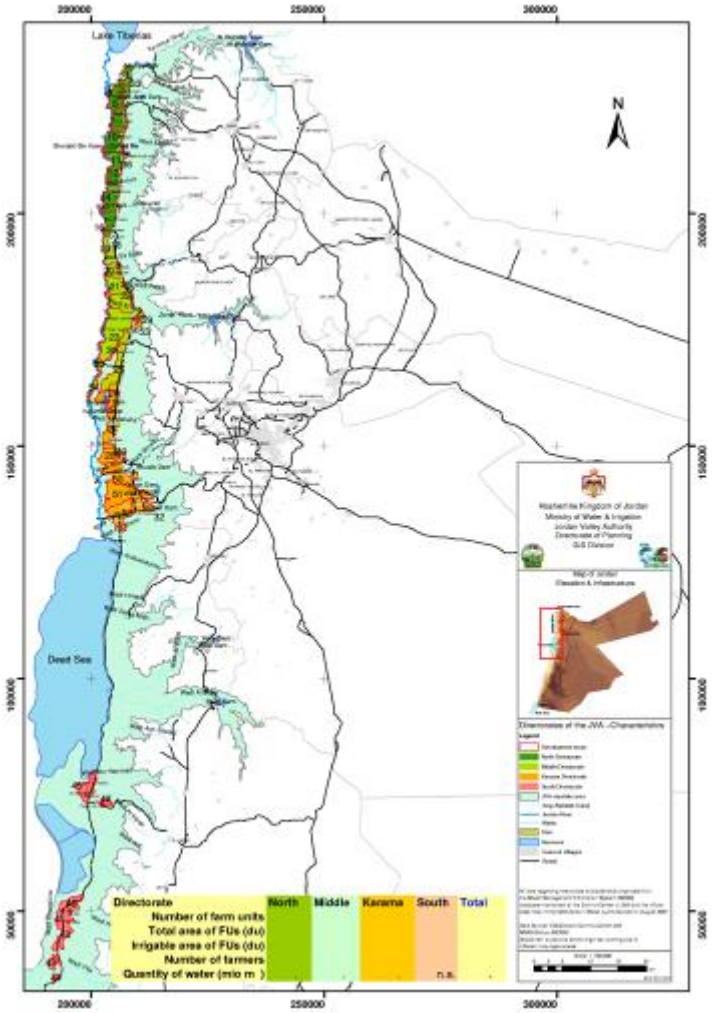


FIGURE 7: MAP OF THE FOUR GEOGRAPHICAL REGIONS OF JORDAN VALLEY &FARM UNITS.

PROJECT ACTIVITIES

- Install the best available technology of water filtration systems in the targeted areas of Jordan Valley. Introduce water treatment and softening technology(ies).
- Assess the potential of reclaimed water desalination projects
- Link operational irrigation systems to the storage dam/facility of the wastewater treatment plants that is capable of utilizing all of the available effluent in peak months.
- Awareness raising campaigns and further support to the agriculture advisory service.
- Water quality monitoring (both micro-biological as well as selected physio-chemical parameters) are to be enforced and supported with ISO 17025 laboratories accreditation (Jordan Food and Drug Administration) and JVA/Ministry of Agriculture labs for crop, soil and water quality monitoring through RSS, JFDA and JVA.
- Best agriculture irrigation practices, and careful irrigation water management A comprehensive soil survey is recommended in relation to soil quality, baseline data and soil salinity
- Salinity management, according to climatic data, and effective rainfall will satisfy most of the leaching requirements during the winter months. Remaining leaching needs should be confined to the months of January and February where crop water requirements are low but water availability is high.

PROJECT ACTIVITIES TIMELINE

TABLE 5: PROJECT (1.2) TIMELINE OF ACTIVITIES

Project (1.2) Activities @ Northern Jordan Valley WWTP	2015			2016				2017				2018				2019
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
1) General rehabilitation and upgrading of on farm irrigation infrastructure and maintenance of the systems																
2) Install the best available technology of water filtration systems																
3) Technical Assistance Support through:																
A- Link operational irrigation systems to the storage dam/facility of the wastewater treatment plants that is capable of utilizing all of the available effluent in peak months.																
B- Support the farmers in the northern Jordan Valley to adapt to new water quality (wastewater) for irrigation of citrus farms, improve on-farm water management, especially to deal with water quality-related issues.																
C- Awareness raising campaigns and further support to the agriculture advisory service are to be established to inform and consult the farmers																
D- Implement a comprehensive soil survey in relation to soil quality, baseline data and soil salinity																
E- Soil salinity management and according to climatic data, plan for best soil management and leaching practices																
4)Water quality monitoring (both micro-biological as well as selected physio-chemical parameters) are to be enforced and supported with ISO 17025 laboratories accreditation																
5) Installation of new Irrigation Systems																

Project (1.3): *Tal El Mantah Wastewater Treatment Plant Wastewater Reuse Project*

FIGURE 8: THE TAL MANTAH WWTP

PROJECT DESCRIPTION AND BACKGROUNG

The wastewater treatment plant is based on the mechanical &natural treatment methods, the total area available for this project is around 420 Dunums , currently only 25 Dunums are being used for the wastewater treatment station, the rest of land is utilized for agricultural activities which depends on the treated waste water for irrigation. The WWTP has a design capacity to treat 1200m3/day of sepatge wastewater, but current capacity is 600-800 m3/day. Currently it is receiving 400m3/day. 150 dunums is available for wastewater reuse. This facility can serve around 30,000 people i.e about 25% of the total population in Jordan valley.

In the sepatge tanks reception unit samples are collected from the wastewater influent discharged by the tankers, where the source and quality of wastewater is verified .The waste water is treated to meet the technical standards wastewater reuse for irrigation purposes. The Effluent coming out of the biological treatment unit runs to a chain of polishing ponds which encompasses wastewater treatment units called (wetland), that are used for further treatment of the wastewater, these units have biomass (reed bed plants) that get their food from the nutrients in the wastewater like (Nitrogen & phosphorus). After some period of time these plants are harvested and reused in making an organic fertilizer or is given as animal feed.

FIGURE 9: VIEW OF THE WWTP AT TAL MANTAH

FIGURE 10: SEPTIC TANK EMPTYING TO THE WWTP HEADWORKS

PROJECT OBJECTIVES

- To find a sustainable, efficient and low cost solution for treating wastewater and its management that would improve public health, adapt to climate change and the surrounding environmental habitat in the Jordan Valley
- Engage local communities in the management of wastewater reuse.

PROJECT ACTIVITIES

Evaluate the quality & suitability of the reuse pilot soil for the future plantation of different types of crops, through laboratory analysis to ensure compliance with FAO and Jordanian pertinent regulations and standards.

- The preparation of wide areas of land to be ready for plantation with either fodder, forest and productive tree species such as date palms in the project area.
- A very important activity of this project is to spread environmental awareness and work on changing wrong attitudes and perceptions towards treated wastewater and ww treatment facilities to irrigate crops.
- There is a possibility of extension & expansion of the station from 400 to 800 & 1200 Cubic meter per day in a phased approach.
- Moreover the project intends to convert & treat the sludge to organic fertilizers which will be used for this project or any other activity outside in the surrounding lands.
- The construction of drying ponds & the removal of sand from the plant head works, with the addition of a grit removal chamber.
- The installation of a tertiary irrigation network and a filtration unit.
- The rehabilitation of the adjacent building to the WWTP to be used as a knowledge & training center for the water user associations (WUA) in the middle Jordan Valley.

FIGURE 11: PROPOSED WASTEWATER REUSE PILOT LAND

FIGURE 12: WUA/ VISITOR KNOWLEDGE CENTRE TO BE REHABILITATED

PROJECT ACTIVITIES TIMELINE

TABLE 6: PROJECT (1.3) ACTIVITIES TIMELINE

Project (1.3) Activities at Tal Mantah WWTP	2015			2016				2017				2018				2019
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
1) Rehabilitation and maintenance of Tal El Mantah WWT plant*																
2) The rehabilitation of the adjacent building to the WWTP to be used as a training center& lab testing																
3) Install the best available technology of water filtration systems																
4) Installation of new Irrigation System																
5) Soil salinity management and according to climatic data, plan for best soil management and leaching practices																

Project (1.4): *Wastewater Reuse at North Shouneh WWTP*

PROJECT DESCRIPTION AND BACKGROUNG

North Shouneh (Shouneh Shamaliya), has a population of over 15,000 people, and is one of the largest towns in the Northern Jordan Valley (NJV). It is part of the Municipality of Mu'ath Bin Jabal, the northern most municipality of the Jordan Valley with a total registered population of over 30,000 people.(Overview of the potential service area (source ECODIT-USAID Consulting Firm)).

Other municipalities in the NJV also include the Municipality of Tabaqit Fahel, just south of Mu'ath BinJabal (MBJ), and the Municipality of Sharhabeel Bin Hasna that is the furthest south. Tabqit Fahel hasover 27,000 registered people and includes towns such Mashari and Sheikh Hussein. Sharhabeel Bin Hasna has over 28,000 people and includes towns such as Wadi Al Yabis, Abu Sido and Kraymah, the southern most town in the NJV.

Population density is relatively high in some of the larger town-centers such as North Shouneh, but is lesson in other smaller residential areas. Residential space is quite limited in the NJV since the valley falls within a narrow strip of highly agricultural lands surrounded by steep hills to the east and the Jordan River to the West. In the hills to the east, the NJV is bordered by the Municipalities of Taybeh and Kura that are home to over 100,000 people.

The WWTP, is with a design capacity of 1,200 m3/day, designed to receive septage from Mu'ath Bin Jabal Municipality and nearby communities through to 2028, when the Municipality's population is expected to exceed 46,000 people. Before 2028, the WWTP will be able to accept septage from a wider service area, servicing most communities of the Northern Jordan Valley during the earlier years of operation.

The treatment technology includes multiple concrete settling / anaerobic basins operating in series, dedicated de-nitrification tanks, and facultative lagoons, re-circulating sand filters and constructed wetlands all of which were recently constructed by USAID and completed during 2014 to comply fully with the JS 289/2006. All treated wastewater will be used at the site or sold to farmers. Therefore there will be no discharge to wadis.

PROJECT OBJECTIVES

- Strengthen climate change adaptation capacity of the local communities, water and environmental institutions and policies pertaining to wastewater treatment and reuse;
- Demonstrate the efficiency and cost-effectiveness of appropriate technologies for the treatment and reuse of domestic wastewater in rural areas
- Promote the participation of local and national governments, local community groups, NGOs, the private sector, and professional associations, individually as well as collaboratively, in planning, developing, implementing and operating sustainable local solutions to the problems of raw sewage discharges and irrigation water scarcity.

PROJECT ACTIVITIES

- There is an overall preference for reuse alternatives to remain flexible. During the scoping session, there was almost unanimous agreement to combine three reuse alternatives:
  - Provide TWW to farmers in the vicinity of the WWTP;
  - Provide TWW to farmers and other users far from the WWTP; and
  - Reuse TWW as part of (or ancillary to) the WWTP operations.
- A preference was expressed by stakeholders for using the TWW on-site as demonstration and an opportunity to generate more income for the WWTP or organization involved (e.g. municipality). With more confidence in TWW reuse and the quality of effluents, then farmers in the vicinity of the WWTP would become the first priority. In the event that it was needed, disposal of TWW to wadis (or the Jordan River) was not perceived by most local stakeholders as a major obstacle, perhaps even beneficial to the River's water quality.
- Transfer to other areas - via canals was also suggested as an option, as was mixing the TWW with fresh supplies for distribution with the irrigation system. Many also suggested using TWW to irrigate trees/forests in and around residential areas (to help reduce temperatures) or to support municipal projects (e.g., parks).The most likely crops to be irrigated, at least in the short-medium term, include forage crops, trees and palm trees, with the possibility of irrigating citrus in the future.

PROJECT ACTIVITIES TIMELINE

TABLE 7: PROJECT (1.4) ACTIVITIES TIMELINE PROJECT

Project (1.4) Activities at North Shouneh WWTP	2015			2016				2017				2018				2019
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
1) Using TWW to irrigate stone fruit trees in and around residential areas																
2) Install the best available technology of water filtration system to polish the effluent before distribution for reuse																
3) Install on farm irrigation infrastructure for farmers in different locations around the vicinity of the pilot and surrounding farms																
4) Technical Assistance Support through:																
A- Support the farmers in the northern Shouneh to adapt to new water quality (wastewater) improve on-farm water management, especially to deal with water quality-related issues.																
B- Awareness raising campaigns and further support to the agriculture advisory service are to be established to inform and consult the farmers																
C- A comprehensive soil survey is recommended in relation to soil quality, baseline data and soil salinity																
D- Water quality monitoring (both micro-biological as well as selected physio-chemical parameters) crop, soil and water quality monitoring through.RSS, JFDA and JVA																

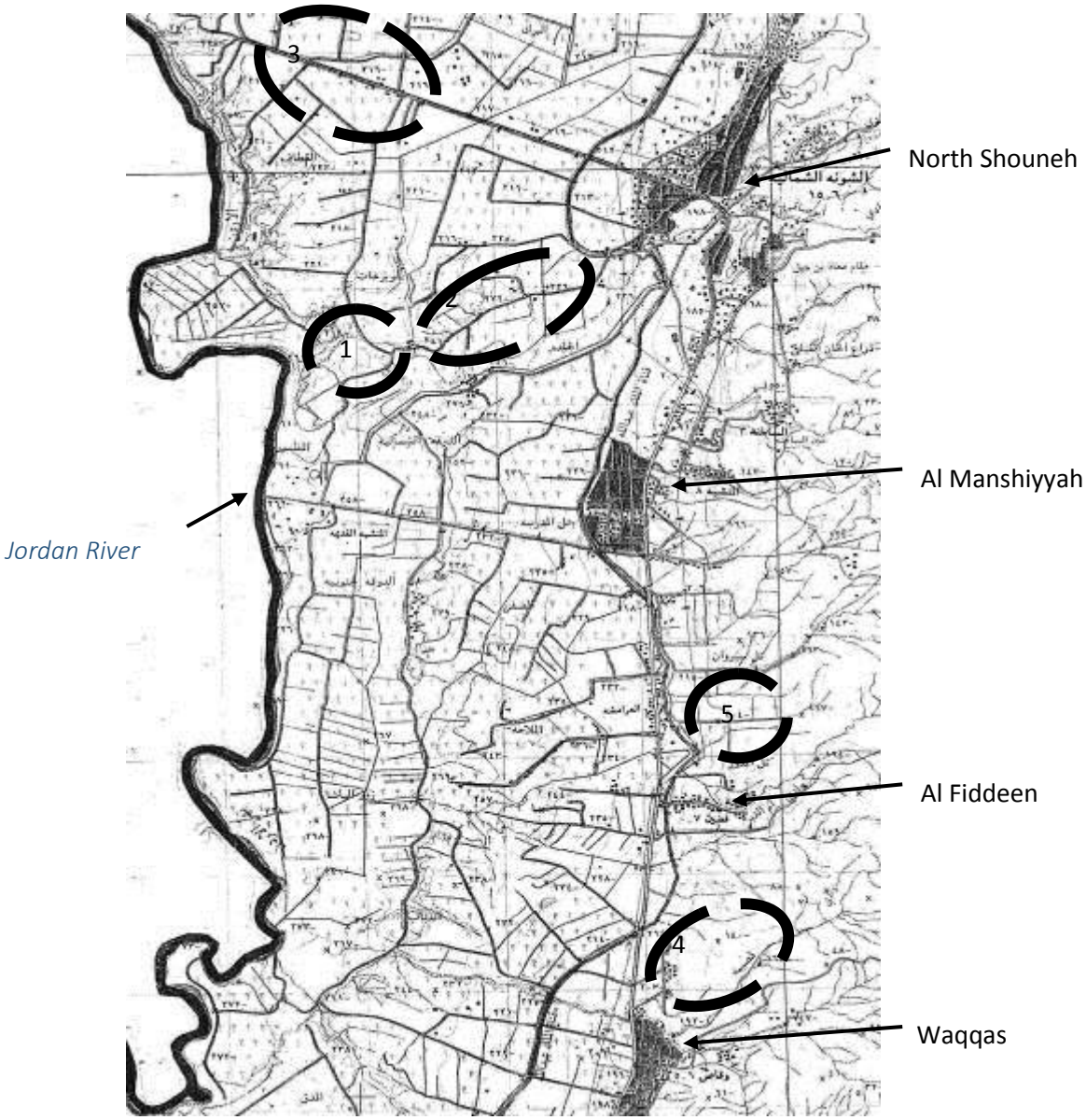


FIGURE 13: LOCATION OF NORTH SHOUNEH WWT

Sub-Component (B): CLIMATE CHANGE ADAPTATION OF AGRICLTRAL SECTOR THROUGH RAINWATER HARVESTING & PERMACULTURE (1.5,1.6)

Rain Water Harvesting

PROJECT (1.5): *Community Resilience and Adaptation to Climate Change Through Water Harvesting Technologies in Poverty Pockets*

PROJECT DESCRIPTION AND BACKGROUNG

Water is a vital resource for crop production in rainfed-farming regions, particularly in countries under severe water stress conditions like Jordan. Water resources in Jordan are greatly affected by the prevailing climatic conditions, and mainly by the seasonal erratic rainfall distribution. Rainfall often occurs at high intensity at times when crop water requirements are minimal. The total area of the country is about 89.206 km2. The majority of this area receives approximately 200 mm or less of rain per year. Furthermore, the total amount of rainfall received by this area largely exceeds all other utilized sources of water in Jordan. This fact indicates the importance of water harvesting in such areas.

Historically, agriculture using surface run-off and rainwater harvesting techniques was extensively practiced as early as 4000 years ago in Jordan. Some of these structures are in good operating conditions such as the Roman pools near Ajloun, Madaba and Mwagger. Flood water is mostly lost by evaporation; it is estimated that the volume of water lost in this manner exceeds all the utilized sources of water in the country, so harvesting part of this water should be a priority.

For a sustainable urban future, society must move towards the goal of efficient and appropriate water use. Rainwater harvesting has a significant role to play in this Project. Water availability has been a matter of concern all over the world. This technology is used for collecting and storing rainwater in earthern check dams. Harvest drain water is a renewable source of clean water that is ideal for agriculture in rainfall water short seasons.

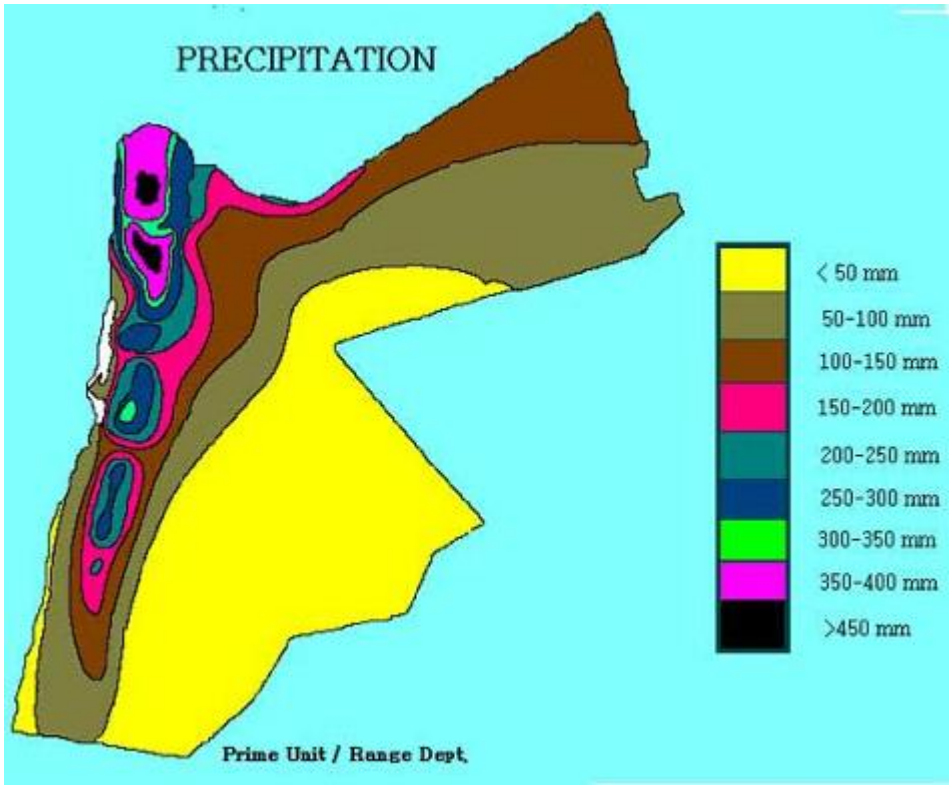


FIGURE 14: AVERAGE ANNUAL RAINFALL IN JORDAN

Rainfall variability is high in addition to the trend of decreasing rainfall amounts resulting from climatic change. Jordan faces long-term challenges due to increasing frequency of drought and the impact of climate change during the last three decades on available water resources.

The agricultural sector consumes more than 65% of the available water resources. Water demand is greater than the present available water resources. Water shortage in 1991 was 664 MCM in the year 2005. Even with the expected government strategies and future plans to solve the problem of water shortages, it is still expected that the water deficit for all uses to be more than 360 MCM/year by the year 2020 (MWI reports) mainly due to population growth.

PROJECT OBJECTIVES

In the absence of run-off sewer lines in some Jordanian rural areas, rainfall harvesting can increase water supply and help combat the chronic water shortages for rural communities and assist them in combating climate change impacts in the country. Moreover rainwater harvesting could be one of the very good options for irrigating crops specially in poverty pocket areas such as Ghore Al Mazraha/Ghore Hadeetha and Fifa which were classified as one of the poverty pockets areas in the kingdom where the poverty rate reaches (44.1%) compared to poverty rate in Karak which amounts to (17.1%) as compared to the poverty rate in the kingdom which is (13.3%), noting that Ghore Al Mazraha/GhoreHadeetha/khnaizerah and Fifa are part of

southern Jordan Valley which is one of Al Karak districts. The average rainfall reaches only 70 mm/ year.

(83.3%) of Ghore Al Mazraha regions are covered by major & minor water networks. Ghour Al Mazraha & Hadeetha,khnaizerah / and Fifa are irrigated by WUAs through irrigation projects managed by Jordan Valley Authority; farmers depend on drip irrigation systems and agricultural ponds to irrigate their crops. The area of agricultural land is about (45) thousand acres, (33.3%) of them is irrigated agriculture. That's why these two areas could have a very good potential to implement rainwater harvesting projects.

The main project objectives and goal is to plan and implement watershed management with focus on water harvesting techniques to help the communities in improving their livelihoods through:

- Sustaining land production and high quality ground and surface water resources
- Restore productivity of degraded lands
- Reduce soil erosion and sediment export
- Improve stream channels
- Reduce flood damages
- Improve water harvesting efficiency

SPECIFIC OBJECTIVES INCLUDE

- Develop an integrated watershed management approach based on participatory approach and involving local community, planners, and policy makers at all levels for land management, biodiversity conservation, and water-use by the community at the watershed scale.
- Involve communities in planning and managing their watershed.
- Achieve a balance between resource use and resource conservation.
- Project duration: The duration of the project will be 4 years.

Project Site(s)

The National Center for Agricultural Research and Extension (NCARE) defined a method for site selection of watersheds for water harvesting techniques depending on a set of criteria (rainfall, topography, accessibility, and the presence of communities) and scoring to help in the selection process using the GIS as a tool.

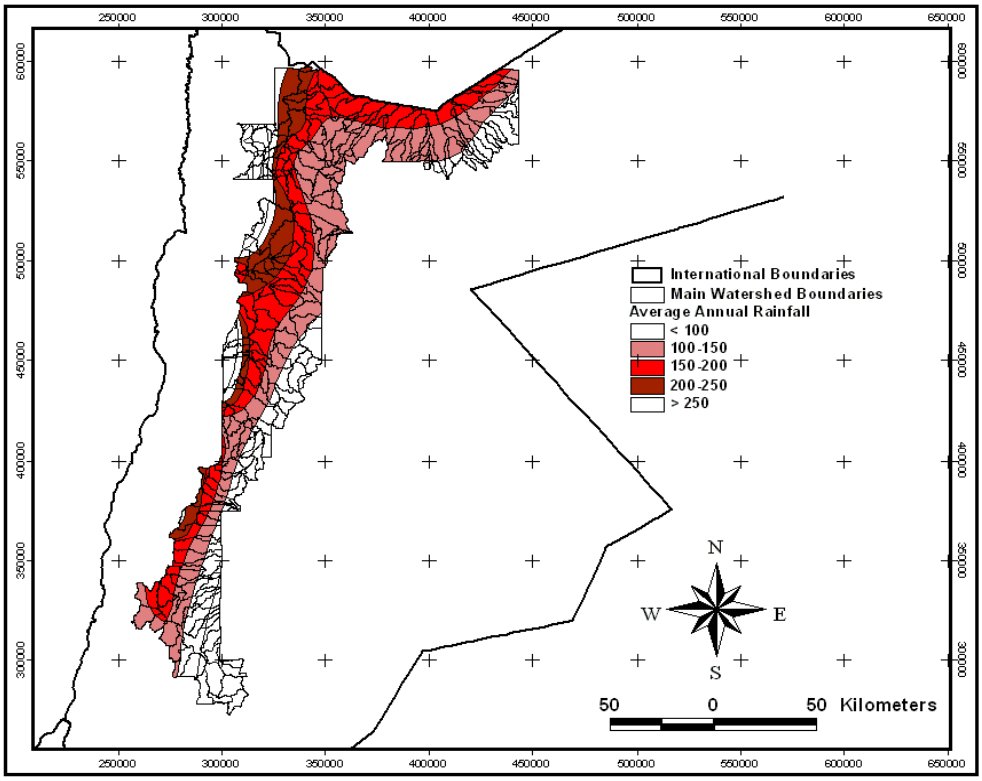


FIGURE 15: THE RAINFALL ISOHYETAL MAP WITH DEFINED WATERSHED BOUNDARIES THAT ARE LOCATED WITHIN THE 100 – 250 MM RAINFALL ZONE. THIS AREA (13600 KM^2) COMPRISES 15.3% OF JORDAN'S LAND AREA.

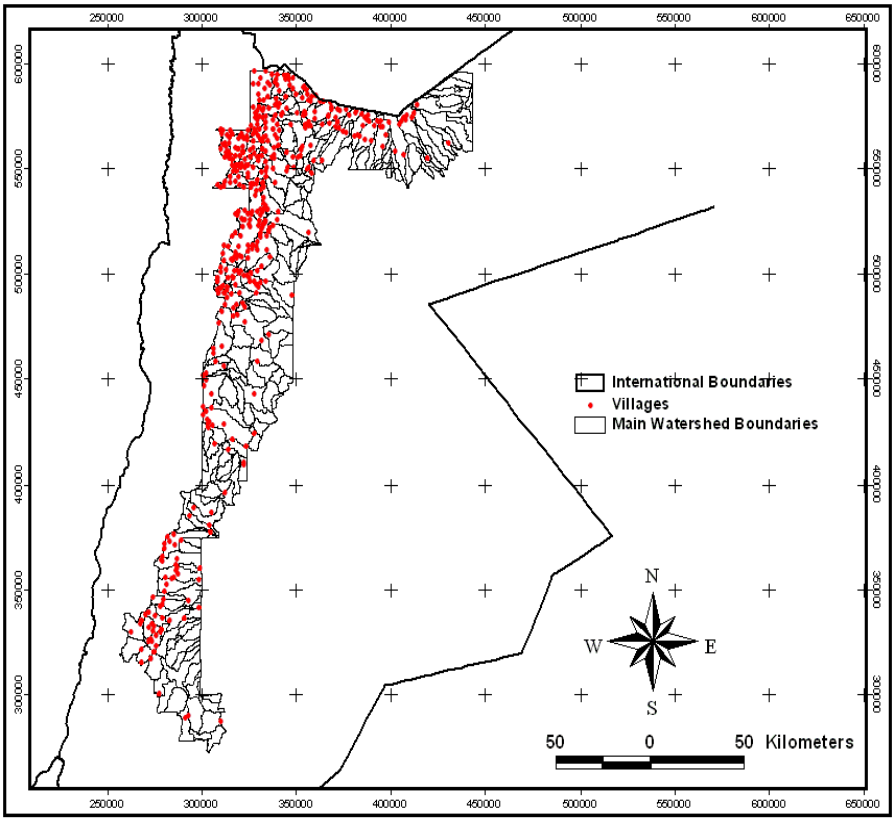


FIGURE 16: THE DISTRIBUTION OF VILLAGES AND COMMUNITIES IN THE SELECTED ZONE.

These above watersheds have a total area exceeding 500 square kilometers and start from the mountain area receiving relatively high rainfall. The largest watershed among those is Seyl Al-Karak with an area exceeding 175 square kilometers. The volume of runoff water that flows in the main stream bed in this watershed is quiet big and can be utilized for more than one purpose. The project site(s) will be selected according to a new set of criteria to suit the objectives of the project.

This zone is just an example in defining potential sites for the project. The sites can also be outside this zone particularly in the southern part of the Kingdom close to the Dead Sea region. Several watersheds are located there where they can be very useful to the communities in Ghor Al-Mazra'a, Ghor Hadeetheh, khnaizerah and Ghor Al-Safi. Any harvested water can be used in irrigated agricultural activities in those areas.

FIGURE 17: GOOGLE EARTH IMAGE FOR GHOR HADEETHEH, KHNAIZERAH AND GHOR AL-MAZRA'A WATERSHEDS.

There are other potential areas in Jordan that have a huge potential for rain water harvesting, there is around 223 Localities or (remote communities) in the Badia (Jordanian desert), the map shows that the localities becomes more dense as we go to the north and less as we move to the south.

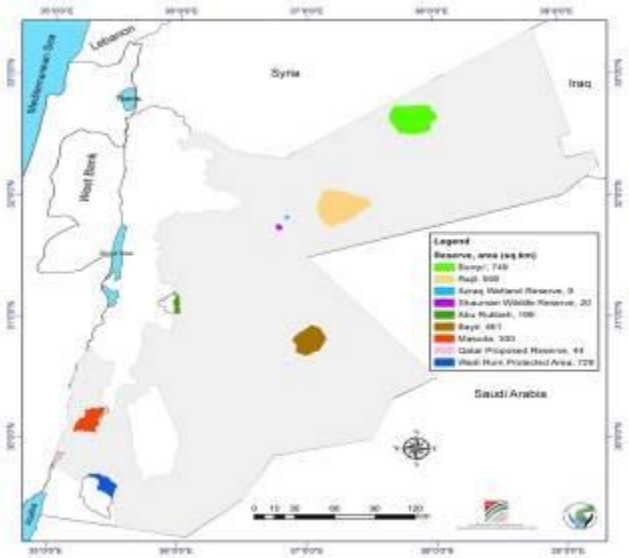


FIGURE 18: POTENTIAL WATERSHEDS IN THE BADIA REGION OF JORDAN.

PROJECT ACTIVITIES

- Obtain rainfall data, potable water supply, population and number and area dwellings in each targeted community.
- Installation of basic components of a rainwater harvesting systems which are for remote region and areas identified as poverty pockets.
- Build Dams which are required for storing flood waters during the wet winter season and releasing the water gradually during the summer season when the demand is high.
- Build reservoirs, called desert dams (water harvesting), to help increase ground water recharge and provide water for pastoral use and assist remote Beduin communities become more resilient to climate change.

PROJECT ACTIVITIES TIMELINE

TABLE 8: PROJECT (1.5) TIMELINE OF ACTIVITIES

Project (1.5) Activities Rain Water Harvesting Technologies	2015			2016				2017				2018				2019
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
1) Obtain scientific data on rainfall data and rainwater harvesting potentials in the Mazraah/Haditha/Fifa Region																
2) Prepare engineering design and feasibility studies for potential earthern dams in region																
3) Construction of a rainwater harvesting earthern dam in khanzeerah arae																
4) Training & Involving communities in planning and managing their watershed.																
5) Water quality monitoring (both micro-biological as well as selected physio-chemical parameters) by JVA labs																
6)Rehabilitate and install where needed new irrigation and filtration systems on farms																

Project (1.6):*Climate Change Adaptation, Building Resilient Food Security Systems through Extending Permaculture Design and Technologies in The Jordan Valley and Beyond.*

PROJECT DISCIPTION AND BACKGROUND

The challenges facing the dry areas, especially in the developing world, where food Insecurity is already a major concern is massive. The dry areas of the developing World occupy some 3 billion hectares, and are home to one third of the global population. About 16% of the population lives in chronic poverty, particularly in marginalized rain fed areas. Characterized by water scarcity, the dry areas are also challenged by rapid population growth, frequent droughts, high Climatic variability, land degradation and desertification, and widespread poverty.

Adopting permaculture and agro-ecological techniques for Land use, and extending the appropriate technologies, E.g. : broad acre and small scale water harvesting techniques, recycling of biomass, dry lands farming strategies, and small scale urban farming and food forestry projects have multiple benefits summarized in the following :

Since it uses a whole system approach, it generates a stable future adapted and profitable investment. It uses biologically fixed nitrogen, i.e avoids the multiple ills of synthetic nitrogen as: destruction of soil organic matter, high energy use, environmental pollution etc. It also help maximize soil Health in particularly organic matter levels. .Economic benefits include

minimizing the use of external inputs such as fertilizers, fossil fuels, and biocides, also it reducing the exposure to cost increase (of previous inputs) and their negative impact on farm profitability.

Permaculture is a branch of ecological design, ecological engineering, environmental design, construction and Integrated Water Resources Management that develops sustainable architecture, regenerative and self-maintained habitat and agricultural systems modeled from natural ecosystems. The word permaculture originally referred to "permanent agriculture" but was expanded to stand also for "permanent culture," as it was seen that social aspects were integral to a truly sustainable system.

Permaculture design emphasizes patterns of landscape, function, and species assemblies. It determines where these elements should be placed so they can provide maximum benefit to the local environment. The central concept of permaculture is maximizing useful connections between components and synergy of the final design. The focus of permaculture, therefore, is not on each separate element, but rather on the relationships created among elements by the way they are placed together; the whole becoming greater than the sum of its parts.

Permaculture is an ethically based solutions oriented system that encompasses ecologically sound technologies into a design pattern with emphasis on connections between a diversity of elements, which when implemented will lead to the regeneration and permanence of the culture.

PRIMARY GOAL OF COMPONENT ACTIVITIES

The activities will demonstrate the potential for improving the livelihood and living conditions of humans in the Jordan Valley using low-cost, low-tech approaches. Permaculture depends on the application of specific agricultural patterns and practices that aim for sustainable use of soil, water, plants and animals by design. It is an integrated system for the environmental management of agricultural process, natural resources, local community and environment in one design system package.

COMMERCIALLY VIABLE DEMONSTRATION SITES (2 PILOT PROJECTS)

Pilot projects that demonstrate what Permaculture practices and ecological farming can do on the ground and between average farmers. Farmers seeing a Pilot Project between them, on an average size piece of land, in an average farming area, developing in an average speed rate will have a great impact on their approval and adoption of Permaculture as a system.

A project like this will start showing results within the first year. A documented study that engages surrounding commercial farmers' Inputs and outputs and compares it with this Pilot Project's Inputs and Outputs over a period of 4 years will result in a very nicely documented evidence for the success of this project. Success stories in Jordan similar to this Pilot Project are documented in the link below that shows how a Permaculture Design of an Organic Farm in Wadi Rum, Jordan, improved yield quantity and quality while building soil and feeding the water table.

FIGURE 19: PERMACULTURE DESIGN OF AN ORGANIC FARM IN WADI RUM

PROJECT SITE SELECTION

Mediterranean climates typically have two slow down periods a year — the cold of mid-winter, and the hot dry of mid-summer. Winter brings bare deciduous trees and brown above and green herbs below, and summer brings green leaf tree canopy above and brown, dried-off herbs below. Only in springtime are both top and bottom green and both lush.

A good permaculture designer can take advantage of the two slow-down in the year and sees them as two edges in time. As we know, the more edges we can take advantage of the better we can design.

The Jordan valley is the most productive farmland in Jordan, which, owing to climatic conditions and availability of irrigation water represents the breadbasket of Jordan – especially for warmth loving fruits and vegetables. For this reason, agriculture along with some tourism forms the key 'industries' of the Jordan Valley.

The agricultural community in the Jordan Valley faces other problems besides water that affect the quality of farm products. This includes extensive use of chemical pesticides and fertilizers, water and soil pollution and solid waste pollution. These factors affect the quality of agricultural products and the sustainable use of natural resources. In addition, agriculture faces other issues that affect the sustainability of the agricultural process, such as the marketing of agricultural products and competition with regional and international markets.

In many successful implemented projects the results show that the application of permaculture methods and introducing permaculture techniques like swales, natural mulching, legume cultivation, have a clear role in improving soil properties, increasing soil organic matter content and reducing soil salinity.

MAIN ACTIVITIES OF THE PERMACULTURE PROJECT:

TRAINING

Re-educating communities at the ground level is the first step to ensure the success of the projects. To reach that ultimate goal we need to create a web of local trainers who will transfer this knowledge to their associates, families and communities. All of these training courses can be conducted in our demonstration site in the Village of Jawasreh South Shouna.

Suggested training topics will include the following:

- The Need to Act, Why farmers need to do the shift to Permaculture
- Principles and Implementation of Permaculture design.
- Soil Management and Erosion Control.
- Soil Rehabilitation through Partnering with Biology.
- Seed Saving and Organic Gardening.
- Recycling and Waste Management.
- Water Harvesting and Management/Earth Works.
- Dry lands Strategies and Draught Proofing.
- Livestock Management.
- Food Forests/Oasis Agriculture.
- Renewable & Energy Efficient Technologies.
- Urban Food Production.
- Food Processing and Quality Control.
- Holistic Management and Keyline Design.
- Re-Education of Consumers, WHY BUY PERMACULTURE.
- Ecological Farm Management.
- Permaculture Design Certificate Courses, (PDC). (72 Hour Curriculum).

I. DESIGN AND IMPLEMENTATION OF2 POLYCULTURE PILOT FARMS WILL INCLUDE:

1. Main Stable Crops
2. Production is now also increasing, we will also try to encourage farmers
3. To grow a diversity of productive trees in their understory, and an overstory of date palms provides the greatly needed shade that allows other species to survive and thrive in their canopy shade.
4. Tree crops that can be grown commercially and are commonly found in local village gardens include dates, olive, figs, pomegranate, mulberry, guava, carob, banana, papaya, cactus fruits, henna, and grapes. Less common are custard apple, mango, caramel sapote, brazil cherry, moringa, passion fruit,
5. Desert Food Forest Systems on Contour.
6. Vegetables on contour between mixed food forests tree systems.
7. Animal Production starting with small animals and poultry and developing into bigger grazing animals as the system evolves and biomass and feed becomes abundant.
8. Beekeeping.
9. Farm Forestry, Wind Break design and Edible Fences.

TABLE 9: PROJECT (1.6) TIMELINE OF ACTIVITIES

Project (1.6) Activities Permaculture	2015			2016				2017				2018				2019
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
1) Training on Permaculture BMPs for 5 days per training section(One training per quarter)																
2) Training leading to award of Permaculture Design Certificate (17) "2 weeks"																
3) Establish 2 permacultre Pilots one in the upper middle Vallay and one in Mazrrah/Haditha Valley																
4) Transformation of regular farms into a Permaculture System																
5) Set up Four Regional Farmers/WUAs Revolving Fund																

FIGURE 20: AN IMAGINED DESERT FOOD FOREST/OASIS ON SWALE SYSTEM

Shade-Water-Soil, (SWS) strategy, is the strategy that we need to work Around in Dry Land scenarios that has a degraded land component. Soil in such pilot project needs to be rebuilt

from scratch, to show farmers that they can also get their soils back to how they remember it was in their childhood. Water is the most critical factor in such a project and access to it along with the best utilization are challenges we will need to show that farmers can deal with as well. Shade and the Creation of it will be a priority and phase1 establishment step. Fast growing high trees (productive and support species) are the first things to go in.

Creating large wicking beds through the use of buried, gravity fed drip irrigation system. (see http://www.netafim.com/). Mulch material will need to be supplied & distributed over these areas in the beginning. Over time, the biomass accumulated through re-vegetation of the site will eventually be the source of all the organic matter required. Livestock and their manure are essential for boosting fertility & organic matter content. Livestock may also be strategically utilized and managed along with partnering grazers. Chippers/shredders should be made available to "process" the organic matter we want to use on site. This would be an enormous help.

The planting of palm trees & fruit trees among the legumes is the primary focus concerning the establishment of a tree-based cropping system within the proposed production system. With this orchestrated progression/succession, an effective tree canopy & windbreak can be established relatively quickly minimizing excessive evaporation and desiccation caused by the sun and wind, setting the stage for other food crops (perennial & annual varieties) to be grown. Additionally, more livestock can be introduced to the system with the improved management of water. If this arrangement is implemented over a large enough area, a more favorable microclimate will be generated within the region, helping to restore the proper functioning of the hydrological cycle.

FIGURE 21: DESERT FOOD FORESTS AND INTERCROPPING BETWEEN PALM OVER STORY CANOPY IS A COMMON OASIS TECHNIQUE.

These pilot projects, although their main concentration is on profit making, can become a training facility and can be replicated in the valley heading north and south to serve and show farmers what can be achieved at their doorstep. This can be run through associations and the model can be extended and replicated throughout the valley.

Component 2: Climate Change Adaptation Capacity Building, Knowledge Dissemination, Policy and Legislation Mainstreaming

"Knowledge is like light. Weightless and intangible, it can easily travel the world, enlightening the lives of people everywhere. Yet billions still live in the darkness of poverty- unnecessarily." (World Development Report 1999).

BACKGROUND: Some studies found that the main capacity constraints identified in Jordan were: Lack of economic incentives for climate change adaptation; Weak institutional and technical capacity development for the Climate Change; Developing linkages between research, systemic observation and policy making; Lack of clear and systematic integration of the UNFCCC main concepts in the national policy formulation process, Capacity Development

for Practical Education and Training, Capacity development for Knowledge management and networking, Capacity Development for National Adaptation Plans.

Public awareness campaigns, capacity Building activities & knowledge dissemination are necessary, needed and crucial to explain the climate change possible impacts on water, agriculture and other sectors for the general public, farmers, building owners, policy-makers etc. Additionally More ***audience-specific awareness events may be implemented*** through mass media, associations, community based organizations (CBOs) chambers, schools, universities and water delivery utilities (water companies, Water Authority of Jordan (WAJ) and Jordan Valley Authority (JVA)).

The Government should also establish policies and enforce laws to ensure Jordan's water is used efficiently and delivers a high return per cubic meter consumed. Following this approach, all users would pay a socially optimal price of water. Unsustainable extraction of groundwater would stop in order to prevent lasting economic and environmental harm. In addition, the Government should consider creating a market for transferable water rights to help ensure optimal water use while guaranteeing farmers continuing access. Reforming current fresh-produce marketing requirements could increase returns to farmers. Creating and strengthening groundwater user associations could improve water allocation.

The recommended possible national climate change adaptation measures that must be implemented include:

Sub-Component 2: NATIONAL CAPACITY BUILDING NEEDS FOR CLIMATE CHANGE ADAPTATION OF JORDAN'S AGRICULTURE SECTOR

A capacity development component for creating an enabling system for linking scientific research to policy making and pilot climate change adaptation programs such as this proposed one is of the major priorities for Adaptation to the stresses of climate change in Jordan. The research capacity building component should be focused on systemic observations and collecting, managing and utilizing activity data as well as capacity to establish a sustainable observation system on Climate Change. It is worthy to mention that, encouraging the commercial agricultural production and food security especially for the low-income families is a critical strategy for climate change adaptation.

In Jordan there are four main governmental entities responsible for providing water services these are: The Ministry of Water & Irrigation (MWI), Water Authority of Jordan (WAJ), Jordan Valley Authority (JVA) and the Program Management Unit. The (MWI) is responsible for the formulation of national water strategies and policies, research and development and information systems.

In the face of the acute water insufficiencies in the Jordan Valley, there is a need to coordinate between public and private sector actors to ensure effective water resources management and sustainability, and enable agribusiness enterprises to adapt to climate change impacts while expanding, competing and attracting investment. Building database, Building capacity of research and extension by developing new technologies that are needed to meet Climate Change challenges, aid in the decision making process, transfer of new technologies to farmers, developing infrastructure of institutions, and ultimately developing necessary legislations for establishing a "National Umbrella for Climate Change".

The major efforts conducted in scientific research on climate change issues in Jordan are not finding their route to the policy making and management systems.

Project (2.1): ***Strengthening the Capacities of Poor& Remote Communities to Better Adapt to Climate Change Adverse Impacts (At the Four Geographical Zones of the Jordan Valley and Wadi Mousa).***

PROJECT DESCRIPTION AND BACKGROUND

The project will focus on: Strengthening the capacities of remote and poor communities working in agriculture to be able to adapt to the adverse impacts of climate change through helping WUAs and farmers make better informed decisions. Training sessions will be held for the local community, famers and WUAs about climate change-driven hazards affecting their areas. Awareness campaign consisting of a number of learning seminars will be carried out targeting the farmers and WUAs in Wadi Mousa and JV in the north, middle and Karamah and South JV.

The seminars curricula will focus on: providing explanation of the climate change science, climate change projected impacts, explanation of vulnerabilities and adaptation methods as well as the communities' adaptive capacity. The awareness campaign will be done with the direct involvement of 1WUA in Wadi Mousa and 48 WUAs in JV and community CBOs, stakeholders and decision makers from governmental entities such MOA, NCARE and Universities.

Main Activities**:**

- Learning seminars: 6 introductory seminars for the CBOs explaining the science of climate change and main adverse impacts as well as adaptation measures.
- The four geographical regions of Jordan Valley and Wadi Mousa ww reuse project
- Workshops for farmers will then be delivered by the CBOs giving them tools to better adapt to climate change adverse impacts on agriculture activities:
- ww reuse and adaptation to climate change measures: Promote several adaptive agriculture practices that will help farmers maximize their production.
- Creating a data base for farmers and agriculture CBOs to be used by the SMS system.
- The SMS system will enable the farmers to send SMS (via mobile customized interface) and specify the parameters they wish to inquire about (e.g crop type, land area, climate conditions…etc) and a message or notice using the application will be sent back with the needed answer according to standard studies of needed amounts of water, best practices and specific warnings.
- Sending informative messages related to climate change and adaptation.

PROJECT OUTCOMES AND INDICATORS:

- Better Informed society & highly aware communities with ability to adapt to climate change impacts. Percentage (80%) of targeted population aware of predicted adverse impacts of climate change.
- At Least 40 -50 % of the registered farmers in the Jordan valley will be registered users in the SMS System Database.

TABLE 10: PROJECT (2.1) TIMELINE OF ACTIVITIES

Project (2.1) Activities Strengthening the capacitie sof poor and remote communities to better adapt to CC adverse impacts	2015			2016				2017				2018				2019
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
1) 6 introductory seminars for the CBOs explaining the science of climate change and main adverse impacts as well as adaptation measures.																
2) workshops for farmers will then be delivered by the CBOs giving them tools to better adapt to climate change adverse impacts on agriculture activities																
3)Creating a data base for farmers and agriculture CBOs to be used by the SMS system.																
4) Testing system Implementation																

Project 2.2: *Using ICT as an enabling tool for more effective climate change adaptation and development programmes*

ICTs encompass the full range of technologies, including traditional and emerging devices such as community radio, television, mobile phones, computer and network hardware and software, the internet, satellite systems, and podcasting. By definition, communication is a participatory, two way process, enabling the inclusion of all people in a critical dialogue to identify solutions and foster change. More concretely, interactive media is a key communication channel and strategic partner for climate change mitigation and adaptation.

ICTs are enabling tools that can increase the effectiveness and efficiency of development programmes. If integrated strategically, ICTs – including community radio, knowledge centres, mobile phones and interactive media– can contribute tangibly to climate change mitigation and adaptation efforts. Therefore, use of ICTs as tools embedded within existing development programmes makes these interventions more efficient and effective (e.g., offering increased access to market information through a mobile phone to increase income; ICTs are therefore considered a catalyst for change within development sectors such as education (e.g., distance learning-learning), health (e.g., e-health, mobile health, telemedicine), governance (e.g., empowering citizens through increasing participation and inclusion in decision-making processes; more accountability/transparency through access to information) and rural development (e.g., access to market information).A multi-stakeholder partnership approach is necessary for effective ICT implementation and up-scaling.

ICTs are interlinked with climate change in a number of ways. They are most obviously used for a range of technical interventions, from high-level satellite weather mapping to scientific research, data analysis and projections and vulnerability assessments.

PROJECT GENERAL OBJECTIVES

- Informing and raising awareness on the effects of climate change.
- When it comes to adaptation, the emphasis in using ICTs is mainly on reducing risk and vulnerability while increasing coping strategies at the local level.
- Reaching remote villages through dissemination, hence enhancing the effectiveness of early-warning systems for disaster prevention and risk reduction and therefore saving lives
- ICTs can also empower the poor and marginalized to raise their voice for political accountability, advocacy and meaningful action.

PROJECT SPECIFIC OBJECTIVES

- Identifying, building, documenting and sharing locally rooted and context utilized adaptation strategies and solutions among communities.
- Facilitating local risk assessments and making communities part of the process to mobilize local knowledge and develop local coping mechanisms.
- Demystify climate change and improve climate literacy at all levels of society
- Internalize climate change with local people by penetrating local pockets of knowledge through local newspapers, community radios and village knowledge centers in order to identify specific coping requirements as a basis for sound policy making.

Setting Up Of An Early Warning System For Drought For Farmers Use (At The Four Geographical Zones Of The Jordan Valley And Wadi Mousa).

PROJECT ACTIVITIES

- **Develop a web Portal for the management of all related information to climate change** this web portal will have three main user types, a normal guest, a registered user and an administrator user, each one of the users will have a certain privilege and will be granted access to the roles in the application as per his job.
- Develop a mobile application for **early warning system** to reflect information of the web portal. The mobile application will enable the user (any of the three types) access the Databank of information using its interface, in addition to a way to enquiry about irrigation times, types and amounts, latest news, climate change actions and behaviors, …etc.
- **Implement a two way SMS Service** for early warning system, which will enable the farmer to send an enquiry SMS containing certain facts about the area of enquiry and accordingly the SMS system will find the suitable answer to it as per the standard studies and information and reply back to him with the answer.
- **Develop an Irrigation Management Information System (IMIS)** which serves as climate change early warning System. The main objective of this project is to create an automated system that collects data from the data acquisition weather stations, sends it to the servers, then imports that data into a database making it available for analysis. This system provides an online functionality to find up-to-data source of information related to the data collected for all concerned stakeholders. The system also provides up-to-date statistical information to researchers and decision makers. A similar system has been developed and implemented by RSS and applied at the National Centre for Agriculture Researches and Extension (NCARE). The project will help initiate and sustain a technology transfer program concerning the issues of when to irrigate and how much irrigation water on-farm level to maximize water use efficiency.

OROJECT OUTCOMES AND INDICATORS

- Decision makers working in the field of agriculture have better knowledge of predicted adverse impacts of climate change.
- At Least 40-50 % of the registered farmers in the Jordan valley will be registered users in the System Database.
- Having a better informed agriculture society that is highly aware with strengthened ability to adapt to climate change negative impacts.
- Conduct various scientific awareness sessions regarding the fair and effective usage of the two way SMS Service.
- Conduct ICT awareness sessions regarding the fair and effective usage of the two way SMS Service.

PROJECT ACTIVITIES TIMELINE

TABLE 11: PROJECT (2.2) TIMELINE OF ACTIVITIES

Project (2.2) Activities Creating An Early Warning Syestem for farmers in JV and Wadi Mousa	2015			2016				2017				2018				2019
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
1- Develop a web Portal for the management of all related information to climate change																
2- Develop a mobile application for early warning system to reflect information of the web portal.																
3- Implement a two way SMS Service for early warning system																
4- Develop an Irrigation Management Information System (IMIS) which serves as climate change early warning System.																
4) Testing system Implementation																

Project 2.3: *Jordan Valley Water Sustainability and Agribusiness Competitiveness*

BACKGROUND ON NEEDS AND DEMANDS

Jordan is facing challenges in terms of economic inclusion, growth, competitiveness, and job creation. These challenges, similar to other transition countries in the Middle East and North Africa (MENA) region, were made even more salient as the Arab Spring unfolded across the region. Job creation and economic inclusion are key priorities for Jordan today—these goals will be advanced by enhancing sectoral competitiveness, and fostering sustainable, private-sector led growth.

Jordan is in a strong position to leverage its competitive advantages in agriculture, a strategic sector which contributed to 4.4% of GDP in 2011, while accounting for 15.3% of export earnings. Jordan banks on a favorable climate, a geographical location at the heart of the Middle East with access to Europe, a skilled agricultural workforce, and good trading relations with a number of countries. The agricultural sector is not only the major source of food items especially fruits and vegetables but also an important source of hard currencies originated from exports.

Developing a competitive, inclusive and sustainable agribusiness industry is therefore a priority of the government. Greater private-sector investments are expected to contribute to improving the rural incomes and sustainable development of agriculture in the long term. The national agriculture strategy focuses on continued improvement in the business climate for increased private sector investment, supporting access to finance, access to markets, the development of clusters of services and skills to raising the productivity of farmers and agribusiness SMEs. A major focus of the government strategy policy is also the sustainable use of water resources in a context where Jordan is confronted to an unprecedented water crisis.

Water is a primary commodity which directly impacts small farmers competitiveness and agribusiness processors throughout the country and which has a significant effect in the country's ability to realize sustainable and socially-shared economic growth. Furthermore, water is closely linked to food, energy and urban development. Yet, the collision of massive economic and demographic pressures with climate and environmental forces is leading to a crisis like none before. The declining water supply in the country is in great part due to a lack of a clear and efficient regulatory system for water and lack of coordination on foundational factors for competitiveness of the agribusiness sector. Current arrangements to provide water to farmers are unsustainable because they are jockeyed with governance issues. Petty corruption, weak or biased enforcement of illegal practices, unclear incentives systems, undependable service delivery, thorny policy making, lack of funding for innovations and mismanagement of resources are some of the issues which thrive in the absence of a market-based commercial

mechanism and market control for water. Finding collaborative solutions to Jordan's water crisis is essential to ensuring the sector's ability to realize its growth potential.

PROJECT OBJECTIVES

This proposed project component aims to support a participatory process, whereby Jordan Valley agribusiness sector stakeholders identify the most critical issues facing the regional agribusiness sector, and jointly design and produce realistic and implementable solutions to achieve an effective integrated water resources and agribusiness management system in the Valley. Resulting public, public-private and private actions are expected to bring in new and "sustainable" investments and jobs into the agribusiness sector in the Jordan Valley.

BASIC APPROACH AND RATIONALE

In the face of the acute water insufficiencies in the Jordan Valley, there is a need to coordinate between public and private sector actors to ensure effective water resources management and sustainability, and enable agribusiness enterprises to expand, compete and attract investment. In this pursuit, a number of actors of the water sector in Jordan, including the Ministry of Water and Irrigation, the Ministry of Agriculture, the Jordan Valley Authority, the Agricultural Credit Corporation, Water Usage Associations (WUAs) and individual farmers, are reaching consensus on the value of a multi-stakeholder engagement initiative around water in the Jordan Valley.

DESCRIPTION OF KEY PROJECT COMPONENTS AND PHASES

The financing requested by this proposal is sought to provide technical assistance to support the following process steps/components (also summarized in the chart below):

- Support for the multi-stakeholder process,
- Identification of related priority recommendations,
- Establishment consensual policy reform proposals,
- Support to ongoing implementation,
- Monitoring reform implementation

The most vulnerable communities and groups to benefit from this project are: agribusiness producers such as the Jordan Exporters and Producers Association for Fruit and Vegetables (JEPA), WUAs in the Jordan Valley under the JVWF, farmers, Agricultural Credit Corporation SMEs, farm workers, and indirectly population of the Jordan Valley. This project which has held numerous stakeholder meetings and two JV Water Forums will help sustain this engagement and enable concrete results along the five themes already selected by the stakeholders:

PROJECT THEMES

- Industry-specific regulations.
- Agricultural skills, technology and innovation, cropping patterns.
- Marketing and export, access to markets.
- Access to finance, agriculture credit integrated water operation, crop management (grading, packing and cold storage) and management (O&M) infrastructure.

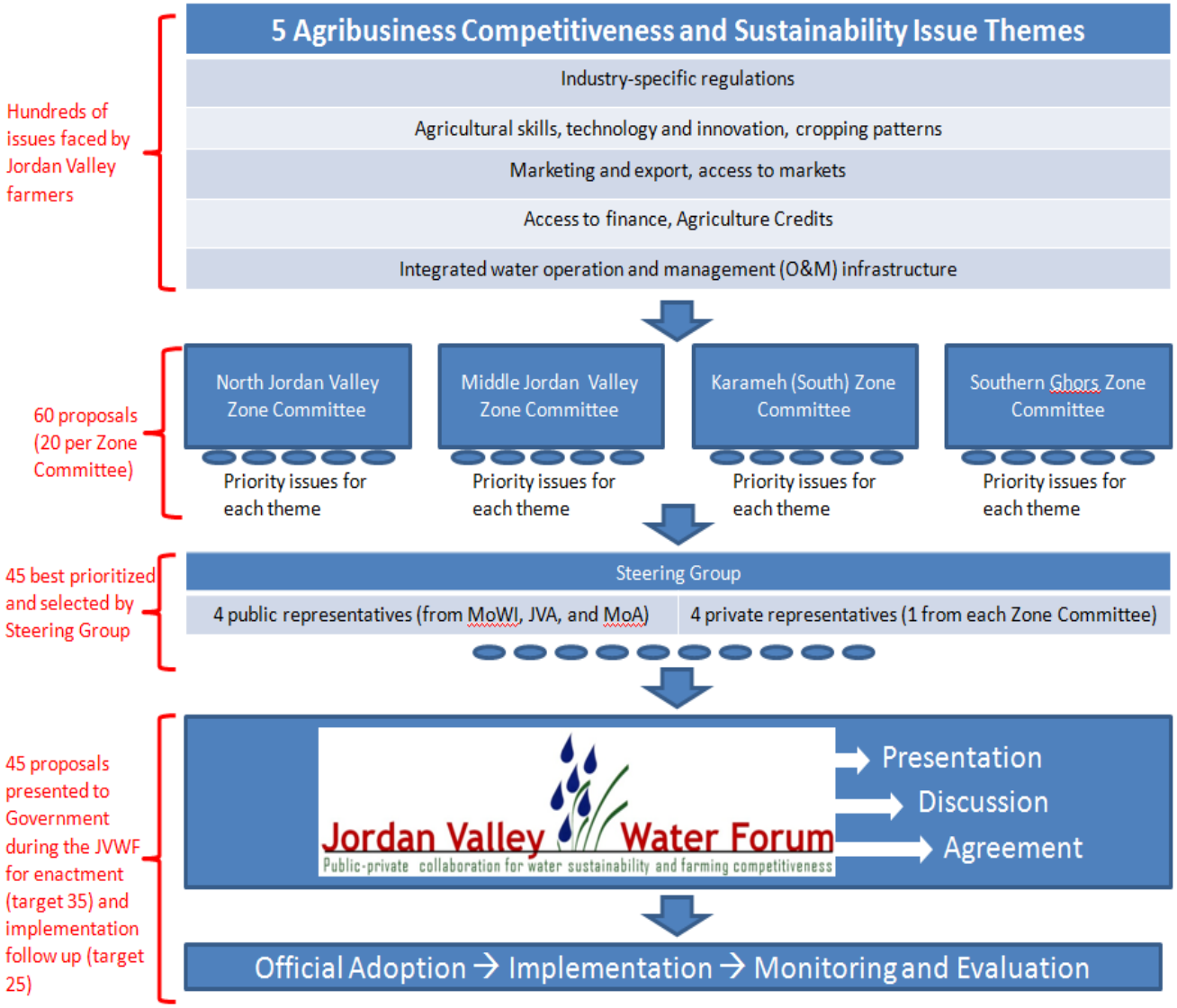


FIGURE 22 : JORDAN VALLEY WATER FORUM STRUCTURE

PHASE I: SECURING BUY-IN, SETTING UP & MAINTAINING A MULTI-STAKEHOLDER ENGAGEMENT PROCESS (Initiated January 2012- Ends March 2015)

Support for the multi-stakeholder process (on- going process):

In a fragile context, with high social and environmental stakes, the government's ideas to impose new crop patterns or top-down solutions that do not fit business needs are likely to clash with the realities and ideas of communities who are suffering from existing weak water governance. In the tense Arab Spring climate, appropriate solutions to water conservation, distribution and even commercialization could only be envisaged without the risk of social flare-up if a multi-stakeholder approach is applied. Such an approach needs to focus on the inclusion of the relevant stakeholders in the policy-making process, in order for those stakeholders to collaborate to enhance the environment for agribusiness competitiveness, fairness in the distribution of water, and accountability through the establishment of clear actions on regulation, skills, financing, innovation, and infrastructure.

The launch of the Jordan Valley Water Forum (JVWF)

The launch of the Jordan Valley Water Forum (JVWF) on June 11, 2012 provided an opportunity to hear from individual farmers, business groups, zone representatives, water experts and public sector leadership from the relevant ministries. The Forum was structured in order to provide significant time for five Thematic Working Groups to compile and prioritize the critical water issues within the theme, and provide realistic recommendations for the public sector to consider.

The Jordan Valley Water Forum was then solidified as a continuous process with a Steering Committee with four public and four private representatives. It is chaired by the Secretary General of the Jordan Valley Authority, and composed of the Minister of Water and Irrigation, the Minister of Agriculture, the Head of the Agriculture Credit Corporation and four elected Jordan Valley regional representatives of the 23 Water Usage Associations (WUAs) that represent farmers, so they can voice concerns in a coordinated manner and discuss specific issues and recommendations.

Identification of priority recommendations: The first set of priority recommendations were selected and prioritized of recommendations based on both selection criteria such as the potential to improve the sector for the most farmers possible and the public sector's ability to realistically implement related activities.

PROPOSED PROJECT ACTIVITIES:

- Creation of an Ad hoc committee to change the mechanism for establishing and utilizing processing facilities and central markets.
- Provide a government guarantee of airfreight space for produce exports on regular flights for a transition period of three years.
- The expansion and support of an "Agricultural Risk Management Fund".(MOA)
- Increased technical assistance through the MoA Extension Services focused on implementing more sustainable and productive crop selections.
- Amending the JVDL through the addition of articles (A and B) in Forum Proceedings.
- Establishment of an independent technical committee to identify opportunities for studying and implementing irrigation network rehabilitation correctly.
- Recruitment of new technically trained staff for O&M in order to provide enhanced water distribution services and increase irrigation network efficiency.

- Installation of innovative filtration systems at the bulk water level to remove impurities present in the local irrigation water.
- Support for farm level water harvesting to improve efficiency and lower demand on bulk water supply: Can be performed through Agriculture Credit Corporation (ACC) or MoA support.
- Implement protection measures along the King Abdullah Canal at JV to prevent pollution from local activities.
- Enact legislation and penalties to control the illegal drilling of wells (already existing at WAJ) as the Ground Water Monitoring by-law
- Deployment of advanced innovative irrigation methods such as drip, spray and micro-sprinkler irrigation.

A 2nd JVWF took place in January 2013 where initial results were announced (the first three points above).

Phase II: Establishment Consensual Policy Reform Proposals (April2016- March 2017)

Sustaining the participatory process

The impact of such proposed measures should not only be considered in economic terms (better yields, better exports, further investment, more jobs) but also in term of inclusive growth and collaborative governance practices. Therefore the established participatory process needs to be maintained, through a coordinated secretariat, with donor input to ensure good practice in the dialogue process.

Establishing consensus around policy reform proposals (selection criteria)

The selection criteria for any given reform proposal submitted to the Jordan Valley Water Forum will be standardized to ensure that issues and recommendations can be compared against each other. The selection criteria for recommendations are:

- Clearly linked to specific outcome targets in terms of improvement of a development indicator;
- Clearly targeted at quantifiable impact results in terms of agricultural productivity / investment generation / infrastructure development / skills development / access to financing / job creation / etc.
- Fully implementable within six months from enactment;
- Projected to have a cost-benefit ratio above 1:4, considering a) private sector cost and benefits and b) public sector cost and benefits;
- Clearly aligned with the Water for Life Strategy 2022 and Jordan's overall development objectives; and informed by international good practice.

The stakeholders will need to agree to detail the recommendations in a series of actionable steps, (they already are requesting support from development partners to do so). The Minister of Water and Irrigation states that "the Forum has been designed to address the next 10 years for the Jordan Valley water users and beyond. He pledges to "take the farmer recommendations collected during the Forum process, and through cooperation, to implement them via a prioritization exercise. This activity all falls within the JVA plans and strategy." The JVA will host the secretariat and coordinate the work with the Ministries and the private sector and define actions according to a sector competitiveness action matrix:

- public-public actions e.g. Industry-specific policy and regulatory reforms, specialized tax regime, incentives regime, industrial land programs, institutional streamlining and coordination, etc.

- public-private actions e.g. PPPs, joint investment, investment promotion, skills partnership between academia and private sector, last mile utility provision, innovation partnerships, etc. and
- private-private actions e.g. joint procurement platforms, joint standard setting, private sector-led certification, joint investment and trade promotion projects, joint training, venture capital, etc.

Phase III: Support to reform implementation and monitoring implementation support (April 2017- Dec 2018)

This phase works with the stakeholders on the implementation of reforms. Specific activities that will be supported in this phase are as follows:

- Support implementation (program management): the project will define roadmaps and program architecture, i.e. instruments, or pilots feeding priority areas and objectives, sources of funding and indicative budget allocations for actions
- Establish monitoring systems and feedback loops (M&E, Impact Evaluation): The project will define measurable objectives / targets, realistic timeframes, results and outcome indicators, etc. These will allow insight into results and impact of suggested policy interventions with the aim to improve instruments, justify budgets spent and promote its success.
- Monitor progress against action plans
- Provide technical inputs across the reform program: Hands-on technical assistance and capacity building to help implement all reform components.
- Maintain reform momentum through continuous PPD throughout implementation. The process will involve workshops to build understanding of the issues and promotion of reforms.

Farmers also need some infrastructure support that would result in enhanced access to markets through the provision of regional cold storage, grading and packaging facilities for vegetables produced in the region:

A cold storage facility per region serving the farmers of the WUAs will be part of the activities: This will ensure that they will have ***food security over climate change impacts and regional fluctuations*** in the marketing system as Jordan is severely impacted by the wars and unrest of the neighboring countries. It consists of ten units, with a concrete base & covered by a Hunger as a roof, the average size of a single cooling unit in the facility is (4*8*3) m, each unit has its own control board, and there will be a central control unit.

TABLE 12: MATRIX ON DIRECT ACTIVITIES TO BE IMPLEMENTED

An overview matrix on direct activities that are to be implemented			
PILOT AREA	**Activity**	**Activity**	**Activity**
TYPE OF CULTIVATION	Citrus	Citrus and Vegetables	Vegetables and Date Palms
WATER RESOURCE	Fresh (Yarmouk River Water)	Mixed (KTR and Yarmouk waters)	KTR and Brackish waters
CURRENT FARMERS CONCERNS	Water Shortage	1-Physical water quality	1- Water shortage
		2- Salinity	2- Physical quality
		3- Water shortage	3- To a lesser extent salinity
FUTURE CONCERNS	Salinity	Same as current problems	Same as current problems

<table>
<tr><td rowspan="2">PROPOSED NEEDS TO BE COVERED BY CIIP ESTABLISHED REVOLVING FUNDS</td><td>Change from surface to efficient drip irrigation system</td><td>On-farm Filtration Systems</td><td></td></tr>
<tr><td>Optimization of drip irrigation system</td><td>Demo sites on the impacts of blending KTR and Fresh Water on yield</td><td></td></tr>
<tr><td>ANTICIPATED RESULTS</td><td>Adapted irrigation systems to anticipated reclaimed water use</td><td>Reduced claims of farmers related to physical problems of water quality</td><td></td></tr>
<tr><td>NEEDS TO BE COVERED BY TECHNICAL SERVICIES</td><td colspan="3">Awareness and training campaign on raising on-farm irrigation and fertilization efficiencies and occupational health problems</td></tr>
<tr><td rowspan="4">ANTICIPATED RESULTS</td><td colspan="3">Raised awareness of farmers on the nutrients available in reclaimed water and its impacts in reducing cost of fertilization</td></tr>
<tr><td colspan="3">Raised on-farm irrigation efficiency and reduce costs of fertilization</td></tr>
<tr><td colspan="3">Reduced risks of microbiological contaminants</td></tr>
<tr><td colspan="3">Raised awareness of farmers on hygiene practices</td></tr>
<tr><td></td><td colspan="3">• Ensuring the sustainability for any intervention by having a proper management and operation arrangements of the pilot. WUA in that area should manage this pilot where capacities for (O&M) of the operators/stakeholders addressed to ensure safe and successful operation of the wastewater treatment system(s).
• Capacity building, TA and training that include also farmers' awareness and training.
• Crop and water quality monitoring, removal of export and acceptance barriers for produce irrigated with reclaimed water should be addressed coupled with enhanced guidelines and famer/consumer understanding that are based on the WHO 2006 guidelines on reuse.
• Piloting Wastewater safety plans and health labeling with linkages to Climate Change adaptation.
• M&E of the wastewater quality should be enforced and institutionalized.
• The provision for JFDA ISO 17025 accreditation should be supported in order to overcome export barriers and ensure proper crop certification programming</td></tr>
</table>

***RESULTS PROJECTION –KNOWLEDGE**

Knowledge base

Consolidated datasets in widespread use among teams and development partners, significantly quickening and raising the quality of project design and impact measurement. (e.g. expansion of enterprise survey database relating to sectoral innovation).

- In-depth case studies actively used by policymakers and development practitioners.

Global platforms for implementers

- Online collaboration platform ("CII Link") in widespread use among practitioners.
- Expert practitioners
- Annual meetings to review progress of initiatives undertaken, challenges faced, learning to date, discussion of ways to incorporate the learning, and identification of priorities.

Field research

- Collect best practices in terms of operations and policies, and analyze successful innovation interventions from different stakeholders for dissemination.
- Flagship research as part of the Knowledge Initiative could include: a toolkit on innovation indicators, development of an integrated innovation web knowledge platform

PROJECT ACTIVITIES TIMELINE

TABLE 13: PROJECT (2.3) TIMELINE OF THE ACTIVITIES

Project (2.3) Activities	2015			2016				2017				2018				2019
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Phase I																
1.Creation of an Ad hoc committee to change the mechanism for establishing and utilizing processing facilities and central markets.																
2. Provide a government guarantee of airfreight space for produce exports on regular flights for a transition period of three years.																
3.The expansion and support of an "Agricultural Risk Management Fund".(MOA)																
4. Increased technical assistance through the MoA Extension Services focused on implementing more sustainable and productive crop selections.																
5.Amending the JVDL through the addition of articles (A and B) in Forum Proceedings.																
6. Establishment of an independent technical committee to identify opportunities for studying and implementing irrigation network rehabilitation correctly.																
7.Recruitment of new technically trained staff for O&M for the JVWF in order to provide enhanced water distribution services and increase irrigation network efficiency.																
8.Installation of innovative filtration systems at the bulk water level to remove impurities present in the local irrigation water.																
9. Support for farm level water harvesting to improve efficiency and lower demand on bulk water supply: Can be performed through ACC or MoA support.																
10. Implement protection measures along the KAC to prevent pollution from local activities.																
11.Enact legislation and penalties to control the illegal drilling of wells (already existing at WAJ) as the Ground Water Monitoring by-law																
12. Deployment of advanced innovative irrigation methods such as drip, spray and micro-sprinkler irrigation.																
Phase 2																
1- Sustaining the participatory process																
2- Feasibility studies for reform proposals resulting from JVWF																
3- Establishing consensus around policy reform proposals (selection criteria)																
Phase 3																
Support to reform implementation and monitoring implementation support																
Support implementation (program management):																
Establish monitoring systems and feedback loops (M&E, Impact Evaluation)																
- Monitor progress against action plans																
Provide technical inputs across the reform program																
Implement workshops to build understanding of the issues and promotion of reforms.																

B. Project/ programme economic, social and environmental benefits

Describe how the project/ programme provide economic, social and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project / programme will avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy of the Adaptation Fund.

locations selection was based on national surveys and assessments of poverty pockets in Jordan as described in the" PROJECT/PROGRAMME BACKGROUND AND CONTEXT" Section and the Programme as a whole is Categorized as B where the risk level of sub-projects activities' with the highest degree of risk ie (treated ww reuse, rainwater harvesting) determined this risk level)l.

Key benefits of the proposed project components and activities

The reuse projects provide a complete win-win situation: farmers making a profit, and the wasting of treated effluent (a resource of value) into the environment is reduced They will provide an excellent example of how to link and integrate wastewater treatment with productive agriculture for the achievement of climate change adaptation in both agriculture and water sectors and demonstrate replication potential in other parts of Jordan and the region. The subprojects are thus expected to enhance community resilience and adaptation to climate change through improved and upgraded household generated of farmers income of poverty pockets in JV and nomadic local Beduin communities in Wadi Mousa by becoming adapted to a new quality of water in irrigated agriculture.

Component (1) subprojects (1.1, 1.2, 1.3, and 1.4): Wastewater Reuse projects have many benefits:

The justification for the added value of implementing another pilot project in Wadi Mousa following the pilot previously funded by USAID, for which lessons have been drawn and for which that pilot was successful, is that the cultivated forage crops in Wadi Mousa which are normally irrigated with both rain and fresh water from wells, however and due to climate change negative impacts there is not enough rainfall thus putting an added stress on the ground water supplies where supplemental irrigation with reclaimed water is becoming more of a necessity and a climate change adaptation method.

There is also a need to exchange the old irrigation system to a conserving irrigation techniques, using wastewater would also release the fresh water supplies for municipal needs. However, since there are an estimated 2,500 dunums irrigated with fresh water in Wadi Mousa, it is possible that at some future date a reclaimed water exchange with these irrigators to meet growing municipal potable water needs could become economically feasible. The pilot will also produce forage for livestock which will aid in solving the shortage in fodder, and contribute in increasing families' income significantly, and no effluent will be discharged to the adjacent valleys (wadis) due to full reuse of the effluent, thus improving the environment and contributing to local labor employment.

Also the beekeeping proposed for Wadi Mousa and training of selected farmer leaders to become experts on beekeeping production and to disseminate their knowledge to the rest of the community will be a community CC adaptation tool; stimulates community spirit and social contact and helps rural people to become self-reliant. It is estimated that each hive can generate about ($150) a year. From an ecological view, beekeeping has a positive effect on the environment; a positive influence on nature specifically on the pollination of cultivated and wild plants and does not occupy land or even require ownership of land.

Aloe Vera cultivation and irrigation with reclaimed water will generate a new cosmetic market niche and boost the socio economic viability of the locals and females in Wadi Mousa as it will create jobs for females and their integration in agriculture and community socioeconomic enhancements.

For the Jordan Valley WW reuse projects :the treated effluent in subprojects (1.2, 1.3and1.4) is used to irrigate & produce several agricultural crops (fruit trees, dates and any other crops allowed by the mixed water quality guidelines developed with support from GIZ), which could be easily sold and utilized by the farmers and thus generate good income for the project. These projects will also strengthen institutional ties among the different stakeholders to ensure the project's sustainability and will mobilize local resources during implementation (e.g., project committees, truck drivers, workers, technicians). The project will also provide an additional and reliable source of water for irrigated agriculture, thereby generating financial benefits to farmers while relieving pressure on fresh surface water resources.

For rainwater harvesting (subproject 1.5) it will not only provide a clean source of water to increase water supplies and supplemental irrigation for fresh fruits and vegetables, but also it involves the public in water management, improves the quality of life and community resilience

specially in arid regions and contribute to climate change adaptation. The technology is low cost, and highly decentralized empowering individuals and communities to manage their water supplies. It improves access to water at the local level. The challenge with rainwater is to keep the collection surfaces and the storage facilities free from contamination and free from mosquito breeding. Remote arid village in the south of JV are in urgent need to get continuous, higher quantity and better quality of water which can be met via rainwater harvesting. In agriculture rainwater harvesting has demonstrated the potential of doubling food production by 100% compared to the 10% increase from irrigation. Currently only 5% of rainwater in Jordan is used as 85% is lost through evapo-transpiration and 10% is lost through runoff.

Economic Implications for participating farmers will be realized as enhanced irrigation systems are introduced and crop production begins. Lease holders will be producing fodder and cereal crops, which will generate income for their households. The income from tree crops will not be realized until the trees mature and begin to produce in a few years. While for the JV farmers enhanced access to irrigation techniques, gradual removal of agricultural export and marketing barriers, coupled with better packing and cold storage facilities, access to climate change early warning system will lead to better resilience and income on the farm level.

Rain water harvesting contributes to reducing flood risks and the load on sewer systems. In addition, rainwater does not require chemical, physical nor biological treatment before use for most non-potable demands. This makes maintenance of rainwater harvesting systems generally easy and cheap. Rainwater harvesting is also used to improve livelihoods by providing water for domestic purposes; for subsistence and income generation activities such as gardening, and livestock rearing; for environmental purposes, through recharging groundwater and establishing woodlots to reduce deforestation. In essence, it can supply water to accelerate social and economic development, to alleviate poverty and generate income for rural farmers by enhancing the crop yield, modifying the method of production, as well as to promoting environmental conservation.

Overall, there are indirect beneficiaries of water reuse for irrigation that are created from the projects' outputs and inputs. In addition to the direct income and jobs created by construction, operation & maintenance, and farming operations, secondary earnings and employment are generated in businesses that use or process the project outputs (e.g., crops) and businesses that supply inputs (e.g. farm supplies). This "multiplier effect" is felt primarily in the local or regional economy, but there are indirect benefits at the national level as well. For example, project outputs can result in an increase in exports or offset imports, thus improving the balance of payments.

Potential positive impacts for the **Permaculture subproject** (1.6): Economically, farmers realize decreased food purchasing costs, since they are growing a variety of their food; decreased agricultural input costs (i.e. fertilizer and seeds), as they depend more on manure; decreased labour input, as the systems put in place are self-sustaining and require little maintenance; income diversification; and income generation, as in supplementing their food sources they can sell the surplus. Therefore, permaculture plays a vital role in building economic resilience for households by diversifying their livelihood strategies and ability to withstand crises. Environmentally, permaculture brings about soil conservation, as systems are designed to build organic matter and return nutrients to the soil.

The normal practice in the project area is monoculture, where farmers use extensive amounts of fertilizers and pesticides which result in negative impacts on human and environmental health. Permaculture is a design system for sustainable living. Adopting permaculture and agro-ecological techniques for land use, and extending the appropriate technologies, e.g: broad acre and small scale water harvesting techniques, recycling of biomass, dry lands farming strategies, and small scale urban farming and food forestry projects have multiple benefits: Since it uses a whole system approach, it generates a stable future adapted and profitable investment. It uses biologically fixed nitrogen, i.e avoids the multiple ill effects of synthetic nitrogen application such as: destruction of soil organic matter, high energy use, environmental pollution etc. It also help maximize soil health in particular the organic matter levels; minimize

the use of external inputs such as fertilizers, fossil fuels, and biocides, also it reduces the exposure to cost increase (of previous inputs) and their negative impact on farm profitability.

Key benefits of component 2 (subprojects 2.1 and 2.2):will be **enhanced access to information, education and communication** plays a critical role in determining the effectiveness of early warning systems which are critical in reducing the impact of floods, droughts, hurricanes, tsunamis and other disasters. Women have lower literacy levels, and therefore are less likely to respond to written early warning announcements and instructions; poor education leads to less involvement in decision making and less representation in disaster response organizations and training, hence lowering their capacity to respond to disasters.

Focus will be placed on the building capacity in participatory and gender-sensitive approaches. As the knowledge of poor people to manage climate change risks affecting their livelihoods, and their food security enhanced, water use efficiency improved, the program will benefit the target population.

Key benefits of component 2 (subprojects 2.3) -**Jordan Valley Water Sustainability and Agribusiness Competitiveness** will be reflected in the increased value of investments, sector revenues(including exports) and jobs generated. In the short to medium term, the activity would support implementation driven public-private dialogue establishment, action plan preparation, including a monitoring and evaluation framework and strengthening of the policy reform agenda. Additionally there will be increased revenues for participating farmers thanks to new crops and better managed resources and number of water association groups that become commercial water utilities will increase, also there will be number of new micro-enterprises created linked to the agribusiness industries.

How to Avoid/ Apply Mitigation Measures to Avoid Potential Negative Environmental and Social Impacts

One of the main results of the climate change in Jordan, is the loss of native plant species and trees such as Phoenician Juniper, Karop, Dufla, and Ratum in Wadi Mousa. An intervention is thus needed to protect the organic origin of these native species as a minimum, and irrigating them with reclaimed water can re-spread their presence.

Unsustainable agriculture, degradation of natural resources and increased migration with replacement of local labor with cheaper foreign labor are leading to poverty and other social problems which are common in locations where irrigated agriculture has been hit by droughts. Another major challenge is the impact of globalization, due to the changes in the world trade system and potential for small scale farming.

The number of farmers making use of treated effluent (and reducing direct disposal into the environment) is on the increase, however field evaluations reveal several problems affecting cropping patterns if not properly controlled. The use of treated wastewater can be improved through adherence to JS/893 2006 for proper cropping patterns and compliance with the risk assessment and guidelines developed by the National Plan for Risk Monitoring and Management System for the Use of Treated Waste Water in Irrigation supervised by GIZ and based on WHO guidelines of irrigation with treated wastewater FY 2006 and ultimately compliance of the ESMP developed for this project to identify risks and implement mitigation measures recommended. Training will be provided for farmers and field workers who will be employed on the farms that will be irrigated with reclaimed water or mixed water quality on the safety and hygiene issues, health risks, gender integration and welfare issues.

Improved farming plans will be developed in cooperation between the community farmers and the project team, and in consultation with NCARE, MoA, to maximize the resources available at the site and optimize the use of reclaimed water. The project team will seek the advice and recommendation of local experts working in similar institutions. The recommendations will include alternative cropping patterns, most proper and efficient irrigation techniques and schedules, increased use of native plants and trees suitable for grazing animals, proper

pruning, fertilizing, and harvesting practices for fruit trees, and adaptation of crop rotation especially when direct grazing is practiced on the irrigated fields.

At the Wadi Mousa pilot project, farmers are generating income from olives, barley, and alfalfa. Alfalfa is the most profitable crop in Wadi Mousa, while olive production covers farmers' household uses. Farmers occasionally encounter difficulties selling their products because of poor handling and lack of experience. Improved harvesting and storage strategies can raise product quality and improve marketability.

Social and Gender Risks, Integration and Impacts

The term "gender" is used to emphasize that "sex inequality is not caused by the anatomic and physiological differences that characterize men and women, but rather by the unequal and inequitable treatment socially accorded to them". In this sense, gender alludes to the cultural, social, economic and political conditions that are the basis of certain standards, values and behavioral patterns related to genders and their relationship"

Gender inequalities cross with climate risks and vulnerabilities: Women's historic dis-advantages –their limited access to resources, restricted rights, and a having a muted voice in shaping decisions – make them highly vulnerable to climate change. The nature of that vulnerability varies widely, cautioning against generalization. But climate change is likely to magnify existing patterns of gender disadvantage

Climate change affects women and men differently; understanding the risks and different impacts of climate change on men and women is a key in achieving sustainable development. Women are not just victims – they can help in implementing mitigation and adaptation of climate change strategies related to energy and resources use, economic and socio-economic perspectives and policy making. Gender-based violence is also a socio-cultural construct that can create specific risks for women and girls in disaster-related situations.

Health Situation: Women have less access to medical services than men, and their workloads increase when they have to spend more time caring for the sick. Women often rely on crop diversity to accommodate climatic variability, but permanent temperature change will reduce agro-biodiversity and traditional medicine options, creating potential impacts on food security and health. An increase in climate-related disease outbreaks will have very different impacts on women than on men.

The poor (the majority of whom are women) are likely to be physically located in places vulnerable to disaster risks and in poorly built environments. In rural areas, they may be small agricultural farmers living on hillsides and desert locations prone to soil erosion, and therefore are at risk of losing their source of livelihood. In urban locations, poor women living and working in marginal areas can also be exposed to technological or human-made risks.

Women in developing countries are the principal producers of basic foods and the agricultural sector is very exposed to risks of drought and reduced precipitation; this means that climate change endangers food security as well as the wellbeing of families and their capacity to survive.

The water reuse associated activities such as crop packaging and grading will be implemented through local women and NGOs and the rainwater harvesting implementation activities will have an impact on the employment and improve environment for women who reside and work in the vicinity of the project sites. Since the farm areas will either be newly planted in an area where no farms previously existed, or on existing farming plots, there will be additional employment opportunities generated for both men and women.

As Gender is a crosscutting issue, and among the stakeholders in the projects, the Wadi Musa currently has a discreet community participation component while In Jordan Valley around 350,000 people who are the main beneficiaries of irrigated agriculture and women form an important component of the labor force and the Jordan Valley Water User Associations have amongst their members some women farmers and a lot of female based NGOs.

Amongst major gender-integration and impact issues, the Project is addressing in the context of national capacity building and development of the female gender at the farming site as follows: Women will be affected by the increased demand for on-farm labor and subsidiary services created as a result of farming sites work demands.

- The women will be affected positively by intensified production, considering changes in labor requirements, in household cash requirements for agricultural investments, and concomitant changes in women's labor allocation.
- Encouraging women householders (particularly widows and divorced women supporting families) to participate in the work of the local registered NGO managing the farming & irrigation activities at the project site.
- Exploring most effective means to use treated wastewater to cultivate crops that can have commercial value added through processing of products or by-products, thus creating employment/income-generating opportunities for women.
- Provide extensive on-site training to both men and women in the safe handling and use of treated wastewater.
- Develop public awareness and social marketing tools directed to both men and women related to safety in handling and exposure and utility of wastewater reuse, recognizing that some of the tools may need to be tailored to the specific sub-audience groups.
- Promote the engagement of female extension agents, and include in their TORs, responsibility for technical issues related to effective and appropriate handling of treated wastewater.
- The project will actively recruit women professional staff in technical and administrative roles.

Criteria to be applied to determine the vulnerability of the Targeted Communities (Poverty Pockets):

For each project component the criteria to be applied to determine the vulnerability of the target communities will be governed by the following**:**

- Climate change vulnerability mapping generated via research institutions and the **National Communications on Climate Change** as well as the result of studies and reports currently being generated for the third national communication all of which will be used to primarily determine the extent of the vulnerability of the target communities to climate change
- **Department of Statistics "State of Poverty In Jordan Report-2012**" this report is based on the updates to the 2010 surveys
- How willing is a community to get organized through local NGO(s)
- Engagement of women and youth in pilot activities
- ***Linkage between climate change adaptation proposed activities to the National CC Adaptation Policy for 2012-2020 and the National Water and Agriculture Strategies***
- How closely linked are the proposed activities to the **National Governorates Development Plan and Poverty Irradiation Measures (poverty pockets) supported by MOPIC**

Elements taken into consideration with regards to public outreach on CC Adaptation and the inter-relationship between national efforts and level of grass root awareness initiatives:

- Sustainability planning and how does the community plan to maintain the project under consideration once CC Adaptation project funding is completed.

- Willingness of the community to engage in public awareness/education on adaptation to climate change, behavior change and to set aside funds for Operation and Maintenance (O&M)

Poverty is defined as the inability of a person to satisfy the basic needs which will secure a descent life. Basic needs include: food, cloths, shelter, healthcare, education & transportation. And these are the necessities to keep a person alive and preserve his dignity and enable him to perform the daily activities which go along with the norms and culture in that specific society. The methodology of measuring poverty line which as certified in Jordan is the measurement of calories needed for a person, moreover surveying the expenditures & families Income is the optimum methodology to measure poverty indicators. Refer to Table (14 below).

In line with the share in total population, Amman governorate (39.5%) is home to 24.6% of the total poor population, though only 8.3% of its population is below the poverty line. Together Amman, Irbid and Zarqa, the three most densely populated governorates in Jordan have around 57% of persons living under the poverty line.

TABLE 14: SUMMARY OF SOME POVERTY INDICATORS BASED ON (DOS) REPORT

Indicator	2008	2010
The food poverty line in JDs per person per year	292	336
General Poverty line in JDs per person per year	680	814
The proportion of the poor population to the population of the Kingdom	13.3	14.4
Average family size	5.7	5.4
Average Annual Family expenditure	8617	9240
The average annual household income	7911	8842
Average annual income per capita	1350.5	1647
Gini Coefficient	0.393	0.376

N.B: Number of poverty pockets (defined as districts/sub-districts with 25% population or more below the national poverty line) increased from 22 poverty pockets in 2006 to 32 poverty pockets in 2008.Non-monetary poverty indicators, i.e. social aspects of poverty that include attitudes, perceptions, concern about living conditions and quality of life, social interaction, access to quality health and education and efficient and equitable social safety nets are also taken in to consideration during the selection process of the targeted communities.

Treated Wastewater Reuse projects (Selection of Targeted Communities 1.1, 1.2, 1.3, and 1.4)

TABLE 15: NUMBER OF POOR PEOPLE DISTRIBUTION ACCORDING TO GOVERNORATES / THE PROPOSED PROJECTS WILL TAKE PLACE IN THE GOVERNORATES HIGHLIGHTED IN YELLOW

Governorate	% of extreme poverty	# of poor people	% of Poverty
Capital	0.25	268545	11.4
Balqa (Central Governorate-Middle JV))	0.00	85494	20.9
Irbid (Northern governorate-Northern JV)	0.10	163933	15.0
Al Karak (Southern governorate-Southern JV and Fifa/Mazzraa and Haditha)	0.59	31581	13.4
Maan (Southern governorate- Wadi Mousa)	2.68	30966	26.6
Kingdom	0.32	876590	14.4

Source: Department of Statistics/ poverty statistics division FY 2012

Referring to Table (15) above, it can be seen that the poverty rates in Maan (where Wadi Mousa is located) is one of the highest rates where it reached 26.6%. This AF funded project will provide treated wastewater which will aid in solving the water problem, produce forages for livestock which aid in the solving the shortage in feedstuff, and contribute in increasing families' income significantly by more than four times, also no effluent will be discharged to the adjacent valley (wadi) due to full reuse of the effluent, thus improving the environment and contributing to local labor employment. 40 low-income families who have had historically the right to rain fed cultivation of the land were consulted in Wadi Musa, especially the ones who will directly benefit from the implementation of this project, among the 40 farmers, 6 women farmers were chosen, Training for the farmers on good agricultural practices, irrigation management and proper handling of reclaimed water used in irrigation will be initiated.

The poverty rate in the Northern Jordan Valley where the North Shouneh Project (1.2) is located is around (36%) compared with the rate of poverty in the governorate of Irbid (15 %).

Project (1.5) Rainwater Harvesting Technologies in Poverty Pockets at Ghour Al Mazraha/Ghore Hadeetha(Khanzeerah) which were classified as one of the poverty pockets areas in the kingdom where the poverty rate reaches (21.4%) compared to poverty rate in Karak which amounts to (13.4% as compared to the poverty rate in the kingdom which is (14.4%) (Table 15), noting that Ghore Al Mazraha/Ghore Hadeetha is part of southern Jordan Valley which is one of Al Karak districts.

Several Consultations were undertaken in the Poverty Pockets areas among these were representatives from communities in Ghore Al Mazraha/GhoreHadeetha, and Khnaizerah the latest was on December 4, 2014. Outcomes of several meetings with the concerned parties there showed that the community requested to be provided with permanent water collection infrastrucuture systems (earthen collection dams)for agriculture and livestock.

(2.3) Jordan Valley Water Sustainability and Agribusiness Competitiveness

Several directly related stakeholders were consulted for this project among these were the Ministry of Water and Irrigation, the Ministry of Agriculture, the Jordan Valley Authority, the Agricultural Credit Corporation, Water User Associations and individual farmers, all agreed that there is a great value of the multi-stakeholder engagement initiative namely the (JVWF) around water in the Jordan Valley.

The results indicate a disparity in poverty rates among the 89 districts of the kingdom which are spread over 12 governorates, where it reached the maximum in both the south of Jordan at Araba Valley in Aqaba Governorate (71.5%). An analysis of the poorest districts in 2010, noted that 22 districts out of 27 exceeded the proportion of 25% in poor population, and the highest rate of poverty reached 71.5% in Araba Valley in the southern most part of JV.

TABLE 16: THE POVERTY RATE IN THE POOREST DISTRICTS IN 2010 (LATEST STATISTICS) BY ADMINISTRATIVE DIVISIONS (WITH PROJECTS LOCATIONS HIGHLIGHTED)

% poverty Rate	District	Poverty Rating in the Kingdom
61.9	Al Safi Valley (Southern JV)	3
52.5	Al Husaineyah (Maan governorate –Wadi Mousa village)	4
50.5	Al Marega (Maan governorate- Wadi Mousa village))	5
36.0	North Shouneh (Northern JV)	10
29.9	Dair Alla (Tal Mantah Middle JV))	16
26.5	Athrah (Maan Governorate Wadi Mousa village)	20
21.4	Al Mazraa Valley (southern JV)	25

Source: Department of Statistics/ poverty statistics division 2012

C. Cost-effectiveness of the proposed project /programme

Describe or provide an analysis of the cost-effectiveness of the proposed project/ programme.

Project Budget Allocation: Almost half of the budget is dedicated to field implementation of needed infrastructure, enhanced irrigation systems and materials, and services that will directly benefit the targeted farmers and local communities. Around one third of the budget is allocated to enhancing the technical capacities and know how on adaptation, and providing soft infrastructure and tools to relevant national and local institutions through use of ICT, investment in a climate change early warning system, support for a CC adaptation Fund, and agro systems support (cold storage, grading and packaging regional centers) all of which will ultimately help in community resilience to climate change. The remaining funds are allocated to policy advocacy, governance through support to WUAs of the JVWF and Wadi Mousa WUA and knowledge management to ensure proper dissemination and potential replication of the project results and experiences gained.

To estimate the cost effectiveness, the budget for each project is discussed below.

As the project activities are a mix of technical support, and investments that are oriented to maximize the adaptation impacts through innovative techniques and pilot activities in a cost-effective manner. The involvement of local community organizations women/youth and stakeholder engagement, in the nontechnical (soft) aspects of the activities, would lead to higher return on investment. Cost-effectiveness will be further analyzed during project implementation and updated based on real cost figures which will be collected in the detailed work plan ahead of implementation. Cost per m3 of treated wastewater in the JV ranges between Piasters 15-23/ m3 equivalent to (21.1 -32.4 US cents/m3) while for Wadi Mousa it is 14.12 US cents/m^3 .

TABLE 17: WATER PRICES ACCORDING TO THE VOLUME ABSTRACTED IN PRIVATE AGRICULTURAL WELLS

Water prices according to the volume abstracted in private agricultural wells.

Quantity of water pumped	Water prices in wells with former abstraction license —2002 bylaw	Water prices in wells with former abstraction license —2004 amendment	Water prices in wells without former abstraction license
0–100,000 m^3	Free	Free	$0.035/m^3$ (JD 0.025)
101,000 –150,000 m^3			$0.042/m^3$ (JD 0.03)
151,000–200,000 m^3	$0.035 m^3 (JD 0.025)	$0.007/m^3$ (JD 0.005)	$0.05/m^3$ (JD 0.035)
More than 200,000 m^3	$0.085/m^3$ (JD 0.06)	$0.085/m^3$ (JD 0.06)	$0.098/m^3$ (JD 0.07)

Source: THKJ and MWI 2002b, 2004a: as mentioned in bylaw No.85 of 2002

TABLE 18: CROP-WISE WATER PRICES AND WATER COSTS IN THE JORDAN VALLEY (NORTHERN AND MIDDLE DIRECTORATES)

Crop-wise Water Prices and Water Costs in the Jordan Valley (Northern and Middle Directorates)

	Vegetable farms	Citrus farms	Banana farms	Weighed average*
Average water price per cubic meter	$0.013 (JD 0.009)	$0.014 (JD 0.010)	($0.023) JD 0.016	$0.018 (JD 0.013)
Total water costs per hectare and per year	$67 (JD 47)	$138 (JD 97)	$350 (JD 245)	$303 (JD 212)

Note: * Evaluation based on irrigated areas in the northern and middle directorates as given in appendix 3

The Budget for each component is: for component (1) Total $ 5,900,000 and for component (2) it is $1,900,000.

The socio-economic results extrapolation of the Wadi Mousa expansion subproject (1.1) coupled with the capacity building and information developed in the marketing, economic, financial, and socioeconomic analyses provide a basis for the following cost effectiveness analysis are listed below:

- The effluent produced by the Wadi Mousa WWTP is a valuable resource,
- The benefit/cost ratio of 2.0 from the staged development of facilities to irrigate with available reclaimed water, using a 50-year period of analysis and a discount rate of 3 percent. The internal rate of return, which is useful in comparing economic performance with other opportunities for investment capital, was estimated as 30 percent; Thus if it is assumed that the direct irrigation benefits per cubic meter per day, as measured in the Wadi Mousa Case Study, are representative of the potential benefits for the other WWTPs in Jordan, the value to the national economy in terms of increased net farm income is approximately JD 9.0 million per year at the current level of effluent production;
- The financial analysis indicates farming operations using reclaimed water for irrigation will be financially viable, if the farmers receive appropriate extension services and farm credit during the development period. It is recommended that the initial water charges during a 5-year development period, be limited to JD 0.01 per cubic meter, which is the rate established by current national pricing policies. Full cost-of-service rates have been estimated as JD 0.05 per cubic meter, if the current water tariff for reclaimed water, incremental construction costs for the drip irrigation system, annual O&M costs, and replacement costs are included in project costs and associated revenue requirements and water rates. This charge would be less than the tariff for fresh water pumped from groundwater, and is less than the returns to reclaimed water estimated by crop enterprise budgets. Noting that the cost per m3 of treated wastewater in the JV ranges between (15-23 Piasters) ie $ 21.1-32.4 while for Wadi Mousa it is US 14.12 cents/m3.
- There is an enormous market for green fodder as an animal feed in Jordan. For example, the present fodder requirements amount to about 830,000 tons annually. The gap must be filled by importing dry hay or substitution with other kinds of feed, such as barley. Pistachio nuts are another market opportunity identified for Wadi Mousa. Jordan presently imports large volumes of pistachios from Syria and Turkey;
- The development of a much needed regional market for fodder crops is another important benefit. For example, stemming from the Wadi Mousa Project, the green fodder production from the farms being developed at the site is estimated to amount to about 6,500 tons per year, with a value of JD 115,600.~ $163,276/yr.

- Economic benefits for participating farmers will be realized as enhanced irrigation systems are introduced and crop production begins. Lease holders will be producing fodder and cereal crops, which will generate income for their households. The income from tree crops will not be realized until the trees mature and begin to produce in a few years. Also enhanced access to irrigation techniques, gradual removal of agricultural export and marketing barriers, coupled with better packing and cold storage facilities, access to climate change early warning system will lead to better resilience and income on the farm level.
- Development of regional market for fodder crops: Further development of reclaimed water at the Wadi Mousa WWTP will result in a large increase in green fodder production. The annual fodder production from the farms being developed is estimated to amount to about 4,300 tons. Since grazing animals consume fodder crops amounting to about 9 percent of their weight, this production would be enough to feed a minimum of 1,800 heads of sheep and goats all year round. The value of the green fodder produced would be about JD 80,500 annually, even without considering the value of the indirect income and employment generated by feeding it to animals grown in the area, or processing animal products.
- Potential Employment Effects: The Wadi Mousa Demonstration Project has already created many jobs. At the demonstration site, two agricultural engineers and many temporary laborers are needed for employment. In addition, many on farm jobs are created to perform irrigation, harvesting, baling, harrowing, and digging activities.
- Many temporary jobs for seasonal activities such as land preparation, planting and harvesting. Milk production is expected to increase significantly from the 1,800 head of sheep and goats fed from fodder production, creating new opportunities in dairy products processing, such as ghee and dry yoghurt production. Since the average flock size is about 20 head per household, for example in Wadi Mousa, a minimum of 90 households in the region will benefit from these opportunities.

Implementing this project in a community-driven and participatory manner as demonstrated in the Jordan Valley Water Forum, the impact of the project will contribute to greater abilities of local communities to “be resilient” to climatic extremes

The community groups that would be positively affected by the project activities include:

- Rain fed farmers in Wadi Mousa with small holdings; and WUAs/Farmers in JV with small land holdings
- Women widows or divorced and supporting families who may become engaged with farming or in small-scale dairy or on farm products processing;
- Sheep and goat raisers and herders and local NGOs including female NGOs;
- Agri-businesses involved in the production process in the region;
- Camel and horse owners; and
- Retired public officials.

For Projects 1.2, 1.3, 1.4, 1.5 and 1.6 (WW Reuse, rainwater harvesting and permaculture projects in the Jordan Valley).

These projects will utilize an integrated approach directed at utilizing local knowledge embedded in communities and institutions; it will deliver cost-effective benefits to vulnerable and marginalized farming communities. Utilizing sustainability and cost effectiveness principles namely: integral approaches, community participation and gender mainstreaming, local know how and knowledge, local participation and approaches that can be replicated and up scaled.

Building on local knowledge and experience is essential for avoidance of mistakes and sustainability of CC adaptation measures. Incorporating local knowledge ensures sustainability and fosters continuity and buy-in to achieve the desired outcomes and impacts, and is more

sustainable. Benefits that are sustained increase the cost-effectiveness of the investments. Building on the community consultations held during the project design period, the project inception phase will host meetings with beneficiaries and stakeholders to ensure that local and scientific knowledge and capacity building are integrated at all levels. Building on existing systems and initiatives: where it will provide guidance on integrating risk reduction and climate change responses into national planning and development processes. Rather than develop new initiatives from scratch, the project will build on, strengthen and scale up relevant existing initiatives to facilitate adaptation.

The cost of adding climate change adaptation interventions using treated wastewater reuse is relatively low when compared to the costs of developing new water and agricultural infrastructure and resources. Similarly, the project will augment water supplies through rainwater harvesting under subproject (1.5) costing $ 627,118 using small check dams, and building on agricultural knowledge through permaculture (subproject 1.6) at $1,000,000. Investment in Early Warning System (EWS) will facilitate a shift towards a proactive approach rather than a reactive one using technology and ICT that links local farming communities to the early warning system.

The project will build on an ongoing donor/lender and government-funded programmes to upscale and pilot process of mainstreaming climate change adaptation measures into these programmes. In addition, the project will mainstream climate change adaptation into existing national and building standards.

Replication and scale up:

The project will be providing an important opportunity to demonstrate the efficacy of replicable adaptation measures and to promote scaling up and replication. Supporting climate-resilient small scale farming agriculture, the design of sustainable grading, processing/packaging centers at regional level, the identification of climate-resilient cropping patterns, and agricultural practices and appropriate physical infrastructure for rainwater harvesting and to mitigate the impacts of climate variability and change for small scale farmers. Development of CC policy recommendations that drive resilient standards and best management practices through inclusion of climate proofing and adaptation interventions into building regulations, infrastructure standards and planning applicable to all municipalities in the country.

Increasing cost effectiveness through community engagement and capacity building:

Cost-effectiveness of the proposed adaptive investments are enhanced even further through community contributions (which also have a positive side effect of stronger ownership and sustainability). In line with experiences from the WBI-supported JVWF, the project preparation team and GOJ (JVA, MOA, MWI, and Agriculture Credit Corporation, Fruits and Vegetables Exporters Association) undertook community consultations and verified commitment from target communities. Cost shares will be encouraged by communities in terms of voluntary labor and in kind contributions in site selection, manual work, planting, patching and, mulching.

Cost-effectiveness in day-to-day project operations:

Operational cost effectiveness under the proposed AF project is further enhanced through the following characteristics:

1. Resources will be aligned with the financing and delivery of project outputs through competitive procurements to ensure best value
2. Involve local communities and connect them directly to local opportunities for the purchase of goods and services.
3. It is also important to note that significant co-benefits across project components are expected. Apart from the direct linkages between enhanced wastewater reuse and rainwater harvesting for enhanced resource utilization and increased retention capacity, planting of drought-resilient food, livestock production systems, climate information services are expected to contribute to the cost effectiveness of adaptive capacities and behavioral changes promoted under the practical applications of the programme.

4. Local community participation through engagement of farmers and members of WUAs at JVWF, CBOs and NGOs will support hands-on awareness raising opportunities as opposed to theoretical tools.

5. Improved climate risk information, such as seasonal forecasts, will amplify the impacts of improved access to drought-resilient crops and result in further cost effectiveness.

Off-farm migration from JV to city centers

Local exodus to city centers in search for jobs has become a traditional coping mechanism for JV farmers in times of difficulty. However, in line with the increasing incidents of urban poverty, forced (refugee) labor influx, and increasing migration trends have a potential for social unrest. Thus, this option is expected to have a larger potential need for state (or donor) intervention for relief operations. The socio economic benefit of intensifying agricultural production in the JV will be achieved through increased inputs, access to markets, contractual farming, and increasing values of agricultural produce.

Other benefits cited from community consultations on the ww reuse projects

- Reduce expenses borne by households for emptying their cesspits
- End the problem of septage flowing in the streets and help the municipalities l maintain a clean environment
- Confine septage to one location thereby protect agricultural lands from pollution
- Provide a new source of irrigation water for agriculture
- Contribute to improving environmental conditions in residential communities
- Organize/streamline the work of tanker trucks
- Provide new jobs for local residents
- Increase the price of land surrounding the WWTP
- Generate revenues to support the municipality
- Protect local communities by averting an environmental disaster in the future
- Provide fertilizers and fertilization at a low cost through the nutrients in treated ww effluent.
- Attract birds around the WWTP
- Protect ground and surface water from pollution
- Limit pollution and contamination of agricultural crops
- Reduce the incidence of disease outbreaks
- Facilitate/encourage the construction of a sewage system in the future
- Encourage replication in other areas of the Kingdom (based on project success)
- Handle/treat all waste products either biologically or physically
- Invigorate the community (based on project success), open communication channels within the community, encourage voluntarism and mo
- Plant forest trees for shade and cooling effects

Component 1- subproject (1.6) Permaculture and Component 2 -subproject (2.3) Agribusiness Development:

- The requested Programme cost for funding from AF for sub Permaculture sub project component (1.6) = $1,000,000 and
- Jordan Valley Water Sustainability and Agribusiness Competitiveness (2.3) = $1,150,000 Climate Resilient food and livestock production systems.

Mono culture is practiced in Jordan including JV have contributed to GDP by 2.9% in FY 2011 and 3.3% in FY 2012 (Central Bank of Jordan report FY2012) at a total value in FY 2012 of 347 million JDs.

Permaculture and enhanced agro-systems are effective alternative to monoculture as is to transform the current agricultural production system in the JV into a less vulnerable system to climate change, requires less intensive investments in the agriculture and water sectors and increase the unit value of revenue from the production. This will reduce the current hindered and stressed development status in Jordan due to political regional turmoil and influx of Syrian refugees which resulted in a shift of the national investment plans towards emergency needs of the refugees and the Jordanian host communities

These subprojects will ensure the capacity building and CC resilience of farming communities through the delivery of:

- Drought-resilient farming methods
- Resilient post-harvest systems
- Diversified livestock production systems

The cost benefit is not available at the time of project development in Dinars or Dollars but rather can be calculated in it being felt in the transformational process impacting positively the socioeconomic livelihood of the farmers, (change in their way of doing farming practices, their way of looking at the cost benefit because of the diverse options they will be empowered with and the long term benefit to the land in terms of rebuilding the fertility in the soil. Instead of depending on the inputs (most of the work in the first 4 years will be in rebuilding the soil livelihood, .When the farmers observe the success of the permaculture that has been achieved on the Greening the Desert Site in the south of Jordan they will understand the importance and effects of permaculture. An example is Jabak Farm in Jordan which produces Organic Vegetables were people can buy in scheme of 100m2 for 120JD/month and they receive the vegetables that their 100 m2 rented plot produces.

The demonstration of the total adaptation benefits accrued to 48 farms around the JV and extrapolated when scaled up to the whole of Jordan under project (1.6) will be estimated fully as project activities commence since it has not been practiced yet it can be extrapolated from international experience as follows:

- Adopting permaculture and agro-ecological techniques for Land use, and extending the appropriate technologies, E.g. : broad acre and small scale water harvesting techniques, recycling of biomass, dry lands farming strategies, and small scale urban farming and food forestry projects have multiple benefits summarized in the following :
- Since it uses a whole system approach, it generates a stable future adapted and profitable investment. It uses biologically fixed nitrogen, i.e avoids the multiple ills of synthetic nitrogen as: destruction of soil organic matter, high energy use, environmental pollution etc. It also help maximize soil Health in particularly organic matter levels;. minimizing the use of external inputs such as fertilizers, fossil fuels, and biocides, also it reducing the exposure to cost increase (of previous inputs) and their negative impact on farm profitability
- Food production improvements will start occurring through one or more of four different mechanisms:
    - Intensification of a single component of farm system, with little change to the rest of the farm, such as home garden intensification with vegetables and/or tree crops, vegetables on rice field embankments, and introduction of fish ponds or a dairy cow.
    - Addition of a new productive element to a farm system, such as fish or shrimp aquaculture farming

In agro forestry, which provide a boost to total farm food production and/or income, but which does not necessarily affect cereal productivity.

- Better use of nature to increase total farm production, especially water (by water harvesting and irrigation scheduling) and land (by reclamation of degraded land), leading to additional new dryland crops and/or increased supply of water for irrigated crops, and thus increasing cropping intensity.
- Improvement in per hectare yields of staples through the introduction of new regenerative elements into farm systems, such as legumes and integrated pest management, and new and locally--appropriate crop varieties and animal breeds.

TABLE 19: BENEFITS OF PERMACULTURE/ POLYCULTURE PRODUCTIVE LANDSCAPES

Site Wide Landscape System Benefits from Productive Landscapes	
Measureable / Direct	**Non measureable / Direct**
Produce at a minimum 2 to 6 times more food than commercial agriculture, with no transport costs.	A productive ecosystem with natural habitat.
67% to 88% less water use required and if rainwater storage is design into the city design the vast majority of this can be capture on site annually from hardware runoff	A natural cooling system for the city.
Build the soil up to 60 times faster than in nature especially when all the organic waste streams of the city are connected to the process	A landscape that is beautiful and engaging.
99% less energy than commercial agriculture, while using a fraction of the resources especially when grown on the site of the city	An absorber of all surplus runoff water from storm events.
Reduce by half or more the amount of land required over modern agricultural monoculture systems.	A place of education and extension of Masdar systems.
50% to 100% less fertilizer required	

- Improved dissemination of climate risk information

Component 2- subprojects 2.1 and 2.2:

- Capacity Building & Awareness subproject (2.1) = $ 200,000
- ICT for Climate Change subproject (2.2) = $ 550,000

Total Programme Costs requested from AF: $750,000 and adaptation benefits accrued to: households (5179 Males, 1061 females)

The potential for investments to achieve CC resilience through such options under the National Investment Plan (which is financially stressed with meeting the emerging due to other emerging needs) is weak as compared to other higher national priorities. As no viable alternatives exist and given the urgent need and nature of the institutional and regulatory infrastructure upgrade with regards to climate risk information dissemination, it can be concluded that the value for money would be high as the activities focus on data, and network strengthened resilience approaches for equipping the community and institutions with hardware. Direct benefits include:

- Climate hazard maps and risk scenario developed.
- Local dissemination and awareness program among the farming communities and nationally.

- Current national experience with ICT use through IFC support to three other sectors related to inspection and enforcement reinforces positive economic returns on investments

Socio-economic impacts of climate change is receiving increasing special attention from relevant research and policy related activities performed in Jordan, in the Third National Communication to UNFCC .The following principles are applied:

- Adaptation efforts need to rest on a sound economic basis. From an economic perspective, adaptation could be evaluated in terms of whether, and by how much, the benefits of such actions exceed the costs incurred; Some adaptations can be implemented at low cost but others, such as infrastructure measures will require significant investment;
- Adaptation policy is about much more than costing & financing. Establishing incentives is also as critical,
- Public private partnership can help provide infrastructure for adaptation and help "climate-proof" existing infrastructure.

Cost of Alternative Options: During the preparation of this proposal, a number of alternative options to achieve the same intended outcome were assessed and discussed with the GOJ and stakeholders in the consultation meetings in terms of, not only costs, but also effectiveness and feasibility.

The alternative options considered in the project design were evaluated in terms of time for execution and monetary value through a review of the National Investment Plan that focuses on infrastructure development, high capital costs and technology driven rather than adopting an integrated cross-sectoral approaches that utilize integrated water demand management, community engagement approaches and capacity building for resilience approaches that makes every drop of water count for livelihood.

Major infrastructure approaches are costly, have high operation and maintenance costs and thus cost for development will be borne by the consumers, farming communities which then get reflected in the farming production costs as compared to the relatively small investment required to utilize the integrated water demand approach for using treated wastewater as a resource of value to augment irrigation water supplies, or to collect rain water through check dams. Also the relative number of beneficiaries assisted by the project contributes to the cost benefit multiplier effect. The consequences of the alternatives approach are: i) unlikelihood for duplication as well as high capital investment needs and expenditure costs; ii) high cost per beneficiary; and iv) low sustainability and community engagement. These alternatives do not touch directly on community livelihoods, are less cost-effective, not resulting in sustainability and resilience and thus less desirable by the communities.

Below is a presentation for the comparison of proposed interventions against alternatives that were considered for ensuring freshwater availability during the dry seasons and for ensuring a stable water supply for irrigated agriculture.

- Micro-scale water capture/ storage infrastructure through rainwater harvesting
- Alternative water supply for irrigation through treated wastewater reuse
- Community-based agro-system enhanced practices through permaculture

According to the Ministry of Water and Irrigation, the annual running and maintenance cost of infrastructure development and operation is around US$ 102.3 per capita for water and sanitation. According to the Capital Investments Plan, the Ministry of Water and Irrigation (WAJ and JVA) FY 2015has the following project related funding:

TABLE 20: COST ESTIMATE OF ALTERNATIVES

Requested for Funding in the National Investment Plan FY 2015	Requested Fund in $	Alignment with this CC Adaptation Project and cost effectiveness
Wastewater versus fresh water supplies		
Percent of available treated wastewater to available fresh water supplies is	47% in the central regions versus 37% in the northern governorates	
Rehabilitation of WWTPs around the kingdom	$2,118,644	
Wastewater reuse systems for the northern region	$6,355,932	This will involve infrastructure development and our project will work on farms and compliment the ww reuse national master plan and will include Northern Jordan Valley
The cost for large infrastructure investment plan for the wastewater	$20,762,711	Same as above
Operation and Maintenance costs for WWTPs for Maan Governorate (where Wadi Mousa WWTP is located)	$706,000	This will ensure that proper treatment of ww is budgeted by GOJ for to ensure meeting national effluent quality standard JS893/2006
Operation and maintenance contract for Wadi Mousa WWTP	$1,000,000	The CC AF project will use the treated effluent of this WWTP and this will ensure meeting national effluent quality standard JS893/2006
The requested Programme cost for funding from AF for wastewater reuse sub projects is for a total $ 5,272,882 distributed for: 1. Wadi Mousa Waste Water Reuse (1.1) = $1,732,461.6 2. Northern Jordan Valley Wastewater Reuse (1.2) = $1,170,000 3. Tal Al Mantah Wastewater Reuse (1.3) = $ 840,420.419 4. North of Shouneh Wastewater Reuse (1.4) = $ 530,000 **Cost Benefit**: Using treated ww is crucial to augment fresh water supplies which can be released for municipal drinking and irrigation of crops eaten raw (restricted irrigation)		
The National Investment Plan for Infrastructure investment cost for fresh water supplies		
Disi water Supply Conveyor system bringing fresh water from 300+ Kms from the Disi aquifer in the south to the central governorate under a Build Operate and Transfer (BOT) system between the Government of Jordan and Disi Water Company this project has now been completed which will augment the drinking water primarily in Amman and surrounding areas of the central governorate.	Total pipeline cost $127,000,000 (Through this project around 100 (MCM) mil cubic meter of water per year will be pumped from a non-renewable fossil aquifer)	Fresh water supplies are scarce and stressed with Jordan being on the list of the four most water scarce countries of the world, this is compounded by CC impacts and the increased fresh water demand by Syrian refugees ~1.5 million

Construction of a water desalination unit in DeirAlla (Middle Jordan Valley)	$706,214	This is a brackish water desalination unit to augment irrigation water supplies
In addition to the above major infrastructure project there are certain communal level projects undertaken by Humanitarian Agencies as part of Syrian Refugee Response Plan.		
Water desalination systems	$112,900	To meet drinking water needs of the refugees and Jordanian host communities
Water networks for poverty pockets	$500,000	Around the Kingdom
Brakish water desalination and operating the desalination units in the Middle Jordan Valley	$141,000	This is for augmenting irrigation water needs using brackish water
Well drilling and operation at kafrein in Southern Jordan Valley	$282,000	This is for augmenting irrigation water needs as no WWTP is in this region and supports the permaculture proposed for this region
Enhanced water sanitation systems in the southern governorates	$750,000	
National Investment Plan for Rain Water Harvesting large infrastructure projects versus small earthen dams construction for Fifa Mazraah and Haditha Ghour		
AF Sub Project for Rainwater Harvesting in Poverty Pockets (1.5) cost $ 627,118		
Karama Dam water desalination and operation)	$282,000 (Southern Jordan Valley)	This is for augmenting irrigation water needs as no WWTP is in this region and supports the permaculture proposed for this region
Rain water harvesting dams around the kingdom	$100,000	These are small collection dams
Pumping systems for water wells in the Southern Region	$75,000	To provide for irrigation and drinking water supplies
Total National Investment needs for water, wastewater infrastructure &technical capacity Building Needs as per the National Investment Plan FY 2015	**$160,892,401**	

The total (direct and indirect) related investment needs is ($160,892,401) as per the National Investment Plan FY 2015 as compared to requested funding from AF for this project at $9,226,000.

Thus the proposed CC adaptation measures to be implemented by the 2 components, are all proven to be effective in enhancing resilience of communities to climate change, resulting in enhanced agricultural productivity, and sustainable use of natural resources thus assuring cost effective CC adaptation results whereby the project funds are not being used on testing technologies with unknown effectiveness or having negative environmental consequences.

D. Project/ programme is consistency with national or sub-national sustainable development strategies

Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.

At the United Nations Millennium Summit in September 2000, leaders of 189 states, including Jordan, adopted the Millennium Declaration. Jordan attaches great importance to addressing the phenomenon of climate change and combating its effects on health, food security and water resources as a means to address the obstacles to the Millennium Development Goals (MDGs).

Jordan, having signed the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 and ratified it in 1993 and having acceded the Kyoto Protocol as non-Annex-I country in 2003, has maintained and will continue maintaining strong commitment to the objectives developed by the international community for the integrated environmental and economic response to the threat of climate change although Jordan contribution to GHGs are equivalent to less than 20 million tons of CO2eq (2000) i.e with only a marginal emission rate of 0.01% of total global emissions. However, Committed to its role and reputation as a global pioneer in the implementation of the various UN conventions, Jordan believes it has a major responsibility in addressing Climate Change challenges while adhering to its national priorities and developmental objectives.

The Ministry of Environment of Jordan has strengthened its policy and legal frameworks to foster compliance with the three Rio Conventions, including the UNFCCC. The long term goal of the climate change policy and sector strategic guidance framework of the Hashemite kingdom of Jordan is to achieve a proactive, climate risk-resilient Jordan, to remain with a low carbon but growing economy, with healthy, sustainable, resilient communities, sustainable water and agricultural resources, and thriving and productive ecosystems in the path towards sustainable development.

The objective of the **climate change policy (2013-2020)** is to build the adaptive capacity of communities & institutions in Jordan with consideration of Gender and addressing the needs of vulnerable groups, to increase the resilience of natural ecosystems and water as well as agricultural resources to climate change, projects (2.1 and 2.2) are designed to implement & reach these objectives. The national priorities and the pillars of climate change policy are adaptation to climate change & mitigation of greenhouse emissions with an emphasis on adaptation as the imperative track.

Under the "**Establishing the Post-2015 Development Agenda: Sustainable Development Goals (SDG) Towards Water Security, the Jordanian Perspective" – The Ministry of Water and Irrigation, March 2014 Report**. As Jordan is in need for further increase of wastewater treatment capacity and to rehabilitate existing ones, . wastewater management remains a major challenge for Jordan in particular due to the interdependency between wastewater disposal and groundwater quality. It is estimated 200 MCM of wastewater could be treated in addition of the current amounts (Water Budget 2012). Wastewater management in Jordan needs to adopt new effective technologies, flexible, modular and robust with minimal

networks and pumping requirements in order to reduce the O&M requirements as well as energy requirements

- *Jordan will set a Water and Sanitation Dedicated Goal* - Human Rights and Justice shall guide the regional and international efforts on this regard.
- Jordan developed its vision beyond 2015 that entails **dedicated global goal for water and sanitation:** Jordan supports fully the efforts of the UN Secretary General's Advisory Board on Water and Sanitation (UNSGAB) and other institutions to dedicate a standalone goal for water and sanitation. A set of potential targets and indicators will be defined on national level that best advance its work for achieving and sustaining such global goal, it will also work with regional countries to achieve equitably the goal.
- Access to clean water and safe sanitation should be recognized as a basic human right
- Jordan Supports a Dedicated Goal for Water and Sanitation post 2015
- The treatment and reuse of urban wastewater in agriculture need to be promoted as well as the benefit in methane conversion to energy in treatment systems recognized.

Several policies, strategies and plans have being developed by the government to enhance the development, management and use of water resources. **Jordan's National Water Strategy "Water for Life 2008–2022"**highlights in its irrigation water chapter drought management and adaptation to climate change as future challenges to be addressed through proper policies and regulations. The strategy dedicated adaptation measures for addressing climate change impacts, of these the following are the most relevant to our proposition: First, to utilize alternative water resources that are not readily available and suitable for direct use as treated wastewater & rainwater harvesting. Secondly, institutional capacity-building, education and public awareness related to climate change impacts and their effect on the social, economic and environmental development of the Kingdom.

With Jordan being amongst the poorest countries in the world on the basis of per capita water availability where renewable water resources are less than 130 cubic meters per person per year. Current total uses exceed the renewable supply. The difference (the water used that is not renewable) comes from nonrenewable and fossil groundwater extraction and the reuse of reclaimed water. If supply remains constant, per capita domestic consumption is projected to fall to 90 cubic meters per person/year by 2025, putting Jordan in the category of having an absolute water shortage that could constrain economic growth and potentially endanger public health.

According to **(Jordan National Climate Change Policy of the Hashemite Kingdom of Jordan for 2013-2020**) and **Jordan's Third National Communication on Climate Change (TNC)** issued in November 2014, by the year 2020, the volume of treated wastewater is expected to reach 220 MCM representing a more significant amount in the national water agenda and thus will become a significant resource for satisfying the total irrigation demand warranting more technical assistance and preparation of remote local communities to using this valuable resource more wisely, safely through compliance with national standard 893/2006 and ultimately assist in the agricultural and water sectors adaptation to climate change.

The demographic characteristics of the Jordanian population show that the Jordanian development process faces a challenge in providing basic needs in such a developing country. One of the main demographic determinants is migration. Migration movements from,to and through Jordan have continually played a key role in shaping its demographic situation as well as the economic and political structure. In both 1948 and 1967Jordan received a great influx of Palestinian refugees from the wars with Israel. In 1991 and 2003 Jordan received about a million refugees from Kuwait and Iraq during the two Gulf wars while in 2011-2014 it was the turn of Syrian refugees escaping turmoil in their homeland.

On Biodiversity and Endangered Species: Jordan has three distinct ecological systems: (i) Jordan Valley which forms a narrow strip located below the mean sea level, and has warm

winters and hot summers with irrigation mainly practiced in this area; (ii) the western highlands where rainfall is relatively high and climate is typical of Mediterranean areas; and (iii) the arid and semiarid inland to the east (estimated to cover over 80% of the total area), known as the "Badia", where the annual rainfall is below 50 mm. Badia is an Arabic word describing the open rangeland where Bedouins (nomads) live and practice seasonal grazing and browsing.

Rainfall amounts and climatic conditions of the country do not support good rainfed agriculture, except for few areas in the northern and western highlands. The rainfed agricultural zone is lying in areas where rainfall exceeds 250 millimeters although significant production of cereals does occur in some areas where rainfall is between 200 and 250millimeters. According to the **Third National Communication to UNFCC, 2014**, Rainwater harvesting is a priority for Jordan, as flood water harvesting at macro-catchment can collect considerable amounts of water in small dams across intermittent rivers and Wadis. Example techniques include earth and stone bonds, terraces and pots. Observed storage media include soil, tanks, underground cisterns, small check dams and one large dam which is the King Talal Reservoir.

The contribution of agriculture to GDP has declined in relative terms from 20% in 1974 to less than 2.9% in 2011while its contribution in absolute terms has increased (e.g.from JD 57 million in 1974 to JD 598.3 million in 2011According to the **IUCN Red List of 2006,** Jordan has 47 globally threatened species. Of the 83 mammals species existing in Jordan, 12 are considered globally threatened. As for birds, there are 15 globally threatened species in Jordan. Around 2,500 species of vascular plants have been recorded, belonging to 152 families, representing about 1% of the total flora of the world.

In March 2014 **The National Resilience Plan (NRP)** was drafted by the Government of Jordan, in cooperation with UNCHCR, other donors and NGOs and seeks to address the accumulating fiscal burden as a result of the Syrian crisis on the Kingdom. This plan includes a request to extend $4.295 billion to Jordan to support the implementation of priority projects in the education, health, energy, municipalities, water, housing and security sectors.

According to the Agriculture Sector Strategy 2011-2013, the main priorities for agricultural development into the next phase are to:

- Intensify water harvesting in various regions, especially the pastoral areas
- Use of non-conventional water resources in agricultural production (forage production and the development of forestry resources).

The specific goals of the Agricultural Strategy are the following:

- Development and protection of forest and grazing resources, and the increase of productivity of pastoral areas through:
- Production of (5) million forest seedlings.
- Afforestation of (3500) dunums of land in the Kingdom and the cultivation of 100 km roadside trees.
- Establishment of (16) Oasis in the Kingdom's various sites.
- Reforestation of land surrounding Dams (1000) dunums in the Kingdom's various sites.
- Maintenance and protection of (1,300,000) dunums of forest land.
- The protection and development of 10 million dunums of pastureland.
- Establishment of water harvesting techniques in the pastoral areas with a capacity of (900 thousand) cubic meters.
- Activation of the legislation on the protection of forest and pastoral Resources.

As the proportion of population living below the extreme poverty line is 14.4% in 2012 while the targeted percentage to be reached by 2015, is estimated at 3.3%. Jordan has made significant achievements in combating poverty and hunger not only per the international standard of $1 a day per capita, but also in relation to the national poverty lines. In the **Poverty Reduction Strategy 2013 – 2020**, Jordan emphasizes the strong linkage between agriculture, rural development and environment. The key policy and technical issues related to the design of the pro-poor agriculture, environment and rural development component of this strategy include creating productive employment and income generation opportunities for the rural poor, especially small holders who need support in farming their land by microfinance and extension services, development of agro-processing value chain that will create new jobs and increase local food production for consumption by rural residents and for food supplies to Jordan's urban population and for its tourism industry.

The percentage of population below the abject poverty line was reduced by more than half between 1992 and 2008, from 6.6% to less than 1%. The poverty gap was also reduced and the poor's share of total consumption increased; however, total economic participation rates and female economic participation rate (40.1% and 14.9% respectively) are still below expectation. Also, unemployment rate among youth and women, still pose a major challenge despite recent reductions. As a result, one of the major objectives of the national economy in relation to employment is to Increase the ratio of the economically active population, particularly women's economic involvement and decrease unemployment rates and increase employment among Jordanians; additionally to encourage entrepreneurship and privately owned businesses. **Thus the proposed CC Adaptation project is very relevant to poverty reduction programs such as the Enhanced Productivity Centers (EPC) Program, Community Empowerment Program in Poverty Pockets, and Small and Micro-finance Program, and their related direct national development interventions.**

One of the objectives of the **Climate Change Policy (2013-2020)** is to build the adaptive capacity of communities and institutions in Jordan, **with consideration for gender and addressing the needs of vulnerable groups, to increase the resilience of natural ecosystems and water as well as agricultural resources to climate change, and to optimize mitigation opportunities.** Awareness campaigns should accompany the implementation of adaptation & mitigation measures and target all relevant stakeholders, including communities and the private sector where the media plays a key role in this regard.

The priorities & actions identified under the **"Adaptation to climate change to sustain Jordan's MDG Achievements 2009-2013 "** where National partners are those identified as execution partners to the AF project ie Ministry of Health (MOH), Ministry of Water and Irrigation (MWI), Ministry of Agriculture (MOA), Ministry of Education (MOE), The Ministry of Environment (MOEnv), Water Authority of Jordan (WAJ), Water supply companies, Parliament, National Center for Agricultural Research and Extension (NCARE), Zarqa Governorate, local municipalities and communities, and the World Conservation Union (IUCN).

These national policy priorities contribute to the climate change objectives formulated in the **National climate change Policy** and will guide project activities**:**

- The sustainable development/ Planning Policy, currently under development and coordinated by the MoPIC will specify how climate change is to be considered in planning, in particular adaptation.
- The revised Third National Communication FY 2014 for Jordan to address climate change.
- The Environment Protection Law no.52 of 2006 is currently being updated and will address climate change, in particular the legal & institutional climate change arrangements in Jordan;
- The National Poverty Reduction Strategy, considers the impact of climate change on poverty with due consideration to the sex disaggregated data.

Stakeholder Involvement: The impact of climate change is coordinated by MoEnv which coordinates with other relevant Ministries at the national and regional levels. The MoEnv encourages the role of associations of local communities in planning and implementation of development projects which has to be increased through actively encouraging locals participating in regional and local development planning and implementation, to spread their activities regionally through awareness campaigns, specialized workshops and training sessions targeting local communities to be held in all governorates. Project (2.1) will focus on these activities.

Awareness Raising and Role of Media: The MoEnv and the sector ministries will further mainstream the role of media in climate change, and support the NGOs in their media activities. NGOs have done valuable work in engaging and training the media in environmental issues. Project (2.2) will be using media & ICT to spread awareness & alert farmers on the possible climate risks they may encounter. Raising awareness on climate change amongst different population segments can increase support and cooperation in implementing climate change mitigation and adaptation policies. The role of the media is important to raise awareness among stakeholders in Jordan on climate change, and to inform and engage stakeholders on specific adaptation and mitigation activities. The MoEnv and the sector ministries will further mainstream the role of media in climate change, and support the NGOs in their media activities. Support the launch of climate change awareness raising campaigns with emphasis on utilizing the media and other available effective communication tools to raise awareness among stakeholders in Jordan on climate change, and to inform and engage stakeholders on specific adaptation and mitigation activities.

Vulnerable Groups (with emphasis on the poor) and Gender Mainstreaming

Jordan is a signatory to and member of several key international agreements that already commit the country to gender mainstreaming. Under the UNFCCC, increased attention is paid to securing a gender perspective in international policies and initiatives. The relation of climate change with gender and poverty is apparent in the following issues:

- Dependence of such vulnerable groups on natural resources that is susceptible to climate change. 20% of the population depends on agriculture for their income. Agriculture vulnerability especially the rainfed and irrigated was also discussed in detail, these discussions lead to the conclusion that this 20% of population which is part of the poorest segment will be most susceptible to climate change impacts;
- Dependence of communities on ecosystem services (water springs, rangelands, and natural vegetation in medicine, etc.) that could be affected by climate change.
- Lack of assets which hinders effective adaptation by the poor segments of population.
- Settlements in high risk areas (drought prone) in Jordan are known to be of the lower income groups, a fact which magnifies the impact of climate change on poverty of these groups;
- Low levels of education and professional skills prevent members of poor households for shifting to climate-resilient sources of income; and
- Role of women in economy of rural areas is known to be substantial. Women in these areas are traditionally responsible for the household economy and are active in field work as well. Any negative impact of climate change will be most sensed by women. Women make crucial contributions in agriculture and rural enterprises in dry lands as farmers, animal husbandry, workers and entrepreneurs through their indigenous knowledge.

The Program **"Mainstreaming Gender in Climate Change Efforts in Jordan"** was prepared in 2010 by MoEnv. and IUCN. The document was endorsed by the GoJ and presented to the international community as the official stand of Jordan on the issue of gender and climate change. The document is also endorsed by the Women's National Committee and adopted as part of the Committee's strategy.

Climate change strategic objectives to vulnerable groups and gender mainstreaming

- To integrate gender considerations and the interest of vulnerable groups in climate change policies and strategies in all relevant sectors particularly in national strategies for poverty, childhood and early childhood development in Jordan;
- To ensure that financing mechanisms on adaptation addresses the needs and conditions for implementation of poor women and men equally
- To build capacity at all levels to design and implement gender responsive climate change policies, strategies and programs.

Priorities, main measures, and instrument for mainstreaming Gender and protecting vulnerable groups are:

- Build capacity at all levels to design and implement gender responsive climate change policies, strategies and programs;
- Ensure that financing mechanisms on adaptation address the needs and conditions for implementation of poor women and men equally; and
- Develop, compile & share practical tools, information and methodologies to facilitate the integration of gender into policy and programming.

E. Project/ programme compliance with national technical standards

Describe how the project / programme meet relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and complies with the Environmental and Social Policy of the Adaptation Fund.

The Jordan AF CC resilience project is compliant with the legislation and associated national standards and will seek to strengthen these by mainstreaming climate change adaptation guidelines as per the Third National Communication and the National Climate Change Policy for Jordan.

The Jordanian Institute of Standards and Metrology (JISM now called JSMO) is the national body for setting standards & metrology in Jordan. Generally the proposed projects will definitely ensure compliance with national technical standards, as despite the water scarcity in Jordan its quality undergoes rigorous testing and monitoring. The water is tested as a source then both prior and during pumping, to ensure that the water is safe for use. Such testing ensures that drinking water in Jordan as well as treated wastewater used for irrigation purposes complies with respective requirements.

TABLE 21: REFERENCES, STANDARDS, REGULATIONS & GUIDELINES THAT GOVERN THE USE OF TREATED WASTEWATER IN JORDAN

The followings are references, standards, regulations and guidelines that govern the use of the treated wastewater in Jordan:

Standard/ regulations/ guidelines	Issued by	Area of use
JS 202/2007	JISM	Industrial wastewater effluents.
JS 893/2006	JISM	The reuse of treated domestic wastewater.
JS 1145/2006	JISM	The safe use of bio-solids.
Regulation no. 18/1998	WAJ according to the wastewater by-law no 66/1994.	Industrial wastewater quality to be connected to the sewer system.
Irrigation Water quality Guidelines.	JVA	Indirect use of treated wastewater.
Guidelines for Reclaimed water Irrigation in the Jordan Valley.	JVA	Good agricultural practices in dealing with blended treated wastewater.
Guidelines for a State Crop Monitoring System for Fresh Vegetables.	JFDA	Methodology for safe sampling and analyses of fresh vegetables.
WHO Guidelines on Wastewater Use in Agriculture 2006.	WHO	Safe use of treated wastewater in agriculture.

Several policies were developed by the **National Water Strategy 2008-2022** among these were the **Irrigation Water policy** governed by the **WHO 2006 Guidelines on Wastewater Use in Agriculture**, which addresses irrigation water including agricultural use, resource management, technology transfer, water quality, and efficiency. **The National Strategic Wastewater Master Plan-Updated on February 2014 by USAID-ISSP Project** master planned for wastewater as an important water resource including its development, management, collection, treatment, and reuse. It addresses the management of wastewater from an infrastructure and demographic perspectives.

Water Authority Law (18/ 88) – Issued in 1988 and is described as the most far-reaching statute pertaining to water pollution. Article 3 of this law created Water Authority of Jordan (WAJ), and article 5 provides full responsibility to Ministry of Water and Irrigation (MWI) for all water and sewage systems and for establishing a water policy. Article 6 charges WAJ with its responsibilities.

Relevant standards: National standards that are of relevance to this project are:

The Jordanian Standard for Reclaimed Domestic Water - No. 893/2006

It has two primary components: i) reclaimed water discharged to streams, wadis or water bodies and ii) reclaimed water for reuse. Reclaimed water for reuse standard in turn has two subsets. The full standard is attached in Annex 6. Reclaimed water specifications under this standard are divided in to two main parts and should conform to specified conditions for every part and according to the final planned use and it is not allowed to dilute reclaimed water by mixing it in the treatment plant with pure water to achieve the stated conditions in this specification.

Category A: Reclaimed water for Wadi (valley) discharge.

Category B: Reclaimed water for reuse purposes.

The Jordanian Standard for Sludge Management No. 1145/ 1996: on "Uses of Sludge in Agriculture" describes sludge treatment methods and presents sludge quality standards for reuse in agriculture (see full standards in Appendix B).

Jordanian Standard on the control of industrial wastewater No. 202/ 2007 Note: No treated industrial wastewater will be utilized or reused under this project noting that industrial effluents are not allowed into municipal wastewater treatment plants.

The Public Health Act (1971): also serves as the basis for the regulation of wastewater discharges and water quality in Jordan. Pursuant to the Public Health Act, standards for the discharge of wastewater have been established. These are discussed in Section 3.2. Article 4 of the Control of Spoiled Sites Regulations (1978) reiterates some of the above Public Health Act provisions and further establishes the right of the president of the municipality, based on the health inspector's recommendation, to take such actions as may be deemed appropriate against the violator. The Town and Country Regulations Act (1966) allows Local or Regional Councils to take action against the operator of any wastewater system that is found to be a nuisance and order that the nuisance be corrected within a specified period of time.

Air Quality Standards:

- Jordan Ambient Air Quality Standards (JS: 1140/2006).
- Maximum Allowable Limits of Air Pollutants Emitted from the Stationary Sources (JS: 1189/1999).
- Air quality is regulated under the Public Health Act (1971), The Control of Spoiled Sites Regulations (1978) and The Traffic and Transportation Law (1984). Noise is regulated under the Town and Country Planning Act (1966), the Control of Spoiled Sites Regulations (1978), the Local Authorities Act (1955), the Monitoring and Organization of Public Markets

Regulations (1961), the Traffic and Transportation Act (1984), the Public Health Act (1971), and the Environment Law.

Solid waste management is regulated under several statutes, including the Public Health Law, Control of Spoiled Sites Regulations, the Town and Country Planning Act, and the Environment Law.

Other Standards

- The Antiquities Law (No. 21, 1988).
- (Regulation No. 113, 1973) For the Protection of Birds and Wildlife and Rules Governing their Hunting.
- Public Health Law (No. 54, 2002).
- Underground Water Regulation No. 85 of 2002.
- Guidelines for Prevention of Noise, 1997.
- Water Authority Law (No. 18, 1988).
- Agricultural Law (No. 44, 2002).
- Penalty Law (No. 16, 1960).
- Civil Defence Law (No. 12, 1959).
- Natural Resources Organization Law (No. 12, 1968).
- Towns and Villages Law (No. 18, 1988).
- Administration of the Ministry of Energy and Mineral Resources Act (No. 26, 1985).
- Traffic Law No. 47, 2001.
- Labor Law No. 8, 1996 (as amended).
- Social Security Law (No. 19, 2001)
- Investment Law (No. 68, 2003).
- Municipalities Law (No. 55, 1954).
- Administration of Public Property Law (No. 17, 1974)
- Regulation No.(1) For the year 2006: Instructions for the elimination of unsanitary occurrences related to health harms generated from workers communities residential units.
- JS 286: 2001 – Drinking water standards
- JS 431: 1985 - Precautionary requirements for storage of hazardous material
- JS 1140: 1996 – Ambient air quality (aimed at industries)
- JS1052, 1053 and 1054: 1998 and JS 703: 1990 - Motor vehicle emissions
- JS 1059: 1998 - Motor vehicles noise levels
- JS 1401 and 1404: 1998 - Environment management systems
- JS 1411 and 1412: 1998 - Guidelines for environment auditing
- JS 525: 1997 - Heat levels allowed to be exposed to in the work environment
- JS 524: 1987 - Lighting levels in work environment

Standards to be followed for sub projects (1.1, 1.2, 1.3, 1.4and 1.6)where treated ww or mixed water (fresh mixed with ww) is used for irrigation of crops.

Jordanian Standard for Reclaimed Domestic Wastewater (893/2006) governs the use of treated effluent in Wadi Mousa. It determines national regulation, requirements and specification for domestic wastewater and its end use. The full standard is attached in Annex 4. It has two primary components: i) reclaimed water discharged to streams, wadis or water bodies and ii) reclaimed water for reuse. Reclaimed water for reuse standard in turn has two subsets**:**

- Discharge to Wadis (valleys)
- Discharged for reuse to be either used for:
  - Irrigation (four categories): fruit trees & green landscape; cooked vegetables & parks; field & industrial crops; flowers.
  - Groundwater recharging (not for drinking)*.

For using surface water, Jordan follows the FAO guidelines, WHO guidelines on wastewater *use* in agriculture 2006 for *the of mixed water quality used in projects (1.2, 1.3, 1.4 and 1.6)* It is clearly stated in the (Water Strategy 2008-2022) that all treated wastewater will be used for irrigation whenever safely possible while ensuring that health standards for farm workers as well as consumers are reinforced. It is also mentioned that for every new wastewater project, an environmental and social impact assessment will be conduct. Such a project will only be executed if there will be no negative environmental impacts from the project in particular on groundwater and the surrounding communities.

To ensure compliance, the relevant Ministry of Water and Irrigation and the Ministry of Health conduct water quality monitoring programs frequently to determine compliance with water quality plans, public health protection and standards. For example for domestic wastewater treatment plants: 33 samples/ collected once per four months and for Industrial wastewater: 40 samples/collected once per four months. It should be mentioned that water sample collection, preservation, and analysis followed the "Standard Methods for Examination of Water and Wastewater".

Standard that will be followed for the rainwater harvesting project (1.5).

Jordan has strong enforcement system that calls for compliance with national codes, standards and regulations. So for the efforts to be undertaken under the rainwater harvesting component will have to get the approval from the relevant GOJ entity, here Ministry of water and irrigation represented by the Jordan Valley Authority who would give approval on the chosen locations for the collection system and infrastructure of the check dams and only approved and classified contractors (Ministry of Public Works and Housing classified and regulated contractors) are allowed to execute construction and collection systems following the completion of the needed environmental approvals which may include an ESMP depending on the complexity of the structure and the sensitivity to the environment .

Regarding Projects1.6 (Permaculture) and 2.3 (Agribusiness Development): Assurance of crop safety will be required (microbiological contamination, heavy metals and nitrate) where in this regard, involving the JFDA in order to scale up their monitoring programme to cover these new areas irrigated with reclaimed water, this needs to be complemented through an ISO 17025 certification for the elements of the crop monitoring programme

Below are the relevant Health and Agriculture laws:

- Food Law 2007
- Interim law No (79) for Year 2001
- Food control Law
- Provisional Law No. (97) For the Year 2001
- Law of Clinical Studies
- Public Health Law No. 54 of 2002
- The General Health Law (Arabic)
- Regulation No. (7) Of the Year 1998, The Regulation of Forming Committees and Supervisors of Occupational Safety and Health Issued by virtue of Article (85) of the Labor Law No. (8) Of the Year 1996

- Fishing Regulation No. 1 of 1944.
- Interim Agriculture Law No. (44) Of year 2002

For more details on Jordanian Laws and Regulations and those selected above refer to http://www.lexadin.nl/wlg/legis/nofr/oeur/lxwejor.htm

The national technical standards most relevant to the project are those relating to EIAs and the National Building Codes and other associated standards and regulations. The following list provides relevant national standards and environmental legislations.

Environmental Protection Law no. 52 / 2006

- The environmental protection law no. 52/2006 sets the definitions and outlines the main responsibilities and functions of the ministry of environment. As per the law, the ministry is responsible for setting Jordan's environmental protection policy, monitoring activities, coordinating national efforts for environmental protection, and preparing environmental contingency plans.
- Article 7 of the law assigns the ministry of environment with the environmental monitoring and inspection responsibilities, and grants its employees the right to enter any facility for inspection needs.
- Articles 8, 9, 10 relate to marine environment.
- Article 13 sets the requirements for conducting environmental impact assessment for projects.
- An environmental protection fund was established under (articles 16 and 17); and sets fees for violation of its provision, terms for delegation of authority, and the operation of environmental non-governmental organizations in Jordan. Finally it lists the regulations that should be issued in accordance to the law.

Of the 12 regulations set by law; the following regulations have already been issued: marine and coastal environment; environment protection from pollution in emergency cases; air protection; nature reserves and national parks; management, transport and handling of harmful and hazardous substances; management of solid wastes; environmental impact assessment; and soil protection.

Many other agencies retain their environmental responsibilities and structures. Environmental sections and departments are present in a number of institutions such as the Ministry of Water and Irrigation, Water Authority of Jordan, and Ministry of Health, among others. Institutions that do not have dedicated environmental departments often resort to naming environmental focal points whose responsibilities often include liaising with institutions on issues that pertain to both their respective agencies‟ mandate and the environment. In several cases, the responsibilities of environmental focal points need to be clarified and/or strengthened.

Visit the following link to view the complete Environmental Protection Law No. 52 of 2006

in English:

http://www.moenv.gov.jo/En/LegislationAndPolicies/Legislation/Regulations/Pages/EnvironmentalProtectionLaw.aspx#.VKBYMsAKo

Environmental Impact Assessment Review Process

Environmental Impact Assessment (EIA) is a key tool to ensure that decisions taken at the legislative and regulatory level are actually executed and built into the design and implementation of development projects.

The legal basis for EIA is established in the Environment Protection Law (EPL) no. 52/2006. It is implemented through its EIA regulations no. 37/2006 and its five annexes. These require that the project proponent would hire a national consulting firm to conduct the EIA and prepare an EIA report. It also assigns full authority to the Ministry the Environment through its department of Licensing and Guidance (which includes the EIA section) to arrange for screening, control and follow up on the EIA process and its implementation. The approval of an EIA is a pre-requisite for any subsequent license or permit by any or all other relevant authorities that may be required prior to construction. All development projects, regardless of EIA classification, must adhere to the air emission, water, wastewater reuse; industrial and municipal discharges" Jordanian standards.

Many features of the Jordanian EA system are compatible with the World Bank EA Policy (OP 4.01) and the European Commission (EC) EIA Regulations no. 97/11. These features are in (i) screening, (ii) scoping; (iii) the EIA report content, (iv) the content of the environment management plan, (v) provisions for appeal; and (vi) requirements for monitoring and follow up.

As per the EIA regulation no. 37/2005, the Technical Review Committee consists of the representatives of the following agencies: ministries of environment, planning and international cooperation, municipal affairs, health, agriculture, industry and trade, energy and mineral resources, water and irrigation, tourism and antiquities, and public works and housing, in addition, to representatives from NGO and academia. The Table below Summarizes the Jordanian EIA Procedures.

At this stage, it is envisaged that the only exception to this will be where official authorizations is for the rainwater harvesting sub project (1.5) where JVA as executing entity will need to follow the EIA procedure set forth below and obtain MoEnv approval which will need tobe provided in writing before the construction of the small earthern water storage reservoir activities can take place, and to be approved by the NIE.

It is noted that during the project detailed design processes will need to be reviewed or generated, and in the event new activities arise or may be identified then the EE wishing to proceed with these activities, will need to be explicitly get approval of the NIE in accordance with the project's Environmental and Social Management Plan (ESMP). In this regard, the proponents will need to show how the required assessment can be achieved within project time frame and budgetary constraints. If this cannot be done, alternative activates will need to be identified.

TABLE 22: SUMMARY OF THE JORDANIAN EIA PROCEDURES

Summary of the Jordanian EIA Procedures	
Stage	**Activity**
Initial Filing and Screening	The Project Proponent completes a Project Information Form (PIF) of the intended project and submits it to the Ministry of Environment for screening. An Inter-ministerial Central Licensing Committee reviews the PIF, and after conducting site surveys determines if the project is classified as: • Category I projects for which an EIA report is required • Category II projects for which an initial EIA is only required • Category III for which no environment analysis is required **The decision is publicly displayed for 2 weeks**
Scoping	The Ministry issues legally binding guidance on the Scope of the Assessment Proponent prepares a ToR, after a mandatory public consultation. An Inter-Ministerial Technical Review Committee (TRC) reviews and approves the ToR. Accredited consulting entity commences with EIA.

The Jordan National Building Codes also establishes design principles and minimum requirements needed to ensure public safety of structures, provide sound and efficient electro-mechanical services and to safeguard against earthquake risks. The project will mainstream climate change adaptation considerations/standards into planning, focusing on mainstreaming adaptation interventions into the design and location of services. Recommendations will be developed on how this tool could be incorporated into relevant municipal and national building codes, regulations, infrastructure standards, planning and associated budgeting processes. Similarly, in rural areas, the project will develop best practice guidelines on incorporating measures to address climate risks in land allocation processes. These guidelines will include steps on how to ensure climate resilience is prioritized in the design and maintenance of infrastructure, as well as in infrastructure standards.

To assure stakeholder engagement on the national level, and for the subprojects to be implemented in Wadi Mousa and the Jordan Valley we find that they are fully aligned with the national strategic objectives in terms of inclusive growth and environmental sustainability. The Minister of Water and Irrigation stated that **"The Jordan Valley Water Forum" (JVWF)** has been designed to address the next 10 years for the Jordan Valley Water Users and Beyond. The national agriculture strategy focuses on continued improvement in the business climate for increased private sector investment, supporting access to finance, access to markets, the development of clusters of services and skills to raising the productivity of farmers and agribusiness SMEs, The JV projects are expected to achieve & implement these objectives in line with the major focus of the government strategy policy is also the sustainable use of water resources in a context where Jordan is confronted to an unprecedented water crisis.

Compliance with the Environmental & Social Policy (ESP) for the Adaptation Fund:

The project activities will comply with all environmental & social principles of the AF. This process will be managed through the Environmental & Social Management Plan (ESMP) that has been developed for the required projects refer to Annex (5)

F. Duplication of project/ programme with other funding sources

Describe if there is duplication of project / programme with other funding sources, if any.

There is no duplication of efforts but rather it is building on existing national and donor/lender efforts.

Through its institutional set-up, MOPIC has the ***International Cooperation Departmen*t** (*one of MOPIC's 13 Departments*). The overall mandate of the *department* is to coordinate the foreign assistance, and being responsible of the mobilization and management of the foreign assistance at various sectors, programs and projects within and outside the Government of Jordan (GOJ). By law, MOPIC is the channel of communication between GOJ and international development partners, so all international external resources are to be coordinated through MOPIC, and this ensures that it is used in accordance and integration with the national development policies, and avoid duplication of efforts. More specifically, the d*epartment* provides developmental projects financing, and continuous search for financing opportunities, identifying their utilization conditions, coordinating the available financing distribution to different developmental projects and programs in cooperation with the granting countries and parties. *It* also improves cooperation relations with granting parties, and builds up relationships with new parties in order to provide technical and financial support for developmental projects in the Kingdom.

The *International Cooperation Department* includes the following divisions:

- World Bank Group and United Nations Agencies Relations Division.
- American Relations Division.
- Asian Relations Division.

- Arab and Islamic Funds Division.
- European Relations Division.
- EU Partnership Division.
- Scientific and Cultural Cooperation Division.

The main responsibilities of the *International Cooperation Department* are:

- Improving aid coordination techniques, managing financing operations for different developmental projects and programs and, according to protocol monitoring the commitment of financing sources to agreed-upon aid programs.
- Collecting information on Jordan needs for aid, and external economic support, and prepare analytical studies in this topic.
- Maintaining external parties' cooperation relationships to provide financial and technical support for developmental projects through setting suitable plans and programs. As well as building and developing mutual relationships with granting parties and countries in order to provide financial and technical support for developmental projects through aid programs and loans from granting parties and countries.
- Continuous search for available financing opportunities, conditions and techniques of utilizing those opportunities, continuous information update, and provide the granting parties and countries with a database.
- Finding suitable financing sources for the developmental projects taking into consideration projects nature and granting sources conditions and approaches.
- Preparing for financing agreements and/or economic and technical cooperation, following up all necessary procedures for executing annual aids programs and agreements. Studying, analyzing and solving the problems that face financing programs and agreements.
- Developing cultural relations with external parties to make use of available qualifications and expertise to fulfill human resources training needs in public sector, in addition to preparing cultural agreements and realizing public sector needs of foreign experts.

This AF project proposal will seek the synergies and integration with other ongoing foreign funded projects and activities; this will be ensured by the mandate of the **Aid Coordination Division**, in cooperation with the Bi-and Multilateral Relations divisions at the *International Cooperation Department*: The key mandates of the **Aid Coordination Division** are:

- Follow up preparation of the Medium-term Aid Planning Document and Calendar of Activities (responsibility within part of MOPIC responsible for national planning)
- Development and coordination of implementation of the National Aid Effectiveness Policy/Strategy and Action Plan
- Development of the aid coordination system & monitoring implementation (process)
- Data collection and analysis
- Hosting and management of JAIMS
- Reporting on aid flows (Jordan Foreign Assistance Report) and reporting on aid effectiveness (OECD)
- Aid visibility and transparency issues
- Secretariat for High-level Coordination Mechanism
- Collaboration with global aid effectiveness institutions and initiatives

- Facilitation of information flows on aid coordination

Moreover, the present formal Government-led sector-level coordination mechanism is already in place under the leadership of MOPIC (*through the **Aid Coordination Division***), it is composed of 11 sector-level Government-Donor Coordination Working Groups *(the 11 groups include: Energy; Employment and Vocational Training; Water and Agriculture; Trade and Investment; Good Governance; Health; Gender; Public Financial Management; Local Development, Tourism; and Education)*. The **proposal** will capitalize on this existing mechanism as well as other mechanism at MOPIC to seek the synergies and integration with other initiatives, donors and stakeholders

In Wadi Mousa, the successes from the pilots implemented in Wadi Mousa and the humble initiatives of the GOJ in rain water harvesting all of which have shown that yields on farmers' fields would increase, as does water productivity providing an excellent example of how to integrate wastewater treatment with productive agriculture for the achievement of climate change adaptation in both agriculture and water sectors all of which encourage complementarity and moving ahead with fully fledged projects at a larger scale where the successes can be replicated not just in Wadi Mousa but in other parts of Jordan and the region. The proposed wastewater reuse and rainwater harvesting projects are thus not duplicating other nationally implemented projects or funding programs such as the completed in 2008 USAID wastewater reuse pilot project. **Component 1 (subprojects 1.2, 1.3, and 1.4 are in the Jordan Valley and under the Authority of the Jordan Valley Authority (JVA) as executing entity who will assure no duplication of project/programme with other funding sources takes place.**

Donor Lender support to Jordan Valley

In the Northern Jordan Valley **the French Development Agency (AFD**) has completed a very successful on farm irrigation system which completed in 2010.The French Development Agency (AFD) is now planning to finance a JV master plan.

KFW is currently financing the upgraded/constructed wastewater treatment plants in the northern region of Jordan at Irbid, Shalalah, Dogara where the treated effluent as required by Jordan Valley Authority must meet the highest standards before it is offered for irrigation with no potential adverse impacts to the irrigation systems there or to the farmers and when leaving the WWTP must meet and be in compliance with JS 893/2006 for cooked vegetables (class A).

GIZ is currently support the water and poverty alleviation project which has some activities in the Jordan Valley and the Participative Management of Irrigation water in JV through the establishment of Water User Associations

UN: Jordan: Adaptation to Climate Change to Sustain Jordan's MDG Achievements FY 2009-2013 Participating UN agencies: FAO, UNDP, UNESCO, WHO.

TABLE 23: KEY DONORS SUPPORTING THE JORDANIAN WATER AND AGRICULTURE SECTORS

Key Donors Supporting the Jordanian Water and Agriculture Sectors	
Donor	**Important Projects and Programmes**
Germany	***BGR: Water Aspects in Land Use Planning**:* Results include the delineation of groundwater protection zones and the inclusion of water protection aspects in regional planning processes and licensing procedures. Groundwater monitoring and groundwater modelling are also fields of activities to enhance the water management capacities of the project partner. ***GIZ: Management of Water Resources*** support and build the capacity of the GoJ, water companies and water users to manage Jordan's water resources efficiently and sustainably. GIZ supports in the fields of institutional development, service improvement, stakeholder participation and water conservation. ***GIZ: Improvement of Energy Efficiency of the Water Authority of Jordan*** works closely with the Water Authority of Jordan and uses private sector expertise and funding

	to achieve sustainable results in reducing the amount of electricity consumed by the WAJ (Jordan's single largest electricity consumer). ***GIZ: SWIM Sustain Water MED*** proposes to implement innovative pilot activities for treating and reusing wastewater for the benefit of the local livelihoods and sustainable water management. All pilots are accompanied by local and regional measures for capacity building and awareness raising. ***GIZ: Training for Water and Energy Efficiency Development*** supports human capacity development in the water sector by strengthening vocational training in Jordan related to water and energy efficiency. ***GIZ: Communication Strategy for the Water Sector*** support MoWI in developing a comprehensive communication strategy as part of water sector governance and reform, addressing the information needs of specific target groups. ***KfW: Financing of projects*** related to the reduction of water losses and improvement of water allocation; construction of wastewater collection systems and treatment plants, as well as the use of treated wastewater in agriculture.
USA	USAID ***Enhancing Water Awareness****:* Mobilizing grassroots action for addressing the water scarcity problem in Jordan and the need for conservation at the rural and municipal levels. ***Red Sea – Dead Sea Water Conveyance Feasibility Study and Environmental and Social Assessment*** A study to examine the technical, economic, financial and environmental feasibility of pumping seawater from the Gulf of Aqaba to the Dead Sea. A separate study will assess regional and local social and environmental impacts. ***Public Action in Water, Energy and Environment*** Effect behavioural changes among the Jordanian public and decision makers to increase efficiency in the use of water and energy, handle solid waste properly and introduce needed policy changes ***Operation and Maintenance Training Program***: Develop certification programs for water sector staffs, including training materials, and a "Training of Trainers" Program. Engage the private sector in a regional training and certification initiative ***Institutional Support & Strengthening Program*** Technical assistance and capacity building to identify and then implement a range of institutional reforms to address key institutional constraints to more effective and efficient management of the water sector, enhance financial management within the water sector, optimize water use and reduce over-exploitation of resources. This includes issues such as water valuation, and restructuring and strengthening water sector institutions with a focus on human resources, financial and facility management ***Water Reuse & Environmental Conservation Project*** Water conservation programs for industry, agriculture and landscaping. Demonstration of industrial water management and pollution prevention, site rehabilitation and institutional capacity building ***Community-Based Initiative for Water Demand Management****:* Administer a community support program to engage poor communities in water demand management by providing small grants to NGOs for revolving loans to improve household and community water facilities. It also broadens the capacities of NGOs to work on development issues
France	***Infrastructure and technical assistance*** *:* Disi Water Conveyance System Project; Groundwater-flow modelling; Highland Water Forum; Red Sea-Dead Sea Water Conveyance Study Program.
Japan	Energy Conservation through Upgrading Water Supply Network in Jordan
Italy	***Feasibility studies for Water Resources Management***: Red Sea – Dead Sea Water Conveyance Feasibility Study and Environmental and Social Assessment
The World Bank	***Jordan Valley Water Forum*** is designed as a process and mechanism for multi-stakeholder engagement aimed at solving critical issues facing the water and agribusiness sectors throughout the Jordan Valley. Through the Forum process, farmers can voice concerns in a coordinated manner and specific issues and recommendations for improving the water sector can be decided and prioritized through dialogue between public and private sector participants. The selection of prioritized recommendations is based on both selection criteria such as the potential to improve the sector for the most farmers possible and the public sector's ability to realistically implement related activities.

UNDP	***Jordan National Self-Assessment on Climate Change Report*** which provides a detailed assessment of the obligations and operational procedures of the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol and their applications in Jordan. The primary goal of the NCSA is to identify, through a country-driven consultative process, is to establish priorities and needs for capacity building to protect the global environment. The National Capacity Self-Assessment exercise includes two key elements that are closely linked: a stocktaking of the previous National Communication work – and a stockholder's consultation ***Third National Communication Report FY 2014****:* Review of the national enabling environment for implementing the UNFCCC, including legislative and institutional frameworks, human and knowledge resources, and natural and physical infrastructure.
UN (FAO, UNDP, UNESCO, WHO)	**Jordan: Adaptation to Climate Change to Sustain Jordan's MDG Achievements** Jordan has one of the lowest levels of water resources availability, per capita, in the world. Although the country has made advances towards achieving MDG targets, its accomplishments are being compromised as this crippling water scarcity and climate change bring additional threats to health, food security, and productivity and human security. The Joint Programme was designed to address these challenges as a key to sustaining Jordan's human development gains and growth. The programme goals were part of an overall effort to assist Jordan in sustainably managing its natural resources, reducing poverty and improving health indicators: • Developing sustained access to improved water supply sources, despite increasing water scarcity due to climate change. • Strengthening the capacity for health protection and food security under conditions of water scarcity.

G. Learning and knowledge management

If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

Our experience in Jordan on pilot projects is that they "Help Spread the Message"

Sub Projects (1.1, 1.2, 1.3, 1.4, 1.5, and 2.3) will use and follow the Wadi Mousa WW Reuse Demonstration pilot project model which has provided the opportunity to increase public awareness about reuse of treated wastewater, and to reassure people that this is safe. The demonstration site is also used to educate agriculture, environment, veterinary and civil engineering students, visitors from schools and universities throughout Jordan. It has welcomed study tours from neighboring countries and from Europe, Asia and North America.

The site at Wadi Mousa has seen numerous visitors, both Jordanian and from other countries. The Demonstration project has a design for a proposed new Awareness Center at Wadi Mousa that will strengthen the capacity of Water Authority of Jordan WAJ and others to tell people about wastewater use and its benefits to people Climate change adaptation, community resilience and the environment. Continuing the success into the future helps provide support for Government policy towards full utilization of precious wastewater as a supplemental irrigation resource thus combating climate change impacts on the water resources including gender integration, and socio economic enhancement of local communities.

A video in collaboration with UNDP was produced entitled **"Making Every Drop Count**" which is available on the Internet at http://www.waterfair.org/country.spring?country=109 which is an excellent example of how pilot programs can become a model not only for Jordan but the entire region.

The project will apply the following knowledge, dissemination and public awareness and learning tools through the implementation of the project:

- Engagement of local media in awareness campaigns and events; Public & school presentations and field visits; Climate forecasting maps, community briefs on integrated water resources management, communal governance and support tools, agro-forestry, use

of reclaimed water for irrigation according to national standards, watershed management, conservation agriculture, drought-resilient cropping patterns, climate-resilient post-harvest practices;

- Study visits between different community groups in JV and Wadi Mousa especially under Outcome 1 in which pilot/demonstration community plots are established;
- Public media articles in journals, newspapers and newsletters;
- Awareness campaigns targeted at local NGOs, public and private sector entities;
- Training workshops and short courses on Climate Change and sustainable land management for non-governmental community leaders and local government institutions
- Policy briefs for national decision makers; and Best practice guidance materials and tools.
- Implementation of concrete adaptation actions through pilot programs to foster learning experience, which will feed into all awareness, training and knowledge management actions facilitated and conducted by the project.
- Close involvement of CBOs/NGOs, which also work in non-project target sites, will facilitate smooth replication of good practices during and after the project.
- Consultative face to face meetings and interactive events, through brochures, leaflets and posters on the effects of climate change on natural resources, and on the relationship between water management practices, agroforestry practices, agricultural cropping, post-harvest and storage practices and the resilience of the surrounding ecosystem.
- Existing awareness materials from other projects will be adopted and tailored to the target groups in the project location.
- The development of M&E systems for relevant outputs/activities will be assured for effective knowledge management and sharing. Development of an M&E framework at the beginning of the project will ensure efficiency and effectiveness and gain in the knowledge management of the project outputs. An M&E specialist will be appointed to will establish detailed monitoring and tracking tools in the inception phase of the project implementation with tools devised to document and capture throughout execution of the project, lessons learned will be captured, codified and discussed among stakeholders which will enable a production of technical report from each of the technical Outputs, which will be collated as “best practice guidance materials and tools”. Periodic project briefs, annual progress reports, midterm evaluation and final evaluation results will be circulated widely for review, comments and edits as needed.

Results expected from project (2.3) also include the generation and dissemination of knowledge for how to better adapt to climate change, enhance community socio economic resilience, and ultimately improve the water sector in JV through collaborative governance. This will be accomplished through collection of south-south engagement, learning from good practice and production of case studies. Creating knowledge from this program could then be used in other projects throughout the JV region. Such knowledge sharing can create a snow-ball effect for implementing these governance platforms in other countries.

Outcomes from the program include better use of sparse water resources, adaptability to climate change, value-add for agribusiness by producing exports further along the value chain, setting a precedent for open governance and transparency in policy-making activities, enhanced service delivery from government ministries to citizens, and positive shifts in the currently volatile social climate in the JV region through citizen participation in the policy-making process.

H. Consultative process

Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender considerations, in compliance with the Environmental and Social Policy of the Adaptation Fund.

COMMUNITY AND STAKEHOLDERS CONSULTATIONS FOR SUBPROJECT (1.1):

For the Wadi Mousa Project**: On 9th of July 2012 MOPIC** held a consultation meeting with ***Al-Sad Al-Ahmar Association (a Community Based Cooperative Association) through the Enhanced Productivity Program (EPP) recognized the need to launch a new initiative – Small Grants for Direct Interventions which was meant to provide funding for community based organizations (CBO) to start and run income generating projects***.

One of the pilot organizations benefiting from the seed funds provided by MOPIC was Al-Assad Al-Ahmar Association, located in Wadi Mousa region. This association requested funds to implement agricultural related project activities relevant to harvesting forages. The project has been implemented with successful activities that enhance the productivity, create new job opportunities and improve the living standards of beneficiaries and utilized wastewater reuse as a water resource for irrigation and adaptation to climate change impacts.

40 low-income families who have had historically the right to rain fed cultivation of the land were consulted in Wadi Musa, especially the ones who will directly benefit from the implementation of this project, among the 40 farmers, 6 women farmers were chosen, Training for the farmers on good agricultural practices, irrigation management and proper handling of reclaimed water used in irrigation will be initiated.

Another recent consultation meetings were held **by MOPIC on the 12th of May 2014 with steering committee of Sad Al Ahmar NGO,** and the other meeting on the 17th of May 2014 with the members of the NGO & representatives of the local community(farmers, WUA members & female farmers),(Annex: 2-9 & 2-11) .

The above consultation meetings aimed to reach an agreement on up-scaling the pilot wastewater reuse project as a climate change adaptation tool in the water and agriculture sectors. Refer to Annex: (2/9 & 2/11) to view list of participants representing Community consultation sign-up sheet and community needs". A wide spectrum of the community ranging from farmers, female heads of households (divorced or widows supporting their families), and local NGOs, discussed the project concept and recognized the importance of using treated waste water as a climate change adaptation in agriculture in Wadi Mousa region. The concerns about possible impacts as voiced by the participants were recorded and answered by the team. Key official stakeholders Water Authority of Jordan (WAJ), Petra Tourism Development Region Authority (PDTRA), were also consulted. Petra Tourism Development Region Authority is the owner of the Wadi Mousa land and authority issuing permissions for activity at the project site. Responsibilities distributed among the key responsible stakeholders at the Wadi Mousa pilot project are summarized in the schematic figure below.

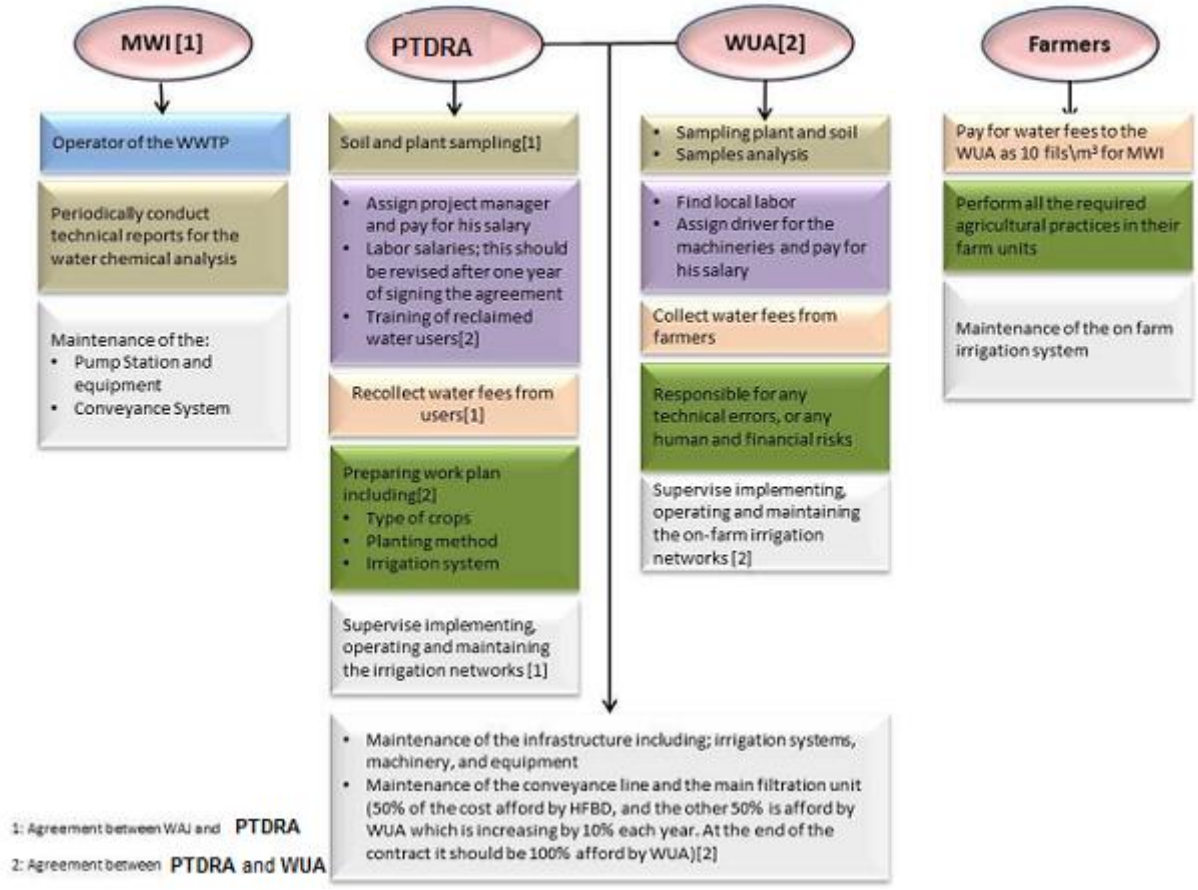


FIGURE 23: RESPONSIBILITIES DISTRIBUTED AMONG THE KEY RESPONSIBLE STAKEHOLDERS AT THE WADI MOUSA PILOT PROJECT

The WUAs' members in Jordan Valley are the farmers in the WUA service area who opt to join the WUA. Membership has been expanding since the inception of the WUAs initiative in 2001. There has been a steady expansion in farmers' participation in the JV since 2002. A small number of women farmers are also WUA members. The current number of member and non-member farmers in each WUA is shown in the figure below. The total number of farmers in WUAs in JV is 4207, ie 44.3% of the total number of farmers in JV for 2012. A few WUAs have membership areas nearly reaching 100%, particularly in Southern Jordan Valley. Around 182,000 du (62%) of the irrigated area of the Jordan Valley is covered by WUAs, i.e. retail water is managed with farmers' participation.

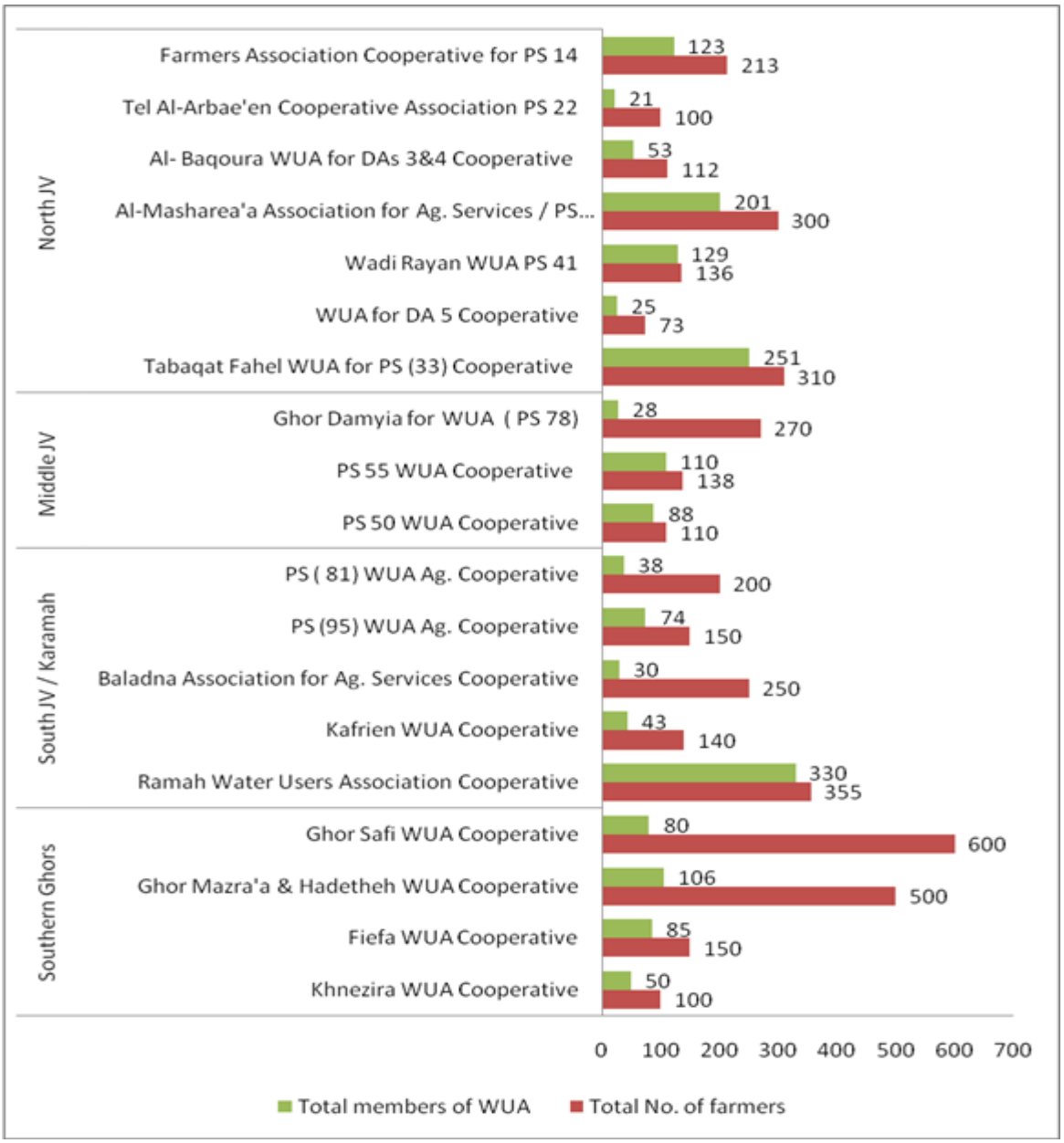


FIGURE 24: THE CURRENT NUMBER OF MEMBER AND NON-MEMBER FARMERS IN EACH WUA

Also several official stakeholders were consulted for this CC AF project among these were the Ministry of Water and Irrigation, the Ministry of Agriculture, the Jordan Valley Authority, the Agricultural Credit Corporation, Water User Associations and individual farmers, all agreed that there is a great value of the multi-stakeholder engagement initiative around water in the Jordan Valley. The World Bank Institute (WBI)'s Private Sector Engagement for Good Governance (PSGG) program brokered a stakeholder participatory process for reforms to the agribusiness (export, marketing, extension and access to finance services) in order to achieve a truly effective integrated water resources and agribusiness management system in the Jordan Valley.

The WB/PSGG team, in consultation with public and private sector stakeholders throughout Jordan and under the JVWF on May 18, 2014 has helped to produce a proposal for setting up a Jordan Valley Water Forum. The Jordan Valley Water Forum was then solidified as a continuous process with a Steering Committee with four public and four private representatives. It is chaired by the Secretary General of the Jordan Valley Authority, and composed of the Minister of Water and Irrigation, the Minister of Agriculture, the Head of the Agriculture Credit Corporation and four elected Jordan Valley regional representatives of the 23 Water Usage

Associations (WUAs) that represent farmers, so they can voice concerns in a coordinated manner and discuss specific issues and recommendations.

Community consultation for Projects (1.2, 1.3, 1.4, and 1.6): WW reuse projects, and Climate Change Adaptation, Building Resilient Food Security Systems through Extending Permaculture Design and Technologies in the Jordan Valley and Beyond. A meeting was held on the 11th of May and December 13th, of 2014 with beneficiaries and community representatives who expressed their interest in the permaculture concept and said that the methodology followed in this project will help them to sustain their families and not depend on any external source for maintaining farming viability in the future. They stressed on the importance of including women in these activities, and requested a mechanism that will help them market and sell their vegetables to other regions. Refer to Annex (2/18) several participants attended the community consultation session for the wastewater reuse at North Shouneh WWTP, Annex (2/15"C") for list of participants.

For the Rain Water Harvesting project (1.5) community resilience and adaptation to climate change through water harvesting technologies in poverty pockets and local community groups. The consultation process was part of the Jordan Valley Water Forums held in June 2012 January 2013, May 2014 and December 4, 2014 and whose proof of consultation is provided under the list of attendees. Refer to Annex (2/14) Outcomes of several meetings with the concerned parties representatives from communities in the Poverty Pockets areas including Ghour Al Mazraha/Ghour Hadeetha and Khnaizereh, on sub project (1.5) showed that the community requested to be provided with water permanently for agriculture and livestock, they also asked to drill new wells and for the construction of rain water harvesting dams and manage their water resources. Refer to Annex (2/17)

CONSULTATION PROCESS RELATED TO COMPONENT 2

On Monday 19th of May 2014 a meeting was held at the Ministry of Environment with the Director of the Climate Change Projects at the ministry, who stressed on the importance of this proposal and that through implementing many of the proposed subprojects the Ministry of Environment achieves several goals related to its commitment & responsibility towards mainstreaming climate change adaptation plans into its environmental policy, and also aid in the capacity building activities specially in the poverty pockets areas. The Ministry of Environment role lies in managing, facilitating & supervising the work of the implementing entities as the RSS & others.

Project (2.1): Strengthened ability of remote and poor communities to make informed decisions about climate change-driven hazards affecting their livelihoods: Consultation was held on Monday 19th of May 2014 a meeting was held at the Royal Scientific Society at the Environmental Research Center with the Managing Director, to collect Information on their contribution towards the awareness raising & capacity building on climate change issues activities, budget possible challenges etc. He has showed great interest in such program especially that they have already a vast experience in undertaking awareness projects around Jordan.

Project (2.2): Using ICT as an enabling tool for more effective climate change adaptation and development programmes. This subproject will enforce Early Warning System for Drought (Using Climate, Vegetation Cover, Water budget, and Crop Risk information) ". On Monday 19th of May 2014 a meeting was held at the Royal Scientific Society at the Information & Technology (IT) Center with the Director of ICT for Development Cluster to collect information on their contribution towards this project in terms of activities, budget, and possible challenges etc. He said they have already implemented similar project for other sectors and that RSS has excellent experience in designing software, mobile applications, and in implementing them & disseminating the information.

Project (2.3): Jordan Valley Water Sustainability and Agribusiness Competitiveness, a Jordan Valley Water Forum was held on 29th June, 2013 participants discusses and agreed on the need to market Jordanian produce and to simplify domestic sale and export procedures as well

as to improve logistical support and transportation systems. A substantive number of proposals have been made during the Forum to improve marketing systems such as the joint development of a national agricultural export strategy, to guarantee airfreight space for export, to obtain international accreditation for national laboratories, to develop food standards, etc. It also recommended changes to the labor policies, increase access to finance, and provision of agricultural and irrigation advisory services; refer to annex (2/22) “E” to view the list of participants. Follow up meetings of the Forum steering committee were held on May 18, 2014 and July, 15, 2014 where these requests were discussed in detail as reflected in the meeting minutes of the regional heads meetings with their geographical WUAs constituencies

I. Justification for funding requested

Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

According to the Third National Communication Report to UNFCC prepared by Jordan has been identified as particularly vulnerable to the impacts of climate change with the water and agriculture resources as being the most vulnerable sectors to climate change. Under the adaptation alternatives, risks to agriculture in the two focus areas through an integrated response will be developed to manage climate change impacts. Our project activities will target vulnerable communities in order to support agribusiness and the agricultural sector to adapt to development opportunities through the use of non-conventional water resources management, and enhanced agricultural practices. The baseline situation and adaptation alternative per project component are presented below:

Component 1: Climate change adaptation of agricultural & water sectors through technology transfer (The use of non-conventional water resources (reuse of wastewater, rainwater harvesting & permaculture).

OUTCOME 1*: Increased water availability and efficient use through wastewater reuse & water harvesting technologies* through integrated and efficient use of non-conventional water resources through treated wastewater reuse and rain water harvesting and the application and use of efficient irrigation systems and technologies.

Baseline

The MWI/JVA, MOA, PDTRA and NCARE are all working towards meeting the national goals of their strategies for augmenting water supplies, and adapting to climate change through water reuse and rainwater harvesting in several areas around Jordan, through the construction of water catchments, and ponds. So the wastewater reuse activities being proposed support these strategies. At Wadi Mousa, Northern Jordan Valley, North Shouneh and Tal Mantah the farmers rely on treated wastewater to augment supplies as a result of water scarcity caused by climate change. In Ghour Haditha, Fifa and Khnaizerah and Mazrraah in the Jordan valley where farmers rely on rainfed agriculture, and on ground water for irrigation without the means for supply augmentation through rainwater-harvesting options.

Adaptation alternative

Aiming at limiting the impact of climate change on water supplies of Jordan by reusing treated wastewater and rainwater harvesting and thereby reducing the consumption of the scarce ground water The project will enhance national agricultural and community resilience to climate change by addressing common water shortages and climate stresses through innovative technology transfer linked to community livelihoods and environmental resources preservation. This will be achieved by providing efficient, simple and cost effective systems and in applying conserving irrigation water resources management practices as key to ensuring that agricultural production can withstand the stresses caused by climate change to farming communities in arid regions who suffer from water scarcity, and food insecurity by the deployment of advanced innovative irrigation methods such as drip, spray and micro-sprinkler irrigation low-cost pumps, low-head drip irrigation kits, tensiometers and other techniques.

The project will support farmers where rainwater harvesting systems and wastewater reuse will target greenhouses and agricultural open farms. These will supply additional water for irrigation, hence increased yields. Depending on the crop, the increase would be up to 2-3 folds the baseline production. In around 10 years, the return on investment will be achieved. Other practices to be promoted by the project include technologies that increase rainwater infiltration and storage in the soil for crop use, and run-off storage for supplemental irrigation using storage structures such as farm ponds, earth dams, water pans and underground tanks.

The introduction of reclaimed wastewater will have other benefits other than supply augmentation, adaptation to climate change, but also reduced application of pesticides and fertilizers, better soil organic matter; and ultimately socioeconomically better quality of life for farmers (reduced cost of agricultural inputs and less contact with harmful pesticides), enhanced quality of agricultural produce, better worker hygiene and better efficiency per unit area. The initial high investment cost needed for the installation irrigation systems and filtration techniques will be offset by the higher productivity and lower expenditures within 2 or 3 years.

OUTCOME 2: ***Reduced exposure at national level to climate-related hazards and threats***

Baseline:

MOA and NCARE/RSS are currently conducting extension activities to support farmers in enhancing their agricultural practices and productivity. Also NCARE and the Department of Meteorology operates a network of weather stations covering most of Jordan that require further support to predict better climate change scenarios and their impact on agriculture and water resources. Further assistance is needed to expand their research and extension activities to cover climate change issues, it is in need of additional technical and financial support.

Adaptation alternative:

The project will directly support Jordan in enhancing its capacity to deliver climate-smart technology for enhanced agricultural production. The adaptation alternative will demonstrate substantial quantifiable improvements in agriculture, water, and livelihoods. As a result of irrigation efficiency, water savings are expected to range between 20-30 percent. Similarly, it is estimated that adaptation measures in agriculture introduced under this project will save about 20 percent of agricultural production and farmer incomes. The results of the program components will be developed and disseminated by means of component 2 , the enhanced extension services and direct training and enhanced awareness to local institutions and farmers. A range of climate-resilient agricultural technologies and methods will be developed and transferred to farmers e.g. drought and disease-resistant varieties, integrated crop-livestock production systems, conservation agriculture and others.

An early warning system linked to IPM and water resources management as well as good agriculture practices, will enable farmers to be more efficient in terms of inputs usage (chemicals (fertilizers and pesticides) water and labor. Savings may reach more than 30% of the cost of production. The current measures of following an annual cropping calendar is proving to be cost in efficient is and making crops more vulnerable to climate variability and pest outbreaks.

OUTCOME 3: ***Raise living standards and resilience to climate change of vulnerable remote poor communities and Bedouins.***

The use of reclaimed water for fodder production in the WadiMousa project will promote adaptive grazing practices to climate variability and preserve natural rangeland resources and ultimately make remote communities more resilient to climate change.

Baseline

Remote and Bedouin communities rely on rangelands and are the most vulnerable to climate change and desertification, degradation of rangelands is being observed caused by natural

(climate effects, floods, drought, etc.) and man-made (over-grazing, desertification, etc.) factors.

Adaptation alternative

The project will be the first project to support MOA in addressing climate change effects in the rangeland ecosystems, provide improved soil salinity management techniques, limit erosion and improve water and nutrient efficiency, thereby contributing to adaptation. Rangelands also support reduced NO2 emissions and carbon sequestration, and ultimately improved feed resources.

Component 2: Capacity Building at both the National and Local Community Levels, Knowledge Dissemination, Policy and Legislation Mainstreaming.

Outcome 1: ***Mainstreaming new policies and legislations which incorporate Climate change adaptation measures into local and national strategies & plans.*** This will be achieved through policy influence and sharing lessons learned through a knowledge management system, and Climate Change Adaptation Fund Support which will provide an agriculture and disaster insurance for farmers.

Baseline:

Currently, there is a climate change adaptation fund in place for farmers in Jordan but it has not been effective as an insurance scheme applied for agriculture for climate adverse effects and in cases of severe weather conditions or natural disasters, when farmers lose their crop yields. The GOJ, through MOA assess the damages in the field and disburse compensation payments to the farmers based on the estimated assessment of their losses. This process, poses a financial burden on the public budget and is not institutionalized and requires capacity building to set forth the financing mechanism and revenue streams as well as funds disposal methods and avoidance of unfair dispersion of funds.

Although Jordan is a signatory to the Kyoto Protocol through MOEnv., aware of the importance of an enhanced response to climate change, yet there is still an absence of a national climate change policy with inter-connected action plans. The public at large are aware of the increasing climatic vulnerability affecting their environment and community livelihood; a lot is yet to be done to link the global aspects of climate change at the national level. There is also a need for linkage between sectoral and development implications of climate change where adaptation measures are not mainstreamed into development planning processes coupled with weak Information and lessons learned documentation to influence policy determinations.

Adaptation alternative:

The project support to MOA's climate change adaptation fund and the climate change monitoring system will relate weather indeces and consequence to climate change impacts on crop failures to farmers and community resilience. This process removes the compensation payments from the Government and supports better assessments of damages in the field

The project outcomes will be strongly linked to a strong learning path for MWI (WAJ-JVA) and PDTRA's/NCARE/RSS public awareness and knowledge management and dissemination component translates lessons learned into policy implementation and institutional development measures ultimately leading to better adaptation to climate change, a more robust agribusiness supported with ICT linkages and knowledge management systems that are be institutionalized and linked to relevant Governmental and research institutions documenting the experiences of communities and disseminating lessons learned and best practices.

Stakeholder consultations revealed that communities in the proposed project locations understand and feel the climate change impacts, The farming communities are actually asking the government to support them with adaptation projects in the agriculture sector to safeguard their livelihoods. Women were particularly amongst the highest impacted social groups. GOJ wants to ensure that gender mainstreaming is a key element as well as civil society, the private

sector and the research organizations are all taking part in this project to ensure an all-inclusive approach to climate change adaptation and development and sustainability.

J. Sustainability of the project/ programme

Describe how the sustainability of the project/programme outcomes has been taken into account when designing the project / programme.

To sustain irrigated agriculture in the future requires that the farmers' skills and knowledge be significantly improved through knowledge of safe irrigation methods. That's why part of these project activities is to initiate farmers on good agricultural practices, irrigation management and proper handling of reclaimed water used in irrigation.

Furthermore a Water User Association (WUA) which was established in January 2008 at Wadi Mousa will ultimately take over the responsibilities of managing farming issues following the end of the project when capacity building measures are completed. Additionally, the establishment of a revolving fund will assist farmers in improving and expanding their farming practices in the future.

The sustainability of the participatory process is not only considered by economic terms i.e.(better yields, better exports, further investment, more jobs) but also in term of inclusive growth and collaborative governance practices. Therefore the established participatory process needs to be maintained, through a coordinated secretariat, with donor input to ensure good practice in the dialogue process. Sustainability of project results and outputs are an integral to the design of the Project. Governance and locals' engagement are essential tools for empowerment. A strong emphasis will be placed on NGOs and community-based organizations (CBOs) in the implementation of the project to ensure participation and ownership by local communities, all of which will assure sustainability of CC adaptive measures and investments.

The design of the project also emphasizes the process of identification of the specific locations and locally suitable designs of rainwater harvesting infrastructure, on-farm demonstrations of wastewater reuse, climate change resilient seed varieties, permaculture pilots . During the project formulation phase, representatives from the project target sites through the Sad Ahmar NGO in Wadi Mousa and the steering committee of the Jordan Valley Water Forum were consulted to verify and validate their commitment and willingness to provide in-kind co-finance, in the form of labour and locally available materials,. Contributions of in-kind co-financing was agreed on and is likely to increase the ownership, and hence, sustainability of the investments as well.

Training will be a significant component of the technical assistance plan. Stakeholder participation is essential to a successful training program. Demonstration of adaptation to climate change, poverty alleviation, food security and (youth & gender all inclusive governance) are the expected major outcomes of the project. Economic viability is an expected outcome of the training so that in the future, when it comes time to re-invest hard-earned income into renewal and replacement improvements, the pilot can be economically self-sustaining.

The approach to providing technical assistance to address economic sustainability will focus on clear definition stakeholder responsibilities; organizational management capacity that would sustain economic benefits and best practices; organizational training to maintain farmers' practice to minimize the potential health risk; and technical proficiency to operate and maintain a productive reclaimed water irrigation system.

The primary focus will be on training farmers on better the sustainable use of treated wastewater in place of fresh water supplies as an adaptation tool to climate change but as governed by the reclaimed water reuse standard JS 289/2006, crop selection, rotation, and harvesting, and in increasing their understanding of how such changes can either make their crops more marketable or enable them to produce a self-sustaining year-round supply of feed for their own livestock. There will also be training on the public health aspects in terms of hygiene, financial responsibility, accountability, and planning, as needed, to achieve economic viability.

It is important to understand that long-term solutions must be culturally consistent with the traditions of the Bedouin people of the Wadi Mousa area. Such activities may involve the use of forage crops and native forage plants and trees in a way that can provide a year-round, self-sustaining supply of feed that can support herding and raising livestock and other on farm productive activities such as dairy and honey production.

Socioeconomic Status Monitoring: Achieving the sustainability of the Wadi Mousa pilot project is a main objective of PDTRA. Because it is clear that the project sustainability depends mainly on the benefits of the project, it is important to encourage the practices that will eventually result in optimizing farmer benefits. A socioeconomic study will be conducted to evaluate the current socioeconomic status of the Wadi Mousa farmers and to monitor the success of the technical assistance. The evaluation will include the social and tribal status, income, family members, and economical status for both farmers and the WUA staff. The WUA will be evaluated for the number of members and the beneficiaries as well as the financial sustainability and the association's governance. The scope of the survey will be developed in consultation with the WUA and (PDTRA) and nearby Al Hussein Bin Talal University academia

The economic return and gain to be achieved from livestock breeding stems from the value of its products which is considered as a necessity for the farmers and shepherds' subsistence by the production of meat, milk, wool and leather. Livestock Breeding "Which is an activity under subproject "1.1": It was agreed to raise 200 sheep to be fed later on fodder produced onsite. Raising sheep is considered as a profitable project for the association and also beneficial for the members who didn't have the chance yet to get advantage of this activity, keeping in mind that those members have vast experience in Livestock Breeding; this fact will definitely strengthen & sustain this project proposal.

Farmers Revolving Fund: To ensure the availability of the necessary financing, it is recommended that a Revolving Loan Fund(RLF) be established to promote economic development in the Wadi Musa – Petra Region. The RLF should target farmers irrigating with reclaimed water in the region, and related agricultural industries able to demonstrate a competitive advantage in supplying agricultural inputs and processing outputs, such as forage crops and tree crops. There also is a local market for the sale of cut-flower products to tourists and hotels. Examples of activities that could be funded include: dairy product manufacturing or fodder baling and transport enterprises. The RLF should be used to provide gap financing, encourage investment, create permanent, year-round jobs, help retain and expand existing businesses, attract new business, encourage development of modern industrial technology, and promote a safe, healthful work environment at Wadi Mousa. (Reference: Marketing and Economic Implications of Irrigation with Reclaimed Water in Jordan (Technical Report by PA Consulting Group, Jordan Wastewater Reuse Implementation Program, USAID).

All the information mentioned applies to all subprojects under Component (1) Sub Component (A)

Subproject (1.6) The JV Permaculture, as a Jordan Valley cross cutting initiative as well as the other proposed subprojects is expected to play a role in diversifying production patterns for plants and animal in order to improve product marketing and increase the return from the farm. The project will launch a revolving fund to help the local community to implement small agricultural projects with a focus on Permaculture. The revolving fund is expected to have a great impact in helping the local community to implement and sustain Permaculture practices in their farms and household gardens.

A revolving fund to be developed under subproject 1.6will be established. However the details about the number of revolving loans that will be granted, in addition to other information as the payback period allowed and the requirements needed will be discussed with the farmers union, "Agriculture Credit Corporation (ACC)" and Ministry of Agriculture. It is worthy to mention that the Agricultural Credit Corporation (ACC) is the sole institutional source of formal credit to both individual farmers and members of village cooperative societies.

The two suggested pilot farms will cultivate different productive crops which will be used to generate income for the local community. At the household level, different crops will be cultivated to provide supplemental food for the families. Families will not use chemicals for plant protection or fertilizers for soil improvement instead they will depend on safe methods and materials for plant protection and organic manure, and compost and plant residue for soil improvements.

Overall Project/ Program Sustainability

Degree of Sustainability of Reuse, Rainwater harvesting & Permaculture Activities

At the end of a given project, sustainable management plans should be in place for all reuse and rainwater harvesting implementation activities that address issues related to the sustainability.

Technical Sustainability

The infrastructure that supports the irrigation system must be robust and able to withstand a high degree of wear and tear. It must be capable of being operated and maintained using local resources, and personnel have an effective program of asset management to ensure periodic maintenance and replacement of parts, and have access to equipment and spare parts necessary for regular maintenance and repair. The design of the infrastructure must be consistent with locally available materials so that in the event of breakdown the system can be repaired speedily and at the lowest possible cost. **A technical O&M manual in Arabic will be made available at regional management site**, along with appropriate training and certification of operators, so that members of the enterprise are fully able to follow standard operating procedures.

Financial Sustainability

The enterprises must be ultimately self-financing and do not rely on capital or operating subsidies. Income generation must be sufficient to cover both recurrent and capital expenditures. There must be an effective financial plan that estimates likely income and expenditure streams, management of financial and capital assets, and mechanisms for determining the timing and scale of future investments. There will be a transparent mechanism to audit receipts and expenditures of either a formal or informal banking account system so that it is accountable to its constituents.

K. Overview of the environmental and social impacts and risks identified

Provide an overview of the environmental and social impacts and risks identified as being relevant to the project / programme.

Risks associated with treated wastewater reuse in Jordan

***All wastewater treatment plants where the subprojects will be tapping into their treated wastewater effluent for reuse have been subjected to an EIA and Environmental Management and Mitigation Plan (EMMP)* according to Ministry of Environment EIA Regulation # 37 FY 2005 which requires inclusion and identifying risks on the environment and social impacts and requires identification of mitigation measures during construction and future operation of the infrastructure and decommissioning.**

According to a review of the AF ESP requirements and the suggested draft ESP of January 9, 2015, the project activities have been screened for environmental and social impacts against the stipulated requirements and principles. The results of the screening are presented in the Table below on the projected environmental and social impacts. The project treated wastewater reuse activities and rain water harvesting through collection in to be constructed earthen dams can be classified as Category B or under Jordanian EIA Regulations Category II i.e. a Project with “Possible but Limited Anticipated Adverse Environmental or Social Impacts”. Whilst limited to no adverse or negative impacts are anticipated, an Environmental and Social Management

Plan (ESMP) (see Annex 5) has been developed to ensure that any unintended adverse impacts are avoided, and that, where this is not the case, they are timely detected and appropriately mitigated. See Parts III.C, III.D and Annex 5 for ESMP for further details.

Particular attention will be given to ensuring that activities do not impact adversely on any priority are of the elements of the environmental and social elements, and in particular on public health impacts of reclaimed wastewater reuse, biodiversity areas (Flora and Fauna) or ecosystem support areas, and that there are no negative impacts on local communities, including vulnerable groups (poverty pockets of marginal groups, small farmers and women) and indigenous people such as beduins. Project activities that may emerge other than those with an already ESIA (ie those identified under the project document and which have been subjected to the ESMP) and pose social or environmental risks and maybe classified as Category A and its equivalent in Jordan Category I will not be approved at all during the detailed quarterly forecasting process.

As described in Section II.E, under the National EIA Systematic Procedure Table 22 Summary of the Jordanian EIA Procedures only project activities that do not require an EIA (category III or require a Preliminary EIA Assessment (category II) as per the National EIA Regulations (see Section II.E) will be supported, due to administrative costs and potential delays. The only exception to this will be where local authorizations can be obtained from the EIA committee of the Ministry of Environment. As demonstrated in section II E Laws, Regulations and Procedures are in place. Such an approval will need to be provided in writing before the abovementioned activities can take place, and are approved by the NIE.

It is worth noting here that for all WWTPs where wastewater reuse activities are planned (Wadi Mousa and the three identified WWTPs in JV) there are EIAs done for them, and they were donor/lender funded and managed and were subject to the EIA regulation where under the design and feasibility process an ESIA is required to meet the donor entity regulations such as Germany for the KFW funded Central Irbid WWTP in northern Jordan Valley, and USAID's 22 CFR Reg. 216 for the Wadi Mousa WWTP in Petra and North Shouneh WWTP while for Tal Mantah it was under Canadian CIDA funding and regulations. Please refer to Annex 3 for the environmental approvals.

EIA approvals of these donors and the Ministry of Environment's EIA Committee review and approvals were secured. For Wadi Mousa the design and feasibility studies were conducted by the USAID engineering firm Camp Dresser and McKee with USAID funding with analysis of effluent reuse options (the source water in Wadi Mousa is strictly treated wastewater) and the wastewater reuse EIA was conducted in February 2006 for the reuse project activity options before it was initiated. Approval of the EIA is attached in Annex 3 noting that it had an Environmental Management and Monitoring Plan (EMMP) for managing the ww reuse pilot.

Each of the JV proposed WWTPs also had a wastewater reuse master plan accompanying the EIA approval that complies with JS 893/2006 and the prevailing 2006 WHO guidelines for the safe reuse of treated wastewater at the time of the EIA.

To give a good understanding of the flow of water resources including treated wastewater in JV from the source WWTP which is the As Samra WWTP into the Zarqa River to the KTR to be mixed with rain water then flows out until it ends into King Abdullah Canal (KAC) where the treated wastewater ***through King Abdullah Canal*** is mixed ***downstream with fresh water supplies from Jordan River (to the middle Jordan Valley and Karamah area of southern Jordan valley) and Yarmouk river (supplying water to North Jordan Valley) to irrigate the JV.*** For Southern most part Ghour of Jordan in Fifa/Khnaizereh and Mazzrah the source water is from springs (fresh water and rain water) thus no negative impacts are envisaged there.

The schematic below demonstrates the main distribution system.

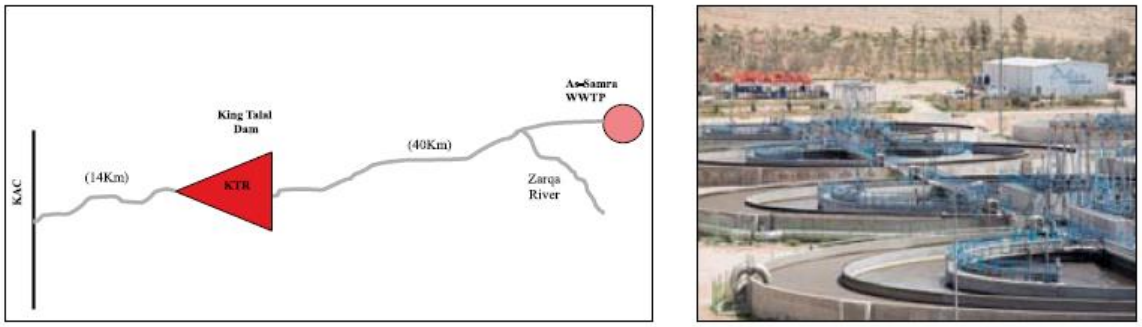


FIGURE 25: THE MAIN DISTRIBUTION SYSTEM.

The Environmental Monitoring and Management Plan (EMMP) for these WWTPs and their reuse pilots demonstrates that as part of the EIA completion requirement it ensured adherence with national laws and regulations which begins with the first element of the ESMS ie the identification of risks through screening and begins with adherence to AF ESP principle # 1 which is screening against domestic and international law and then the 14 other principles. Documentation of the screening process and the results are detailed in the ESMP of Annex5. The 15 principles in the AF table are ensured in the national EIA and EMMP thus satisfying the AF ESP Guidance and its Principles.

TABLE 24: AF Check List of Environmental and Social Principles

Checklist of environmental and social principles	Justification (if answer is yes describe risks) If No: No further assessment required for compliance	Corrective or Preventive Actions) Potential impacts and risks – further assessment and management required for compliance
Compliance with the Law **Key Issue**: Does The development of the project represent any potential risks of noncompliance with local and/or international law & legislation?)	**Yes:** all WWTPs and major infrastructure projects utilized under this CC Adaptation Project have had a comprehensive EIA according to the EA regulation # 37 FY 2005 and an environmental and social safeguards management and monitoring plan compliant with the Environmental Law # 52 FY 2006 & international regulations governing the funding donor/lender agencies and Jordanian regulation. The construction of small earthen dams will fall under category II which require an initial (preliminary EIA) Procedures and screening of impacts and mitigations were addressed in the ESMP Table 41. Also pls refer to Part II E for details of prevailing national standards. For the treated ww reuse and mixed water reuse in irrigated agriculture a risk management plan has been prepared for Wadi Mousa and JV.	All impacts and risks identified in EIA and social management plans no further action or assessment needed as they will comply with Jordanian and international governing laws. Request Executing Entities to secure respective permits, cadastral plans and related legal approvals on implemented activities. M of Env will monitor regularly for compliance with the pertinent national laws and standards as well as MOPIC's environmental and Social (M&E specialist) will monitor adherence to the 15 principles
Access and Equity **Key Issue:** Is there a risk that there will be no just and equitable access to benefits? (treated effluent, rainwater harvested, related health and socio-economic benefits/ services, etc?)	**Yes**: As all activities are oriented towards poverty pockets and vulnerable socioeconomic groups of farmers and beduins. There is a risk that access to services and benefits such as capacity building would not be oriented towards all.	- Application of Free and Safe Access and Equity is ensured under the EIA Regulation #37 FY 2005 and National Environmental Law #52 FY 2006. - Request that all capacity building activities and funding initiatives be published in local media and that the developed ICT tools reach all stakeholders via sms and through the local NGOs and CBOs. Also include contractual clauses to executing agencies that ensure requiring equitable access to project benefits and including females, youth and beduins - Project shall adopt an approach that capacitates vulnerable groups and people with special needs, women, beduins, poverty pockets of farming communities thus assuring fair and equitable access to services and benefits.

Marginalized and Vulnerable Groups **Key Issue:** that project activities risk generating adverse impacts on marginalized and vulnerable groups (women, poverty pockets, farmers, beduins in remote areas of Wadi Mousa, Syrian and Iraqi refugees who maybe living in project areas, children and youth) Large influxes of refugees from Syria and Iraq are reported but it is unclear if and to what extent they are present in the project areas. They would be an important vulnerable group, and the risks to them as a group and as individuals resulting from project funding should be explicitly identified and assessed, as needed. However, total number of Iraqi refugees in Jordan is 400,000 concentrated mainly in Amman (Non targeting governorate). The total number of Syrian refugees registered with UNHCR in Jordan is 623,000	**Yes:** No initiatives are identified with orientation or execution that could generate a negative impact on marginalized and/or vulnerable groups. All the initiatives are oriented to generate benefits for the groups most vulnerable to climate change and socioeconomic conditions. However, there is the risk of overlooking their engagement in design and development of the agricultural activities. The ESMP scoping sessions has taken care of this issue by ensuring all segments of the society have representation in the meetings - About 176,929 refugees of them are distributed in targeting project governorates (in Irbid governorate 140,968; in Balqa governorate 19,845; Karak governorate 9,093; and in Ma'an governorate 7,023). However, there are about 6100 refugees in the targeting project areas (in Shoubak: 600; in South Ghor: 900; in Middle Ghors: 3,600; and in North Ghors; 1,000. Major risks to the Syrian refugees are: - -Limited access to natural resources such as grazing and foraging of range shrubs and forest trees, -The project might attract people to come and work in the area which ultimately will result in increasing cost of living (mainly rental costs), thereby affecting Syrian refugees' standard of living; -Some Syrian refugees, who get their income from illegal practices, such as collecting wild plants and cultivated government's land will be affected	- Marginalized groups must not be impacted and their concerns addressed as per the social safeguards plan ensured under the EIA and National EIA Regulation and Environmental Law #52 FY 2006. - Executing agencies will be consulted during the development and implementation of the Initiatives. The ESIAs already conducted ensures that mitigation plans eliminate or solve the adverse impacts. - Include clauses that the development of the initiatives will not generate adverse impacts on marginalized groups. - Priority should be to target poverty pockets, women, vulnerable local groups, and beduins and ensure the benefit of vulnerable groups living in the project areas and to create jobs for the people with disabilities -Liaze closely with UNHCR, Aid organizations and Prime Ministry

Human Rights **Key Issue:** The development of the project represents a risk of disrespecting international human rights?)	**No** initiatives are identified whose execution is misaligned with the established international human rights. Project objectives promote basic human rights for equitable access to service and water for irrigated agriculture and capacity building as well as access to information.	- HR are not to be violated under the --(Jordanian Human Rights Law and are monitored by the Jordanian Human Rights Centre) - Include contractual clauses to executing agencies so that the development of the project activities will be in compliance with human-rights and Jordanian Human Rights Law and that during their development no deviation or disrespect of human rights will be tolerated. - The project will respect and promote human rights, equality, freedom of expression and association, access to services, information as mandated by the Jordanian Constitution
Gender Equity and Women's Empowerment **Key Issue:** The development of the project represents a risk of not promoting gender equity in a way that men and women are enabled to participate fully and equally, receiving equal social and economic benefits and not suffering from adverse effects? There are also issues related to gender-differentiated job creation targeting in the programme proposal)	**Yes:** Through the Global Gender Gap Report 2014, the World Economic Forum quantifies the magnitude of gender-based disparities and tracks their progress over time. The Global Gender Gap Index 2014 gives each country's overall performance in closing the gender gap on a 0-to-1 scale and its rank out of 142 reviewed countries. Moreover, Jordan ranks was 134 out of 142 countries. Jordanian women participation in economic activities was poor. Percentage of Female workers in 2012 is only 23.5 percent of the total labor force and was employed primarily in community, personal and social services including activities such as teaching, nursing and financial activities. Women participation is often hindered by social perceptions, social and family attitudes, traditions and habits of rural inhabitants that consider women work unacceptable and the women are housekeepers. The activities of the project are oriented to promote a fair and equal development between men and women. Some initiatives such as in agricultural produce grading and packing are also oriented to promote the active involvement of women groups in order to achieve enhanced empowerment. However, during the execution of the initiatives a risk exists of not promoting gender equity.	- Women engagement and empowerment through the labour and social laws are ensured. Include contractual clauses to executing agencies that for all initiatives, a cross-cutting component of gender equity has to exist and be maintained. This will be also monitored under the M&E of the project reporting and through ensuring gender sensitive meetings and appointment of female experts so that women feel at ease to be engaged with project activities and meetings. - The project will ensure that the M&E/gender expert will be monitoring gender integration during implementation so that women and men are engaged fully and in an equitable manner as identified under gender mainstreaming activities, and that they both are treated equally and fairly in terms of benefits (social and economic) with no adverse impacts on them. - The National Jordanian Committee for Women affairs issued the women strategy 2012-2015 which underlined that Jordan aims to increase the women participation in economic activities. Though the 5,400 job creation targets for women (represent about 27 percent of the total) and the 14,400 job creation targets for men (represent about 63 percent of the total). - One of the main activities of this programme is to gradually increase women participation in the target areas through pilot demonstrations to encourage women to participate in agribusiness.

Core Labor Rights **Key Issue:** The project represents a risk of disrespecting the labor rights identified by the International Organization for Work?) Child Labor may pose another risk	**Yes**: The risk has been identified that the people working for the beneficiaries or the executing organization of the initiatives could be outside the national or international legislation (for example minimum salary, maternity leave, nursing facilities and hrs, vacations and sick leave, insurance, etc.) Children are at risk when their needs for food, shelter, education, medical care, protection, and security are not met. Also, especially in the remote areas of the project where people are less educated and poverty rate is higher which forces some parents to push their children to work, Child labor has physical and psychosocial impact on child's health and his growth and development. Child labor has a negative effect on the child's physical, affective, and cognitive development.	- Jordan is one of the first countries that endorsed international agreement relevant to protect economic utilization of child including child rights and their two protocols. The National Strategy to constrain child labor issued in June 2006 chartered a set of policies to constrain joining of child in labor market, and steer planning to include impact of such policies on status of working child to understand their needs. The national Strategy depend on the guidelines of the International Labor organization agreement No. 182 in 1999 regarding prevention of worst forms of child labor and immediate actions to eliminate it, in addition to agreement No. 138 in 1973 regarding the lowest age of laborers. Ministry of Labor in Jordan, operates a division on child labor mandated to set action plans and effective policies to constrain child labor. However, The Jordan labor law issued in 1996, article prevent employment of youngster who not completes 16 years in any form of labor, and 18 years in dangerous activities or fatigued or harmful to health activities. An economic, social and health indicators study was conducted in 2007 by Ministry of Labor indicated that most of child labor in Jordan focused in Amman, Zarqa and Irbid governorates and they are working in vehicles maintenance, handling, sewing and other vocational activities. - Labour law compliance for worker safety, health and rights supervised by the national , international human rights orgs and ILO - Request executing agencies a legal declaration that shows compliance with labor rights identified by the International Labor Organization - Request confirmation from the (Social Security System) that the executing agency is in due compliance with the pertinent Jordanian labor law and Social Security . - Project will focus on job creation and poverty alleviation focusing on women , people with disabilities and marginalized groups - For the child labor risk mitigation, The project team will ensure to include this issue in the curricula of the capacity building workshops under component 2, The project team will also collaborate with Public nongovernmental and international institutions to eliminate child labor and propose practical solutions for families, employers and society. Additionally decision and policy makers will consider and enhance the dialogue at the school setting and avoid using all forms of abuse against children at school settings

Indigenous Peoples **key Issue:** The development of the project represents a risk of disrespecting the rights and responsibilities established in the Declaration of the United Nations about the Rights of Indigenous groups and/or applicable instruments related to indigenous groups?)	**Yes**: No initiatives are identified whose orientation or execution de-respects the rights and responsibilities of indigenous groups being here the beduins. However, there does exist a risk that during the development of the project initiatives, the rights of beduin groups could be disrespected in a direct or collateral way, for example because of territorial (tribal land rights or cultural issues.	- Beduins as Indigenous people must be protected according to the Jordanian Tribal law - A socioeconomic survey has been pre conducted to learn and identify rights and vulnerable beduin groups in Wadi Mousa that could be directly or indirectly impacted during and after the development of the project initiatives and in case they exist, request concrete mitigation plans to eliminate or solve the adverse impacts. Include contractual clauses to executing agencies that the development of initiatives will not generate adverse direct or indirect impacts on indigenous beduin groups. - Project will respect the rights and responsibilities set forth in the United Nations Declaration on the Rights of Indigenous Peoples being here the beduins in Wadi Mousa and will utilize the results of the socioeconomic study already conducted as a pre project survey and assessment.
Involuntary Resettlement **Key Issue:** The development of the project represents a risk of involuntary resettlement of inhabitants?)	**No**: Resettlement is not allowed or envisaged under this project activities. No initiative has been identified with orientation or execution requiring involuntary resettlement.	- No involuntary settlement is allowed under project activities - Include a contractual clause for the necessity to communicate to the executing agencies that no involuntary resettlement of part of the population is allowed for the development of the project activities. - No activities that could require compensation are envisaged, in particular, with regard to possibility of some modified grazing regimes or earthen dams for rainwater harvesting as they would be in WUAs owned land
Protection of Natural Habitats **Key Issue:** The development of the project represents an unjustified risk of conversion or degradation of natural habitat including those legally protected, officially proposed to become legally protected, critical habitats or areas renown and protected for indigenous groups or traditions?)	**Yes:** There is a risk that some agricultural and treated ww reuse activities are developed nearby protected areas or surrounding areas.	- The Agriculture Law # 44, 2002 and National Regulations for protection of birds and wildlife and rules covering their hunting (No. 113, 1973). - Request cadastral plans or land use permits to verify the existence or proximity to protected areas. - Project intervention sites, where the ww reuse and rainwater harvesting activities will happen in Component 1, will reduce the negative impacts of climate variability and change on natural habitats and no negative effects on natural habitats are anticipated.

Conservation of Biological Diversity **Key Issue:** The development of the initiatives represents a risk of unjustified reduction or loss of biodiversity, as for example the massive introduction of alien species?)	**Yes**: The activities are focusing on Ecosystems Rejuvenation based Adaptation as proposed, including recovery of biodiversity and agro-ecological practices at the farm level. A risk of introduction of nonindigenous species is a potential risk to be considered.	Ministry of Agriculture Law (No. 44, 2002) and Regulations for Protection of birds and wildlife and roles covering their hunting (No. 113, 1973). - Request executing agencies to identify and prevent risks of biodiversity loss and to avoid introduction of alien species. - Project interventions will enable improved management of natural habitats, thereby supporting the conservation of biological diversity. In accordance with national EIA Regulation (see Section II.E), these will continuously be assessed against the EIA Regulation to ascertain if a Preliminary Environmental Assessment is required or not. Should a Preliminary Assessment need emerge and be required, this will be used to inform the design of the relevant interventions. No significant impacts on natural habitats or biological diversity are anticipated. Rather, biological diversity will be conserved and protected. - The Royal Society for the Conservation of Nature (RSCN) has a delegation of authority for M of Env to protect flora and Fauna and will monitor protection measures implemented by the project
Climate Change **Key Issue:** The development of the initiatives represents a risk of unjustified generation of greenhouse gases?)	**No:** No activity has been identified with an orientation or execution that could generate unjustified greenhouse gases. On the contrary implementation of permaculture, low carbon technologies and improved pasture land will lead to greenhouse gases reduction. There are transport processes for the initiatives but these are considered unavoidable and minimal. In Jordan there are established maximum emission parameters controlled by Ministry of Environment and Ministry of Transport. WW TPs have methane and gas collection systems and some of them use these biogases as fossil fuel substitutes.	The adherence to the recommendations of the Third National Communication issued in November 2014 to UNFCC and the National Climate Change Policy of the Hashemite Kingdom of Jordan (2013-2020) will ensure adaptation to CC through this project - Project Vehicles should have road worthy certificates - The project will build community and poverty pockets resilience to climate change, and will not result in an increase in greenhouse gas emissions or other climate change inducing drivers.

Pollution Prevention and Resource Efficiency **Key Issue:** The development of the initiatives represents a risk of not making efficient use of energy, water resources, or not providing adequate treatment and disposal of waste streams?) Building of a factory to produce dairy products. The major waste product of dairy processing plants is polluted water, either extracted from the milk or from cleaning the processing installation and equipment. Accordingly, the small dairy plant ww effluent may cause potential contamination of GW or surface water streams	**YES:** - There will be some waste streams discharged out of the (small dairy plant) such as wastewater & the whey " which is produced after processing the cheese), if wastewater & whey is dumped in the environment as the water salinity is very high which may cause damage to trees & plants also it may leak to underground water aquifer and may cause contamination. No initiative has been identified as a big consumer of energy, however there exists the risk that during the implementation of some initiatives, the use of energy or fuel would not be efficient. - No initiatives have been identified as big consumers of natural resources and therefore would require measures for their efficient use. On the contrary, some initiatives are oriented towards the better use of available resources, especially fresh water however, in some initiatives there may exist the risk that the resources may not be used in an efficient way, for example in construction or transportation. - There is a risk that the generated waste or wastewater in some initiatives such as the dairy plant which will be small sized, or, mainly in remote rural areas, or sludge and agriculture waste will not be adequately disposed of. However, no initiative has been identified that generates solid waste that requires any treatment.	- According to the Jordanian Environmental Law # 52 FY 2006, Regulations No. (37) of 2005 - Article (4) No industrial, agricultural, commercial, housing or tourism project or any construction development project may commence operations with the services relevant thereto, until it obtains the Environmental Approval required for this purpose from the Ministry. - Also Article 11 of Environmental Law # 52 FY 2006 states: - A- 1- It is forbidden to dump, dispose of, or collect any materials harmful to the Environment, whether such materials are solid, liquid, gaseous, radioactive or thermal, in the sources of water. It also punish the polluter as it say under (B): - B- Any person perpetrating the acts stated in Paragraph A hereof shall be punishable by imprisonment for a period of not less than 3 months and not exceeding 2 years or by a fine of not less than Ten Thousand Dinars (14000$) and not exceeding Fifty Thousand Dinars (71000$), or both, and shall be obligated to remove the subject of the violation within the period set by the Court based upon a technical report. If the perpetrator fails to meet this obligation, the Ministry or whoever it delegates shall remove such violation at the expense of the perpetrator, and shall levy an additional 25% of such expenses as administrative costs. He shall also be fined an amount of not less than Fifty Dinars (71$) and not exceeding Two Hundred Dinars (284$) for each day he fails to remove the violation after the end of the period set by the Court for such removal. - Building of a factory to produce dairy products. The major waste product of dairy processing plants is polluted water, either extracted from the milk or from cleaning the processing installation and equipment. The risk assessment on p. 109 for this principle should be changed to 'yes' accordingly. The project team responsible for the activities related to the dairy plant should stress on the treatment & if possible recycling of wastewater stream, As it may be reused after some treatment in cleaning, also the whey (which is known to have high nutritional value) should be used to make other useful byproducts or it may be used as cattle feed. - Ministry of Agriculture Law (No. 44, 2002). - Natural Resources Authority Laws 2002. - Request an identification of environmental aspects and impacts for each initiative and measures to control and mitigate the energy efficiency risks. - Request an identification of environmental aspects and impacts for each initiative and measures to control or mitigate those environmental aspects. - The project will not produce excessive waste, or release pollutants, and the small dairy plant must comply with effluent discharge standard JS 202/FY 2007. Programme activities will seek to minimize material resource use and be energy efficient where appropriate. NIE will request a waste management plan for those initiatives that require one and will encourage resource recycling such as composting of agricultural waste and sludge stabilization and use as a compost.

Public Health **Key Issue:** The development of the initiatives represents a risk of generating potential negative effects on public health?)	**Yes:** The risk has been identified that some of the agricultural initiatives could generate health related issues such as the treated wastewater reuse or odor problems, mainly those related to waste management.	Adherence to Public Health Law (No. 54, 2002) and Occupational Safety and Health Regulations and the use of Personal Protective Equipment such as gloves and safety shoes when in contactwith treated effluent -Farmers training will be initiated to ensure no negative impacts on public health arise as a result of the project.
Physical and Cultural Heritage **Key Issue:** The development of the initiatives represents a risk of alteration, damage or removal of resources or cultural sites or with an accepted natural and scenic value?)	**Yes:** there is a risk during the development of some of the initiatives that there will be alteration or damage to sites or cultural resources with natural or scenic value.	- Application of the Antiquities Law (No. 21, 1988) and EIA and National EIA Regulation#37 FY 2005 and Environmental Law # 52 FY 2006. - Request compliance with Law regarding identification and protection of cultural and archaeological, nearby the location where activities are taking place - Request the identification of preventive measures if necessary in order to avoid direct or indirect damage. - The project will adopt an inclusive approach, and cultural sites identified by the communities in the target areas will not be altered, damaged or removed. - Include contractual clauses that if during the development of the initiative damages to cultural, archaeological or sites accepted as natural or scenic are identified, they must be communicated by the executing entity to the National Implementing Entity (NIE) and if necessary, actions must be suspended until finding and implementing a valid solution.
Lands and Soil Conservation **Key Issue:** The development of the initiatives represents a risk of degradation of land or soil?)	**Yes:** No initiatives have been identified with orientation or execution that could degrade soil or productive land. On the contrary some of the initiatives are oriented towards the conservation and use of soil however there exists a risk that during the application of good practices technical errors might occur that generate degradation of land and soil.	Ministry of Agriculture Law (No. 44, 2002). - Request compliance with Law of Soil Use and Conservation and Monitoring with technical endorsement, to verify that there is no risk of degradation of land and/or soil. - The project will seek to conserve land and soil through restoring of grasslands and adjacent riparian environments, through reducing bush encroachment thereby reducing the fuel load and threat of wild and fires, and through the promotion of conservation agriculture techniques that conserve topsoil.

The NIE has documented and summarized the findings of the Screening/Risk assessment process and Categorization in the paragraphs below of this Part II K, and completed the checklist provided above. Detailed information on the screening process and findings are made available in annex 5 under the ESMP.

Risks Associated with mixed quality WW Reuse in Irrigated Agriculture

To quantify the **public health risks** associated with mixed quality ww reuse in Jordan JV and demonstrate the safe control and ensure compliance with international standards, The German GIZ −Jordanian Water Resources Management Programme, Use of Marginal Water Project commissioned the services of Duncan Mara Emeritus Professor of Civil Engineering from the University of Leeds, UK to carry out an assessment on WASTEWATER USE IN JORDAN: IS IT SAFE?" during May 2011. He reviewed analytical system and data available at all the concerned authorities in Jordan that monitor ww reuse and in particular the Jordan Valley. The assessment results were published following the risk assessment based on the World Health Organization (WHO) Guidelines for Waste Water Use in Agriculture (2006). **Also the ESMP in Annex (5) has been developed for this project which addresses the potential risks and mitigation measures for the Category B project activities which also meets AF ESP Guidelines of Jan 9, 2015 and its preceding one of November 2013.**

Estimation of infection risks due to the consumption of wastewater-irrigated food through post-treatment: Health-protection control measures and associated pathogen reductions in the Jordan Valley:

- On-farm pond: 1-log unit pathogen reduction
- Drip irrigation + plastic sheeting: 4-log unit pathogen reduction
- Pathogen die-off between last irrigation and consumption: 2-log unit pathogen reduction
- Produce washing with clean water at home: 1-log unit pathogen reduction

Thus: TOTAL PATHOGEN REDUCTION = 8 log units

Estimation of infection risks due to consumption of wastewater-irrigated food: Without the 6−8 log unit pathogen reduction, the median Noro Virus (NV) infection risk is 2.6 ×10−3pppy for 0.1−1 NV per 105E. coli and 2.6 ×10−2pppy for 1−10 NV per 105E. coli − both values < the tolerable NV infection risk of 0.14 pppy for a tolerable DALY loss of 10−4pppy.

►with the 6−8 log unit pathogen reduction, the risk is extremely small − less than 10−8pppy

Public Health: Estimation of infection risks due to working on wastewater-irrigated farms: Exposure scenario used in the 2006 WHO Guidelines: involuntary ingestion of wastewater-contaminated soil particles. Due to use of drip irrigation + plastic sheeting the JV farmers ingest very small quantities of soil − if any, but say 1−10 mg per working day and assume farmers are exposed for 9 months (274 days per year)

►QMRA results: NV infection risk of around 10^{-7}pppy is within acceptable levels

Vector Breeding Risk

- The issue of vectors related to the sludge drying beds and attraction to the pond areas. Mitigation can be achieved via adherence to national standard on sludge management and treatment
- Building water retention dams in a watershed always carries risks, this can be mitigated by aerating the retention ponds to avoid stagnation and ensure aeration of ponds.

Odor Risk

- Concerns over odors released from the treatment processes, this is already dealt with via odor treatment units at WWTPs

Social Risks Associated with Wastewater Reuse: The reuse of treated wastewater for agricultural irrigation is often wrongly perceived. **Socioeconomic Risks may include:**

- Water demand pressure.

- Limited Jobs available for local communities
- Climate change negative impacts.
- Low awareness of farmers and beduins on the pros and cons of ww reuse
- Farmers, beduins and livestock coming in direct contact with treated wastewater:
- Overflows of partially untreated or untreated wastewater
- Farmers and beduins unaware of proper cropping patterns
- Farmers and beduins reject switching to reclaimed water
- Contractors usually bring their own staff from external areas, and preventing the local community from getting the economic benefits.

This risk can be mitigated if ww can be viewed as a positive means of recycling water due to the potential large volumes of water that can be used. Recycled water can have the socioeconomic advantage of being a constant, reliable water source and reduces the amount of water extracted from the environment.

Soil Salinity: Soil salinity due to application of the treated effluent is an important reuse issue that needs to be closely investigated and mitigated **through mitigation measures that reduce salinity such as leaching, crop rotation and other sound environmental measures.**

Water Quality Risk issues that can create real or perceived problems in agriculture include nutrient and sodium concentrations (soil Salinity) which will if not managed properly negatively impact the viability of the soil and negatively impact the environment and land.

Pertinent Environmental Risks and concern include the following:

- The quality of TWW for irrigation purposes.
- Application methods of TWW.
- Effect of TWW on crops and plants.
- Effect of TWW on soils.
- Effect of TWW on groundwater & eventually entering Aqaba Gulf's seawaters.
- Possible evaporation from facultative and maturation ponds.
- Attitudes and concerns towards TWW for irrigation and agriculture.
- Potential misuse of TWW by the general public.
- Operational reliability issues.

Risk of Potential Contamination of Groundwater: Concerns are always raised regarding the possible contamination of groundwater due to the leaching of the TWW, following regular application for irrigation and the fate of such contaminants potentially polluting ground water aquifers. As a mitigation measure the GOJ locates WWTPs at locations selected to be away from GW resources or aquifers. WW storage ponds are always lined and irrigation scheduling ensures no flooding and contamination to GW.

Risk of the Possibility of the Quantity of Reclaimed Water Exceeding the Irrigation Demand, particularly during the winter months. **Potential Impacts:** Loss of resource and flooding with reclaimed water (soil salinity and degradation). This can be mitigated by discharge to water bodies according to standard or extra storage capacity for winter or sale to meet industrial demand or through Irrigation Management Practices

Uphill Pumping and GHG Emissions Risks: All WWTPs whose treated effluent will be utilized are designed and positioned so that the effluent flows via gravity or with minimal pumping to the ww reuse sites or potential end users. Uphill pumping and consumption of

fossil fuel generating greenhouse gases will be minimized to reduce costs of fuel and greenhouse gas emissions by use of diesel fuel. According to the TNC FY 2014, the sectoral breakdown of GHGs total emissions showed that the Agriculture sector contributed (1,318 Gg CO2 eq.) as a percent of 4.6% to the total Gg emissions. These emissions can be further reduced through mitigation measures and adherence with national standards and assisting impacted communities and sectors in adaptation measures to reduce the negative impacts of CC.

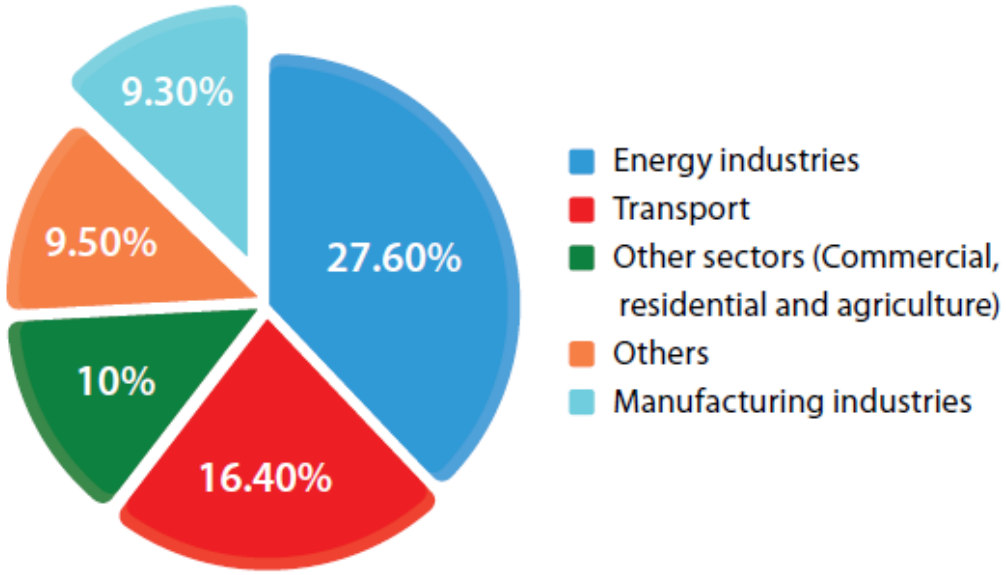


FIGURE 26: ENERGY SECTORS CONTRIBUTION TO GHG EMISSIONS (IN PERCENTAGES)- SOURCE TNC –JORDAN FY 2014

Weak Water Governance: Risks: That there might be a weakness in creating an enabling environment for nursing water governance as a prerequisite for integrated water resources management and for equitable and sustainable development. This risk is mitigated through working with WUAs whose mandate is equitable water distribution through governance.

Public Health & Occupational Safety: Risk issues that filed workers and beduins may be unaware of occupational safety and need public health measures with using treated wastewater for irrigation and practice low sanitation conditions in pilot areas: This risk can be mitigated via awareness sessions and practice of safety precautions

Gender Integration Risks: In Jordan, household responsibility for water consumption is still considered to be the responsibility of the female head of house. Women cook, clean, bathe children, do the washing, tend to home gardens and determine how much water to use on each task. Women struggle significantly when there are water shortages which impede their ability to attend to household needs. Despite being the primary water users in the household women in rural areas are not the sole decision makers when it comes to water storage and supply.

Also, rural women in Jordan are intricately involved in the management and use of water within the household. In all cases women still suffer from water shortages and economic constraints placed on the community due to growing water scarcity. Also Women in rural regions spend long hours every day performing tedious and mostly unpaid labor-intensive and time-consuming agricultural and domestic work.

Women in rural areas depend on water resources both domestically and for productive uses such as agriculture and livestock breading. However women's participation in water

management and decision making is still somewhat constrained and to mitigate this the project has in place gender integration and consultation activities and ensured consulting with women alone to get their feedback and buy in for their role in water management, income generation activities such as sorting, and packaging, dairy production and other farm related activities, etc

Marginal and Vulnerable Groups Risks: Before initiating the project in Wadi Mousa, USAID in cooperation with the Hashemite Fund for Badia Development funded a Socio-economic Assessment for the Wadi Mousa Wastewater Re-use Implementation Project in 2003 prepared by Mohamed Fayez Tarawneh as socio-economist. The study identified the risks associated with: tribal rights and tensions , and looked at land deeds and rights, the social structure and families, who has the most right to work at the pilot, community leaders who should manage community perceptions and alert the project team to sensitivities.

Potential for Leachate Leakage Impacting Ground Water Quality: This will be mitigated by liners used in ponds.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Arrangements for project/ programme implementation

Describe the arrangements for project/ programme implementation.

The Ministry of Planning and International Cooperation (MOPIC)is the entity responsible for the overall Implementation of the project where it will host the Program Management Unit (PMU),within the Enhanced Social & Economic Productivity Program (EPP) which will have a crucial coordinating role in linking the key players.

At the national level, the overall project will be supported by a **National Steering Committee (NSC).** The NSC will be formed to oversee, monitor and keep abreast of project progress and facilitate the implementation of the project in partnership with co-financing institutions. Direct implementation of the project and decisions regarding the allocation of resources and assistance under the project will be taken by MOPIC as the executing agency under the overall direction of the NSC, in consultation and partnership with the Government of Jordan. The NSC will be chaired by MOPIC and include Secretary Generals from the Ministry of Environment, Ministry of Agriculture, Jordan Valley Authority , Ministry of Water and Irrigation, and Director Generals Department of Statistics, the Jordan Food and Drug Administration (JFDA), Department of Meteorology, and the Commissioner of the Petra Tourism Development Regional Authority (PDTRA). The Directors of Enhanced Social & Economic productivity Program (EPP) in MOPIC is also part of the NSC assigned as non-voting technical support members.

The proposed project emphasizes major goals of the Enhanced **Social & Economic Productivity Program (EPP) at MOPIC** with objectives to enhance the productivity of poor people and improve living standards of local communities and residences specially those living in poverty pockets and this will eventually lead to Increased ecosystem resilience in response to climate change and variability-induced stress.

EPP has the accessibility to the most vulnerable people through 32 poverty pockets that were updated recently in 2012 and designs programs to alleviate poverty in such regions. EPP annual budget exceeds US$ 20 million. EPP is guided by a Steering Committee (SC), chaired by H.E Prime Minister and includes Ministers of relevant entities and Private Sector. The SC of the EPP set the general policy of EPP, provides strategic guidance and oversight for the unit, advice on corrective measures, provide conflict resolution. So, EPP has the necessary autonomously for optimal coordination, management and sustainability of its programs.

Moreover, EPP meets the criteria necessary to house the proposed Program Management Unit (PMU). The Government of Jordan’s commitment to EPP, the flexibility and the accountability of ESPP are highly valuable essentials for project implementation. For the project to be

successful, it is crucial that the PMU is able to operate in a flexible and transparent manner, as well as to attract competitively recruited eminent staff with project management experience and TORs acceptable to the donor. At each phase of project implementation, the performance of the PMU within EPP will be closely monitored, and EPP will establish the PMU and process essential procurement contracts prior to project effectiveness.

The project Implementation Arrangements:

The PMU as the implementing entity will be tasked with the Project coordination of the activities of all project executing agencies/entities. It will ensure liaison, communication, collaboration and joint problem-solving between entities; ensure timely external auditing of project accounts; ensure appropriateness of procurement and FM activities as per agreed terms; and act as the secretariat of the NSC and chair the project's **Technical Working Group (TWG).** PMU duties will also include a focus on social and environmental risk management through a seconded specialist from the Ministry of Environment to the PMU for the duration of the project to control environmental and social compliance. .

The PMU will report any unintended social and environmental risks that are detected through the project monitoring, evaluation and reporting processes to the PSC, together with a proposed risk management plan that shows how these risks will be mitigated. The NIE and PSC may propose the redirection of project funds to risk management activities, or the withholding of the next tranche of payment until satisfactory risk management actions are determined and agreed. Project stakeholders will be made aware of the project's grievance procedures should they wish to raise any issues and concerns, including those related to project risk management.

The PMU, will be staffed by a **Project Team (PT)** and will consist of the following core staff:

- 1 National Project Manager chairing the PMU whose mandate will be to provide technical guidance , liaison with the donor lenders, sub components coordination and oversight of administrative, financial and M&E activities.
- 1 Monitoring and Evaluation Officer (responsible for tracking of results indicators) with a strong background in gender, environmental and safeguards monitoring experience.
- 1 Financial and Procurement Assistant;
- 1 Administrative /Data Management Assistant;
- Technical Sector Specialists (agriculture, water/irrigation engineer, livestock, agro-economist, soil conservation and rainwater harvesting) whose services will be contracted as needed.
- Seconded specialist from the Ministry of Environment to the PMU for project the duration to control environmental and social compliance according to ESMP and Environmental Law.

The PMU will coordinate the project activities and ensure preparation of annual work plans and budgets; it will also ensure collaboration between stakeholders and collect M&E reports from sub components to conduct M&E and include in overall project reporting. The establishment of M&E systems for relevant outputs/activities is of paramount importance for effective knowledge management and sharing. Based on MOPIC's experience from community-based adaptation projects, presentation of concrete/tangible benefits (in terms of, for example, increased available quantities of water though wastewater reuse , increased farmer income, reduced harvest losses) in a way that is easy to understand by community members is often one of the most effective means for up-scaling and replication. The PMU will also draw lessons and experiences from the NIE project development and implementation processes. This will support Climate Change Adaptation planning, decision making and monitoring and evaluation with a view to enhancing the benefits of adaptation responses both nationally and internationally.

It is noted here that investing in a robust and systematic M&E framework at the beginning of the project has a significant efficiency and effectiveness gain in the knowledge management within

the project. Using M&E tools, and training the assigned M&E focal points at each sub component throughout execution of the project, will ensure that project activities are well coordinated and monitored and that lessons learned will be captured, codified and discussed among stakeholders. **This M&E framework** will enable a production of technical reports from each of the technical Outputs, which will be collated as "best practice guidance materials and tools". Periodic project briefs, annual progress reports, midterm evaluation and final evaluation results will be circulated widely for review.

Execution Arrangements: Project components will be executed by the following government and NGO entities as follows:

- Component I will be executed by PDTRA as owner of Wadi Mousa land, and JVA as owner of JV for the Jordan Valley projects (with support from MoA,, DOS, WUAs and university academia.
- Component II will be executed by MoENV, with support from MWI/JVA, MoA/NCARE, JFDA, JSMO, RSS, and Department of Meteorology.

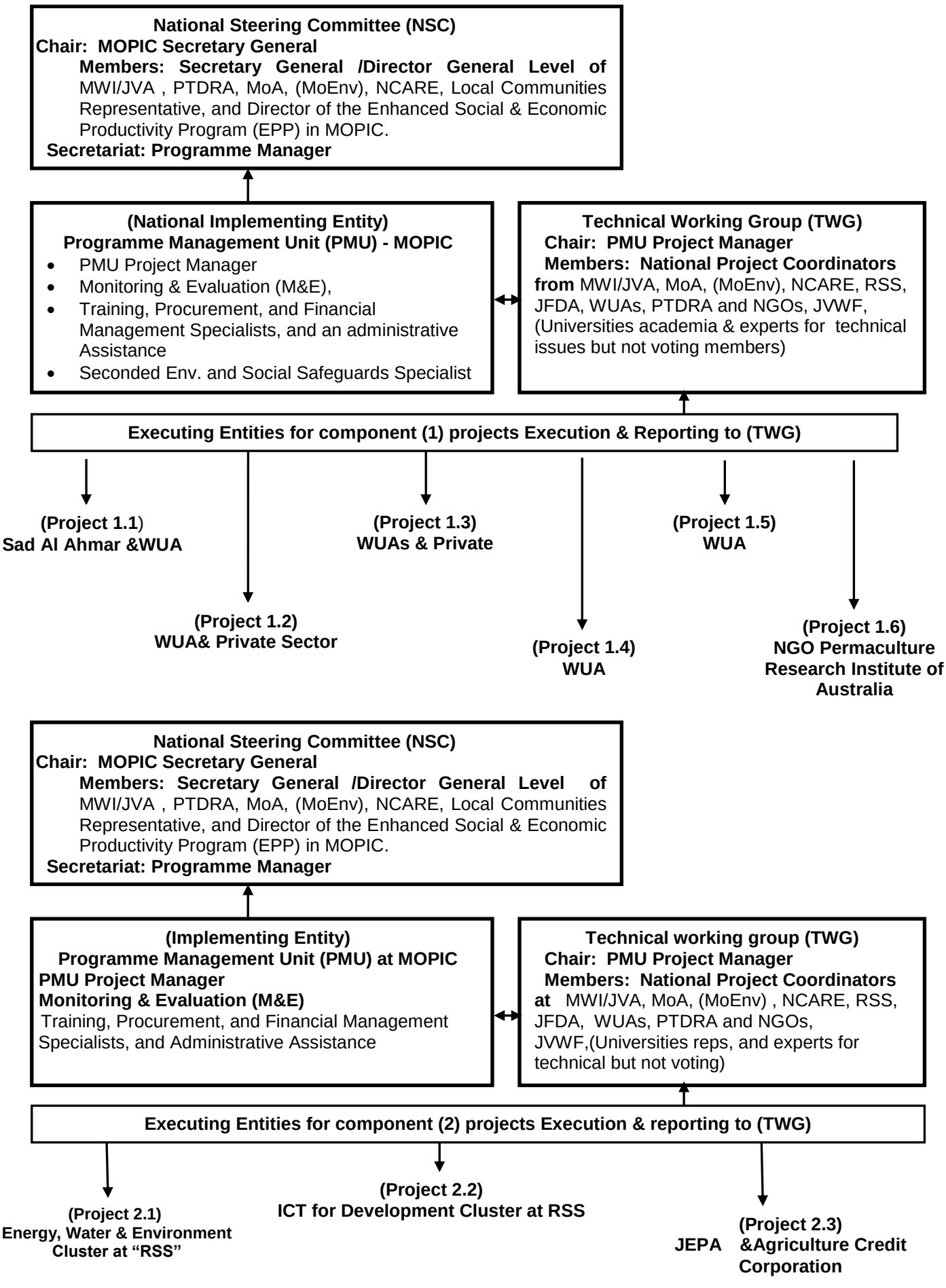
At the field sub component execution level- Field Satellite Management Units (FSMU) which will include partners from the relevant organizations, ministries, research institutions, NGOs etc. Each FSMU entity will manage & execute the project according to its mandate, role and professional expertise. These institutions will include but not limited to (The Ministry of Water and Irrigation (MWI), Ministry of Agriculture (MoA), Ministry of Environment (MoEnv), Jordan Valley Authority (JVA), National Center for Agricultural Research and Extension (NCARE),Royal Scientific Society (RSS), Jordan Food and Drug Administration (JFDA) , Water Users Associations (WUA) and the Petra Tourism Development Region Authority (PDTRA) and Water Research and Environment Centers at local universities as the source for technical consultancies (Jordan University for Science and Technology in Irbid for the northern JV support and Al Balqa Applied University for the Middle and Karamh Ghours and Al Hussein Bin Talal University in Maan for Wadi Mousa Project support while the University of Jordan can provide support to the Mazzrah Haditha Ghours. The Department of Statistics, Department of Meteorology and Jordan Institute for Standards and Metrology will also be involved

Technical Working Group (TWG): The CC Project Manager will chair the Technical Working *Group with focal points from MoA,* (MoEnv)*, MWI, NCARE, JVA, WUAs, PDTRA, RSS, JSMO, and Dept of Meteorology.* Local and international experts will be hired as consultants with expertise in relevant fields as and when needed.).

The TWG will discuss technical issues, enable information exchange between project activities, provide technical advice and guidance on various aspects of project implementation, and may also make recommendations to be discussed at the SC. It is crucial for project success that the PMU operate in a flexible, transparent and collaborative manner with all concerned parties. To this end, the TWG will be a key mechanism. The TWG will meet on a quarterly basis, or more often if required. The two diagrams below illustrate the execution arrangements and coordination for all projects under components 1 and 2.

GRIEVANCE AND REDRESS MECHANISM: MOPIC PMU will have a process that is clear and transparent process for receiving grievance and redress, with a clear process of how they will receive and handle complaints. The process should include a clear way of informing the public where to send their concerns (how they advertise this-ie. website, newspaper, application form, banners, etc.), how long it will take the PMU to respond (in a timely manner) and how they plan on responding to complaints (ie. face-to face, meetings, etc.).During project inception workshops and component launch workshops, stakeholders will be informed that any concerns relating to the design or management of the implementation Resilience subprojects, including social and environmental risks, should be raised and if these are not adequately addressed, these may be escalated to the project PSC and if necessary the National Steering Committee.

Project Steering (Implementation Oversight) Structure



Following is Background information on the Executing Entities:

Ministry of Agriculture (MOA):

The ministry works on the organization and development of the agricultural sector in order to produce a sophisticated agricultural and growing, diversified and integrated preserves the environment, natural resources and promotes sustainability of resource use in and self-reliance in food production in line with the requirements of the local and regional markets.

The ministry aims to increase the production of food and agricultural products, create the right climate for investment in the agricultural sector, increase farmer's income and improve their standard of living and improve the efficiency of irrigation water use at the farm level.

The Ministry of Water and Irrigation:

Ministry of Water and Irrigation (MWI) is the official body responsible for the overall monitoring of the water sector, water supply and wastewater system and the related projects, planning and management, the formulation of national water strategies and policies, research and development, information systems and procurement of financial resources. Its role also includes the provision of centralized water-related data, standardization and consolidation of data.

The MWI main goal is to maintain sustainable water resources to achieve the national water security and to serve the overall development objectives. The Ministry of Water and Irrigation embraces the two most important entities dealing with water in Jordan: The Water Authority of Jordan (WAJ): in charge of water & sewage systems. The Jordan Valley Authority (JVA): responsible for the socio-economic development of the Jordan Rift Valley, including water development and distribution of irrigation.

This relative position with respect to WAJ & JVA reinforces MWI's leading role as Jordan's lead entity on water issues. With its extensive Water Information System1, MWI has become a leader in the region that uses GIS-based digital tools for Water Master Planning activities, offering the framework, databases and tools necessary to manage water data and providing water specialists with data and information for water sector monitoring, management and planning. MWI regularly produces essential water sector information products including the Water Master Plan.

Jordan Valley Authority (JVA):

JVA carries out integrated socioeconomic development of the Jordan Valley area which extends from the Northern border of the Hashemite Kingdom of Jordan in the North to the Northern tip of the Dead Sea in the South; the Jordan River to the west.

JVAs mission is to develop and protect water sources for exploitation in all fields, Improve and develop the Jordan valley economically, agriculturally and socially, provide appropriate climate for investments and preserve the environment in the Jordan valley.

Moreover JVA Institutional goals is to sustain and increase traditional sources of water, improve and increase the efficiency of irrigation systems in the Jordan valley, effective storage of surface water, increase the sources of non-conventional water, utilize the treated water in industrial and agricultural fields, protect water sources from pollution and depletion and protect the soil from degradation.

Functions of the Jordan Valley Authority

The duties of the Jordan Valley Authority include the following:

Develop the water resources and exploit them in the irrigated agriculture, domestic use, municipal and industrial affairs, electricity generation and other useful purposes as well as protect and preserve these resources and do all the required work to develop them. Also conduct the necessary studies to assess water resources, including hydrological and

hydrogeological studies, Geological survey, drilling optional wells, and building monitoring stations.

Study, design, implement, operate and do the maintenance of irrigation projects and the projects' facilities and business. Survey, classify and identify the lands appropriate for irrigated agriculture and reclaim and divide these lands into farm units. Settle all the disputes arising from the use of water resources. Organize and direct the establishment of private and public wells. Develop the environment in the valley, and protect, improve and implement all actions necessary to this end.

Ministry of Environment (MOE):

The role of the Ministry of Environment is to contribute to the achievement of sustainable development: through implementation of policies, mechanisms and appropriate operational tools that appear and strengthen the links between environmental protection and economic prosperity and contribute to the integration of environmental concepts into national development plans.

The Ministry of Environment is also responsible for development of policy and legislation and strengthening supervision and inspection and application of legislation and most importantly, promote education and awareness through disseminating environmental education and raising public awareness in the field of environmental protection.

Petra Tourism and Development Region Authority (PDTRA)- Jordan

Petra development tourism Region Authority is a legal, financial and administrative independent Authority, founded in 2009 and aims to develop the region touristy, economically, socially, culturally, and contribute to local community development. It aims at:

- Disaster Reduction
- Enhanced capacity of government and Civil Society organizations (CSOs) to prevent, respond to and mitigate natural and man-made disasters.
- Enhancing Institutional Capacities to reduce Disaster Risk and to integrate Climate Change in the region which includes:
    1. Integrated Risk Assessment.
    2. Setting up an Early Warning System for Flash Floods.
    3. Petra Neighborhood Disaster Volunteers.
    4. Making Petra Resilient City. Petra Is getting ready making disaster risk reduction a policy priority, institutional strengthening.

The National Center for Agricultural Research and Extension (NCARE):

The National Center for Agricultural Research and Extension (NCARE) is a leading center for research & extension in Jordan; it houses most agricultural research, projects and extension activities. NCARE is the supportive pillar for agricultural sector to achieve sustainability and protect the environment.

NCARE serve as reference center for developing, conducting applied agricultural research and disseminate the results in order to achieve comprehensive and sustainable agricultural development through optimal use of the available natural resources and preserve environment.

NCARE has also an important role in Watershed Management and Water Harvesting through the Determination and adaptation of different techniques of water harvesting suited to the agro climatic conditions in Jordan. The activities of Water Management and Environmental Research Program are related to: irrigated agriculture, optimum use of water resources, and management of natural resources in rainfed areas, marginal and desert regions.

The Royal Scientific Society (RSS):

RSS is a non-governmental organization involved primarily in R&D related to the development process in Jordan. RSS operates on not-for-profit basis and enjoys financial and administrative independence.

RSS is the premiere research organization in Jordan, boasting a proven track record of services to the local industry. It plays a substantive role in the development of the local economy and technology base. It specializes in mechanical engineering, electronics, environmental research, building research, IT, and chemical research. It includes a university at which computer science and engineering are taught.

RSS works diligently towards maintaining its technological leading role in the country through acquiring national and international accreditation for its laboratories, working jointly with leading international entrepreneurs, facilitating up-to-date IT infrastructure and links for its staff and securing advanced specialized training for its employees.. RSS is unequivocally committed to testing with guaranteed accuracy, and is dedicated to research and development. The Outreach Sector at RSS includes a diverse set of programmes that work closely with the local community to address different issues *RSS realizes its goals through the following specialized centers:*

- Computer Technology, Training and Industrial Studies
- Electronic Services and Training
- Mechanical Design and Technology
- Building Research
- Industrial Chemistry
- Environmental Research

Jordan Food & Drug Administration:

Jordan Food and Drug Administration (JFDA) have been created in 2003 as the sole national competent authority for drug safety & efficacy and food safety and quality.

Objective:

JFDA is an independent public sector regulatory institution whose main objectives are to ensure that:-

- Food is safe, wholesome, and properly labeled.
- Drugs are safe and efficacious.
- Safety of all products explicitly stated in the enforced drug and pharmacy law.

Tasks and Duties:

- Supervision and inspection of the quality and suitability of food stuffs in accordance with technical rules, specifications and standards stipulated in the legislations in force.
- To achieve the requirements and take measures in connection with drug and pharmacy law, also to guarantee and supervise the safety and quality of medication in accordance with the rules and standards specified in the legislations in effect.
- To exercise any other supervision and inspection in connection with food stuffs and drug specified in the Food Law and Drug and Pharmacy Law in effect.

Jordan Standards and Metrology Organization (JSMO):

JSMO is pioneer and distinguished Organization nationally, regionally, and internationally in the fields of standardization and quality infrastructure.

One of their main aims is to practice an initiative and effective role in protecting human's health, safety, and rights as well as the environment. Furthermore, enhancing confidence in the services and products placed in the market, through developing and implementing systems that are compatible with best international practices in the fields of standardization, metrology, conformity assessment, market surveillance, accreditation and knowledge management, in cooperation with stakeholders and through providing a supportive environment.

Organizational Objectives:

- Ensuring the compliance of products placed in the market to technical regulations and other related mandatory requirements, In order to protect human's health, safety and rights.
- Providing high quality services and products, in order to enhance the confidence in national products and services.
- Increasing the effectiveness of resources management to achieve the sustainability and development of JSMO's activities.
- Contributing in improving the environment in Jordan.
- Adoption of a national system for standardization and metrology based on accepted international practices.
- Keeping pace with scientific and technical developments in the fields of standards, metrology, conformity
- Ensuring the health and safety of the Kingdom's citizenry and protection of the environment by making sure that products are in compliance with the technical regulations adopted by the Organization for the purpose. Assessment and laboratory accreditation.

Jordan Meteorological Department

Mission: Raising the quality of local products through the adoption of appropriate Jordanian Standards in order to enhance their competitiveness in the local and international markets and thus support the national economy. The Department was established in 1951 as part of the Civil Aviation Authority. In 1967 it became an independent entity attached to the Ministry of Transport. The Department operates 31 Stations: 11 Synoptic, 9 Climate, 10 Agro meteorological Stations and 1 Radiosound Station. The Department now functions in many everyday aspects of citizens' life, where its role is no longer limited to issuing a weather forecast, but also provides various services in the fields of aviation, agriculture, climate and constructions. The Meteorological department is responsible for sustaining and building the climatic register by widening the net of weather stations for the observation of the elements of the atmosphere and archiving the data in digital format- climate database leading to presentation of the service for users with suitable time speed for analysis, research and sustainable deployment. Its activities include:

- Install and maintain national observation network.
- Contribute in national development program by providing specialized data informal.
- Deploy the National Climate Registry.
- Contribute to relevant external activities.

Coordination Arrangements for Sub-Projects execution and Supervision

The PMU project team will coordinate with (PDTRA, JVA , MOE) and the with technical managers of Components 1 and 2 to guide the sub project teams on the extent of cooperation needed by (the execution entity for each sub project) The subproject manager will work closely with the assigned Technical working group members will to appoint a senior and two assistant

engineers as a point of contact for the farmers and WUA when the farmers need assistance in managing the pilot.

Execution and Coordination Activities of the components 1 and 2 managers:

Work with the WUA on all aspects of pilot project management through setting up of a ***satellite field project management offices***.

- Support the representatives of the WUA and the project with GoJ various agencies on as needed basis.
- On as needed basis; represent the project & WUA in meetings with donors and in coordination meetings with other national and international parties.
- Follow up on the relevant WWTP effluent water quality with the relevant water company in charge of the WWTP to make sure it is within the permissible standards.
- Assist the WUA in managing the irrigation schedule.
- Assist the WUA in managing the O&M of the project machinery and the irrigation main lines and its working schedule.
- Establish seasonal plantation policies; monitor the cropping pattern to make sure compliance with regulations.
- Employ and manage the pilot project staff including the pilot project manager, laborers and guards.
- Assist the WUA in managing the revolving fund once it is established.
- Ensure that sub project managers keep proper records on production, water usage, machinery O&M, water quality, machinery operations.
- Continue mentoring the WUAs to build their capacity and to be able to manage all above aspects on their own in the future.
- To coordinate with JVA or Petra Tourism and Development Regional Authority (PDTRA) as and where needed.
- JVA will manage and supervise the execution and operation of the activities in JV while PDTRA will manage those in Wadi Mousa.

The project should have an effective Project Management Unit (PMU) capable of directing and supporting project implementation plan. A local steering committee is also required and would include representatives of potential partners involved in the implementation of the action plans. Partners could include NGO's, CBO's and cooperatives representing the communities and those partners can use grant money as revolving funds to members in the local communities to help them to benefit from the project. GIS and Remote Sensing tools will be used in planning and along the duration of the project. Also as monitoring and evaluation component is needed for monitoring project activities during the project duration each sub project will assign an M&E person to collect need data.

B. Measures for financial and project / programme risk management

Describe the measures for financial and project / programme risk management.

The government of Jordan is having to go through very costly infrastructure measures to meet the rising demand for water supplies exacerbated by the Syrian refugees influx problem through the initiation of mega projects such as the Disi Water Conveyance System, rehabilitation of springs and wells, construction of modular water and wastewater treatment plants all of which were in an attempt to narrow the gap between supply and the increasing and competing demands for water while suffering over the past three year from the daily influx of Syrian refugees to Jordan.

There are risks associated with the implementation of the project some of which are of political nature due to the prevailing regional turmoil and Arab Spring, institutional related to the weak climate change policies and need for capacity building, and technical nature related to the nature of reclaimed water reuse and the need to demonstrate public health safety while demonstrating climate change adaptation measures via pilots to the society.

These risks have been taken into account in the project design, with a view to minimizing or mitigating them through an ESMP developed for the project and attached to Annex(5). Based on the overall assessment, this project can be classified as being of a “moderate” risk category but can be controlled via the mitigation measures and national controls..

During the project preparation/design and formulation phase, key risks underlying the project were analyzed and qualitatively assessed in connection with the context of the planned outcomes and target demonstration/pilot sites for the project. MOPIC as the key executing agency will be responsible for overall project oversight while, MWI/JVA and MOA are responsible towards addressing and mitigating the project risks in relation to water and agricultural sectors respectively while MOEnv would ensure that that the implemented measures correlate with the EIA regulation, Environmental law, and recommendations of the Third National Communication released in November 2014.

MOPIC and NIE will be the ultimate responsible entity with regards to all financial risks, coordination oversight and the right of cessation of activities, or withdrawal of funding in the event of risks that cannot be otherwise managed.

Potential risks with an assessment of the degree of each risk, and the mitigation measures identified to mitigate are presented in the table below:

TABLE 25: POTENTIAL RISKS AND MITIGATION MEASURES

No	Risk	Classification	Measures for Addressing Risk
1	Weak interaction and response of local communities and institutions to CC interventions,	Moderate	Embedding effective capacity building and training measures in the component 2, to ensure effectiveness and sustainability at the all levels
2	Delays in programme implementation, and continued stress and competing demands on infrastructure interventions	Moderate	GOJ line ministries and MWI PMU continuously carry out design and feasibility studies in support of infrastructure implementation
3	Delays in Completion of data and information gathering	Low	Surveys and community participation and engagement has already taken place via poverty pockets surveys, design and feasibility studies, Jordan Valley water Forum Field visits and stakeholder gatherings have already taken place
4	Weak incentives for stakeholders, farmers and local communities to cooperate due to time lag for fruition of results, may reduce stakeholder engagement and participation	Moderate	Pilot activities will yield immediate benefits for Communities in terms socio economic livelihoods and community enhancements, awareness. preparedness, skill development and income generation activities. This will be emphasized during inception phase.
5	Recruitment Delays may affect initiation of project activities	Low	High level coordination will be established by MOPIC at inception phase. Position descriptions and staff TORs for project will be prepared upon AF Board project endorsement
6	Potential for unsatisfactory performance of government and non-government agencies implementing project components	Low	Line participating ministries and NGOs competencies, are known through the Second national Communication. Expert technical support through the project would limit this risk
7	Required coordination with National and donor/ lender funded ongoing projects fails	Low	Under the MDGs Jordan and donors are coordinating and harmonizing projects for alignment with national developmental plans. As executing agency MOIC will have a strong hold the coordination mechanism through the Project management Unit and through its role for the donor lender coordination and funds mainstreaming and national planning coordination.
8	Cabinet changes and reshuffles in the government may impact project thrust and momentum	Moderate	PMU must keep line ministers and agency heads of project progress and developments
9	Regional Political instability may impact implementation or cause delay.	Moderate	The GOJ institutional and financial systems have shown admirable resilience to various political stalemates; however the risks exist and will be monitored.
	Failure to involve adequate representation of vulnerable communities including refugees working under work permits outside of camps, particularly women, poverty pockets, and beduins resulting in failed ownership of the project at the community level at project sites.	LOW	The capacity building component will ensure engagement of vulnerable groups and women and will adopt a gender-sensitive approach, as guided by the M&E -Gender and Social Expert. The project will adopt a two way communication approach to create community ownership and buy-in of the project intervention. The development of implementation plans will be undertaken in a participatory manner, encouraging input from all beduin tribal heads, community members, and women.

Over the course of the project, a Program Management Unit (PMU) which will implement the role of National Steering Committee (NSC) will monitor the risks outlined above and identify risks ratings and adherence to the ESMP. Issues/Risks will be raised to NSC where these risks will be discussed and mitigation measures identified for Implementation. The current strong political commitment of national and local implementation partners is evident which will limit risks from materializing.

The Table Below assigns risks per component output based on the indicators, baselines & targets with sources of verification:

TABLE 26: RISKS PER COMPONENT OUTPUT BASED ON THE INDICATORS, BASELINES & TARGETS WITH SOURCES OF VERIFICATION:

Output	Indicator(s)	Baseline	Target	Source of Verification	Risks & Assumptions
Component 1					
Outcome 1: Increased water availability and efficient use through wastewater reuse& Rainwater Harvesting	❖ Total Quantity (m3) of irrigation wastewater made available for agriculture	18,022,000 MCM	21,591,400 MCM	MDG Report FY 2010 MWI annual report FY 2017	Delays in programme implementation, and particularly in the development of infrastructure intervention. Recruitment delays may affect initiation of project activities Potential for unsatisfactory performance of government and Non government agencies implementing project components Delays in Completion of data and information gathering
Output (1): Securing high quality treated wastewater for irrigation purposes in Wadi Musa & in Northern Jordan Valley *Output (2):* Securing Rainwater harvested for poverty pockets (Southern JV) and local community groups.				MDG Report FY 2010 MWI annual report for FY 2017	
	❖ Total Quantity of rain water harvested (m3)	0 MCM	300,000 m^3/Year	MOA Report from Dept of Rainwater Harvesting for FY 2017	
Outcome 2: Increased adaptive capacity within relevant development and natural resource sectors *Output (3):* Providing fresh vegetables through Permaculture projects in the Jordan Valley	Number of farms applying permaculture as a climate change adaptive capacity.	2 pilot Permaculture Farm	48 Farms	MOA Annual Report for FY 2017	

Component 2					
Outcome 1: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level *Output (1):* Number of Targeted population groups aware of Climate change risks on natural resources and the ecosystem.	❖ #of targeted population in Jordan Valley & Wadi Mousa aware of predicted adverse impacts of climate change, Target	0	48 WUAs in JV and one in Wadi Mousa (3187 Males ,653 Females)	Third National Communication on Climate Change issued Nov. 2014	Farmers cooperate with the project and provide the land and required Contributions. Regional political instability might cause effectiveness or implementation delays.
Output (2): Targeted population groups covered by adequate risk reduction systems *Output (3):* New micro-enterprises created linked to Agribusiness Industries. *Output (4):* Standards and policies reviewed & amended in support of climate change adaptation	❖ Early Warning Systems installed ❖ Number of New direct& indirect Jobs related to Agribusiness in Jordan Valley ❖ Number of laws & regulations amended in support of climate change adaptation	0 0 National Self Assessment Report on Climate Change 2010	3 19,800 Jobs (5,400 for Females, 14,400 Males) Implementation progress of Third National Communication on Climate Change	Third National Communication on Climate Change issued Nov. 2014 Annual MDG report MOA Annual report and National Statistical Report	Cabinet changes and reshuffles in the government may impact project thrust and momentum. Weak incentives for stakeholders, farmers and local communities to cooperate due to time lag for fruition of results. Weak interaction and response of local communities and institutions to Climate change

C. Measures for environmental and social risk management, in line with the Environmental and Social Policy of the Adaptation Fund

Describe the measures for environmental and social risk management, in line with the Environmental and Social Policy of the Adaptation Fund.

National Environmental Safeguards

In Jordan, environmental approval for projects is provided by the Ministry of Environment's EIA Regulation no. 37/2005 which categorizes projects according to impact as per Annex 1 below: Category —CI projects are subject to EIA, with social safeguards embedded in the EIA. The screening and review procedures must be carried out before sub-projects are financed in order to prevent funding of economic activities with negative impacts on human development and the environment.

The Ministry of Environment under the obligation of providing an opinion on the EIA within 14 days of receiving the EIA; Category—CII projects require an initial environmental assessment and are subject to standard mitigation procedures while Category III projects require no environmental analysis. After screening and approval of the impact assessment by the Ministry of Environment, the sub-project is cleared for financing under the Facility. Mitigation actions would be specified as an Annex to the impact assessment, which would include: impact; mitigation; party responsible for mitigation; monitoring indicator; indicator; timing; cost. Independent annual supervision may monitor indicators such as waste management, verify if mitigation actions are being taken and indicators monitored, and cumulative impacts. The essence of the environmental impact assessments, the environmental and social management plan and how monitoring of key issues is described in this section of the Proposal.

Jordanian policies are modeled after the World Bank operational guidelines and polices. Operational Policies (OP) and Bank Procedures (BP), are designed to protect the environment and populations from potential negative impacts of projects, plans, programs and policies and as such; Category A (World Bank (WB)/Category I (Jordan) sub-projects would not be eligible for funding under this project. ***An ESMP has been prepared to meet the AF requirements for safeguards under this project and is in Annex 5.***

All wastewater treatment plants where the project will be tapping into their treated wastewater effluent for reuse have been subjected to an EIA and Environmental Management and Mitigation Plan (EMMP) according to Ministry of Environment EIA Regulation # 37 FY 2005 which includes identifying risks on the environment and social impacts and requires identification of mitigation measures during construction and future operation and decommissioning of the infrastructure. Each of these WWTPs also had a wastewater reuse master plan and was subjected to an EIA which included under the design and feasibility study a ww reuse master plan for the reuse location. These reuse master plans were part of the WWTPs pertinent, scoping, review and EIA clearances and had to comply with JS 893/2006 and the prevailing WHO Guidelines on Wastewater Use in Agriculture (2006) at the time of the EIAs. These EIAs were done under donor/lender funded WWTP where under the design and feasibility approvals process an EIA is required to meet the donor entity regulations. Please refer to Annex 3 for EIA approvals of these donors and the Ministry of Environment Jordan EIA committee review and approvals.

The Jordan water strategy (2008-2022) comes in line with the and now Jordan has fully developed Irrigation Water Quality Guidelines modeled after the Jordan wastewater effluent standard JS 893/2006 and the WHO 2006 guidelines. These guidelines aim at maximizing the **protection of public health** and the **beneficial use of the important resources** and were developed to be used as a basis for the development of international and national approaches **to manage the health risks from hazards associated with the use of wastewater in agriculture as well as provide a framework for national decision making**. Basically, the

components of an **on-farm strategy and risk management** in using treated wastewater will consist of a combination of:

- crop selection,
- selection of irrigation method, using the two sources in rotation and by blending conventional water with treated effluent,
- Adoption of appropriate management practices,
- Continuously monitor the irrigated areas to assess the effectiveness of the irrigation management plan, and determine the degree to which excess irrigation water is entering the soil.
- Annual application of phosphor-gypsum in designated rates.
- Vegetative bioremediation—a plant-assisted reclamation approach—relies on growing appropriate plant species that can tolerate ambient soil salinity and sodicity levels during reclamation of salt-affected soils.

Mitigation measures to manage the risks associated with treated wastewater reuse in Jordan

For greater efficiency, the implementation of an ESIA in Jordan is usually integrated with the process of the (EIA), which is supposed to ensure that the project activities have no significant negative or long-term social or environmental impacts. By following the methodology of the ESIA the executing entities ensure that they avoid, reduce or mitigate the negative impacts to an acceptable level. As part of the ESIA a "negative list" excludes certain activities such as: those universally excluded by donors (weapons, illegal activities, Casinos, etc...), in addition to those affecting natural habitats, forests, endangered species, forced relocation of populations, dams, watercourses, and activities in the disputed areas.

The ESIA provides that, at the national level, an annual evaluation is made to assess the cumulative impacts that were considered negligible at the level of individual projects, and to modify mitigation measures if needed accordingly. ESIA also provides training to execution stakeholders to allow examining environmental conditions preceding the activities. This methodology is almost universal and is commonly reproduced in similar forms in the countries concerned. In Jordan, for example, the national EIA Regulation defines a list of projects that must do a comprehensive Environmental and Social Impact Assessment (ESIA) in addition through the Screening processes unlisted projects could be asked to conduct an ESIA if they prove to have significant negative environmental impacts. In addition, the national Jordanian regulations divide the projects into three categories that correspond roughly to the three categories of the World Bank.

The ESIA is based on a two-step approach:

- Make an environmental ("screening") to determine the environmental category of the activity to be financed;
- Implement the appropriate procedure relative to the determined category. This is could be described in three categories and three modes of operation:
  - Important impact (Category "A" according to the WB and the ADB) or excluded activity under the negative list: project is excluded;
  - Average impact (Category "B" according to the WB and the ADB) ESMP is completed and the tender documents signed in accordance with the Jordanian regulations;
  - Negligible or absent impact (Category "C" according to the WB): no impact assessment is required.

An Environmental and Social Management Plan (ESMP Annex 5) has been developed to comply with the AF Environmental and Social Policy in order to identify, minimize, avoid, screen out, mitigate and monitor potential social and environmental impacts in compliance with AF Policies, and the Jordanian applicable environmental laws and regulations. The ESMP will be

applied by the Ministry of Environment (MOE) in the supervision of project activities to be financed by the AF. The ESMP will consist broadly of: (i) a screening mechanism to determine the environmental category of the sub-project; and (ii) impact assessment and mitigation. For its application to Jordan, assessment and mitigation measures would be done according to the Jordanian environment law.

Impact minimization and mitigation measures would therefore be prepared by the sub projects execution entities. In most cases, the negative environmental impacts that may be generated by the subprojects would be easily mitigated by complying with national laws and through the implementation of the ESMP, which includes a screening mechanism against common environmental impacts such as the generation of waste, wastewater, dust, noise, disturbance to traffic, potential injury to personnel, negative impacts on flora and Fauna, habitat endangering, negative impacts on archaeological sites, and land degradation, according to applicable GEF and national safeguards.

It is anticipated that for subprojects with negative impacts, in most cases, the preparation and implementation of subproject-specific Environmental and Social Management Plans (ESMPs) would be sufficient. If an emerging subproject is categorized according to Jordan's EIA regulation no. 37/2005—as C I or C II then an environmental action would be required but if categorized as C III, no environmental action would be required. However such activities will be discouraged as it would delay project implementation due cost implications and to the length of time needed to complete the scrutiny and approval process,

The Ministry of Planning and International Cooperation (MoPIC)'s - Enhanced Productivity Program (EPP), has in house capability within its staff members in particular with social safeguards (and will ensure close consultation with Ministry of Environment and if needed the secondment of a local expert to be funded directly through MOPIC resources to support the project), the National Center for Agricultural Research and Extension (NCARE), Ministry of Water and Irrigation, Ministry of Agriculture (MOA), NGOs, WUAs ,farmers and other stakeholders of the project activities take place.

The application of the ESMP of the AF would be based on the background studies, ESIAs already conducted for the WWTPs, surveys needed and available statistics and needs that are established within the EPP data base of poverty pockets and youth/gender priority needs and priority areas (socio-economic surveys, national statistical database, and institutional capacity assessments and needs). The project Management Unit (PMU) at the EPP will have the overall responsibility for implementation of the EMPs in relation to environmental and social safeguards in close coordination with the project executing agencies.

Social Safeguards

MOPIC has an established grievance mechanism within the EPP manpower resources and will dedicate a focal point at the EPP to provide that support and offer communities an effective avenue for expressing concerns, achieving remedies, and promoting a mutually constructive relationship. MOPIC has identified a central point for coordination within the project PMU to address concerns related to the project. MOPIC will make available to the public who and how to contact through the website, and be responsible to respond to complaints in writing or by phone within a week of the complaint. A record will be kept of the complaints and how they were responded to. Social safeguards experts are available at the EPP for the monitoring and implementation of social safeguards issues MOPIC will periodically conduct an internal assessment of the grievance mechanism to evaluate and improve its effectiveness.

Social safeguards experts are available at the MOPIC EPP which will be the Implementing Entity for the project for the monitoring and implementation of social safeguards issues. Environmental safeguards are enforced by the M. of Environment and can be seconded to the PMU using MOPICs own resources. The MOPIC Social and Safeguards experts working for the EPP will review institutional objectives at programme/project scale, screen potential risks that may be connected with implementation activities, prioritize potential risks and build risk assessment matrix, identify mitigation and social/environmental protection actions.

Environmental safeguards are available at the M. of Environment and can be seconded to the PMU using MOPIC's own resources.

The PMU will be responsible for implementation of contracts/works, and will report to the CC Adaptation Fund on implementation, including compliance with ESMP. MOPIC will be accountable for the monitoring and reporting on safeguards issues. The PMU will be responsible to aggregate information on compliance with the ESMP, and include as a section in the reporting to the CC Adaptation Fund.

To describe how Jordan's Environmental and Social Risk Management/Safeguards correlate with the AF Environmental and Social Policy (ESP) Please refer to the ESMP IN Annex (5)

All subprojects (1.1,1.2,1.3,1.4,1.5, and1.6) submitted under this proposal would have qualified for Category B under the AF regulations , however since they have had an EIA and an accompanying Environmental Management and Mitigation Plan (EMMP) under national regulations which also complied with international funding agencies that funded the construction of the WWTPs and their reuse pilots. This scrutiny of the EMMPs and full adherence to the AF ESMP and EIAs conducted in Jordan would ensure no violation of both requirements. As for the FIFA Mazzarah rain water harvesting activity under sub project 1.5 these check dams being proposed are small structures which will be used for small temporary streams caused by the run-off during the rainy season and as seasonal storage facilities. *According to the JVA, the practice of erecting such small check dams is very common in the entire red JVA zone, and they will not have any negative effect on natural streams and ecosystem surrounding them. Further, the streams do not include any critical natural habitats yet securing the concerned authorities especially the Royal Society for Conservation of Nature and MoEnv.& MOA approvals will be sought prior to construction commencement*

D. Monitoring and evaluation arrangements

Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan.

Monitoring, Surveillance and Risk Assessment

The MOE, WAJ, and MOH Laws all assign their respective institutions with responsibility for water and wastewater quality monitoring. MOE is concerned with environmental protection to ensure public health and long-term environmental sustainability. WAJ is most concerned with protecting water resources, also for public health. Public health concerns are a primary concern of the MOH, and its focus is mainly on testing of microbiological parameters. The MOH and WAJ communicate and coordinate closely on monitoring and surveillance plans, results and responses to those results. The MOH can take appropriate action in relation to wastewater treatment plant operated by WAJ or any of its water company agents (i.e., AWC for Wadi Mousa WWTP and reuse area) if needed.

They can also close down establishment it deems are a danger to public health. In practice, WAJ monitors wastewater treatment plants connected to the sewer system. For those who recycle their own wastewater, monitoring levels depend on risk assessment.

A Monitoring & Evaluation system would be used by the PMU to keep track of project progress, compilation of data and information, tracking and dissemination of project outcomes and outputs, experiences and insights to all stakeholders.

The establishment of M&E systems for relevant outputs/activities is of paramount importance for effective knowledge management and sharing. Based on MOPIC's experience from community-based adaptation projects, presentation of concrete/tangible benefits (in terms of, for example, increased available quantities of water though wastewater reuse , increased farmer income, reduced harvest losses) in a way that is easy to understand by community members is often one of the most effective means for upscaling and replication.

Also investing in a robust and systematic M&E framework at the beginning of the project has a significant efficiency and effectiveness gain in the knowledge management within the project. Using M&E tools, throughout execution of the project, lessons learned will be captured, codified and discussed among stakeholders. This M&E framework will enable a production of technical reports from each of the technical Outputs, which will be collated as “best practice guidance materials and tools”. Periodic project briefs, annual progress reports, midterm evaluation and final evaluation results will be circulated widely for review.

Gender Integration and Impacts will be an integral part of the M&E system and project activities the project will be actively recruiting women professional staff in both technical and administrative roles. Project activities will definitely have an impact on the employment and improved environment for women who reside and work in the vicinity of the Project Implementation Sites. Training will be provided for pilot field workers. As Gender is a crosscutting issue, and among the stakeholders in the projects, Some of the major gender-impact issues that will be addressed in the context of the capacity building, climate change adaptation and development work relate to:

1. The extent to which women will be affected by the project activities.
2. The extent to which women will be affected by intensified production, considering changes in labor requirements, and concomitant changes in women's labor allocation.
3. Encouraging women householders (particularly widows and divorced women supporting families) to participate in the work of the local registered NGO engaged in activities at the project sites.
4. As the project pilots and activities develop and expand, continuously involving both male and female community beneficiaries in the design work and in decisions regarding infrastructure design and placement.
5. Development of public awareness and social marketing tools directed to both men and women recognizing that some of the tools may need to be tailored to the specific sub-audience groups.

The project would introduce a gender disaggregated system of data collection and reporting for each project component managed by the Monitoring and Evaluation Specialist of MOPIC EPP Unit which will host the NIE’s PMU. The system would be designed to capture the rate of implementation against planned targets and objectives, as set out by the project design. The M&E plan would also track: (i) the financial management system (FMO) and information t;(ii) recording and reporting of progress against planned project targets; and (iii) the assessment of the gender, socio-economic and environmental impact of project activities on the target groups, stakeholder, community based livelihoods and their adaptation to climate change.

The PMU will be the entity responsible for reporting on the Monitoring and Evaluation of the project achievements and knowledge management. Standard format for a project M&E matrix and performance checklist aligned with indicators, baseline data, methods for data collection, synthesis and a communication strategy for lessons learned will be utilized. MOPIC is familiar with this role through their work with donor lender agencies and projects/programs monitoring.

Updating , continuous feed in and tracking and validation of benchmark data (disaggregated by poverty pockets, livelihood group, resilience, and gender integration) will take place with the key M &E activities relying on the original approved project design and baseline data and surveys , continuous updates of data and achievements will be tracked with each implementing or partner agency reporting the findings of the monitoring exercise; annual impact assessment and evaluations submitted as per the AF regulations; a midterm review; and a final completion report based on assessment.

The M&E reports will be always be linked to the project rationale, log frame, annual work plans and budgets and the beneficiary assessments. The findings of the M&E will be used to take corrective or enhancing measures at the level of project management.

M&E Data collection responsibilities and flow:

- **Each executing entity appoints an M&E person** for data collection from sub projects it is overseeing their execution.
- **Each sub project assigns a field staff person to collect** data and assist in surveys to pass to executing entity M&E specialist
- **PMU will appoint a senior manager for M&E to collate data and survey results** from executing entities and prepare reports to PMU National Project Coordinator and TWG . This manager prepares M&E reports for review and approval to be sent to AF Secretariat.

The project will be monitored through the following M& E activities. The M&E budget is provided in the table below. The M&E framework set out in the Project Results Framework of this project document will be adhered to.

The key M&E project activities are:

Project Inception Workshop

A Project Inception Workshop will be conducted within one month of project start up/ It will be held within the first 2 months of project start up with those having assigned roles in the project organization structure, MOPIC, GOJ officials and regional heads of the WUAs and technical policy and program advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan. It will layout project activities (modalities of project implementation and execution) and desired results and to plan the first year annual work plan. The Inception Workshop will address a number of key issues including:

a) Assist all partners to fully understand and take ownership of the project; Detail the roles, support services and complementary responsibilities of project team; Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.

b) Based on the project results framework set out in Part III, Section D of this project document, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.

c) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.

d) Discuss financial reporting procedures and obligations, and arrangements for annual audit.

e) Plan and schedule public briefing meetings. The first PB meeting should be held within the first 12 months following the inception workshop.

Following the Inception Workshop, an **Inception Report** will be prepared as a key reference document. The Inception Report will serve as an Annex to the signed project document and shared with participants to formalize various agreements and plans decided during the meeting. The Inception Workshop Report will be prepared and shared with participants.

Reporting

Quarterly Progress, Semi-annual and Annual Project Reports will be prepared by the PMU and approved by the NSC to monitor progress during the reporting period. These reports include, but are not limited to, reporting on the following:

- Progress made toward objectives, and outcomes verified by data and indicators
- Project outputs delivered per project outcome (annual);
- Lessons learned/good practices;
- Annual Audited Financial Expenditure Report;
- Risk analysis and management.

Quarterly Reports: Project progress will be monitored through the MOPIC and the NSC. Based on the initial risk analysis submitted, a risk log will be regularly updated. Risks become critical when the impact and probability are high (more than 50%).

Annually: Annual ***Project Performance Report*** **(PPR)** is an extensive key report which is prepared to monitor progress made since project start and in particular for the previous reporting period (on a rolling basis). An external consultant appointed by MOPIC PMU will assess the quality of PPR, reviews all PPRs prepared by MOPIC-supported adaptation projects for completeness, comprehensiveness, analytical rigor and lessons learned.

The PPR includes, but is not limited to, reporting on the following: (a) Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative); (b) Project outputs delivered per project outcome (annual); (c) Lesson learned/good practice; (d) AWP and other expenditure reports; (e) Risk and adaptive management; (f) Portfolio level indicators are used by most focal areas on an annual basis as well.

Periodic Monitoring through site visits: MOPIC PMU will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Members of the Project Steering Committee and Technical Working Group (TWG) will join these visits as required. Responsible Government authorities, including interested scientific research organizations and institutions, as well as donor/lender agencies will be granted the chance to conduct regular field visits to project sites for demonstration, documentation and feedback. A Field Visit Report/ will be prepared by PMU for circulation no less than one month after the visit to the project team and PSC members.

Mid-term of project cycle: The project will undergo an independent Mid-Term Review at the mid-point of project implementation. The Mid-Term Review will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation, and provide an independent review of MOPIC's role as an Executing Entity for this project. The Mid-term Review will highlight issues requiring decisions and actions and present initial lessons learned about project design, implementation and management to the NSC. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term Review will be prepared by the MOPIC PMU in partnership with the Government .

End of Project: An independent Terminal Evaluation will take place three months prior to the final NSC meeting. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. It will also include an independent review of project implementation arrangements and their efficacy. The Terms of Reference for this evaluation will be prepared by

the MOPIC PMU. During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (Objectives, Outcomes, Outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

External Evaluations

The project will undergo an independent external Mid-Term Evaluation to determine progress towards the achievement of outcomes and identify course correction if needed. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the projects term. A Final External Evaluation will be conducted 3 months before project close out. The external evaluations would be carried out based on terms of reference prepared by the Government, and approved by AF.

Learning and knowledge sharing: Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects. Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

Financial Reporting

The provision of Certified Periodic Financial Statements and with an Annual Audit Report from a certified audit firm in relation to the financial statements relating to the status of project funds according to the established procedures will be the responsibility of MOPIC PMU.

Audit: Project will be audited in accordance with GOJ Financial Regulations and Rules and applicable on audit policies.

M&E Schedule, Budget and Roles

Note this budget will be used to conduct workshops that lead to data generation and collation of baseline and progress data and beneficiary survey to be included in the M&E reports and results.

TABLE 27: M&E SCHEDULE, BUDGET AND ROLES

M&E Activity	Responsibility	Role of of executing entities in M&E	Budget (USD)	Timeframe
Inception workshop - 2500	PMU – MoA	Each sub project will assign a Field staff to collect data for reporting and surveys requested by executing entity M&E focal point. Executing entity Focal Points Report to PMU (MOPIC) senior M&E specialist who reviews data for indicators & Outcomes, progress reports	3000	first month of start date
Quarterly report	PMU		1000	Every 3 Months
Annual reports	PMU		2000	Every Year
Mid-term Evaluation	PMU		3000	End of 2nd Year of Implementation
Final Evaluation	PMU and external evaluator		10000	Within last two months of the project
Final completion report	PMU		---	By the end date of the project
Field visits	GOJ agencies, research institutions and donor/lender groups, i.e executing entities		5000	Quarterly and upon need or request
Audit	Executing entities		5000	After operational closure of the project
Total Indicative Cost in US $	**29,000**			

TWG: Technical Working Group.

E. Framework for the project proposal, including milestones, targets and indicators

Include a results framework for the project proposal, including milestones, targets and indicators.

TABLE 28: FRAMEWORK FOR THE PROJECT PROPOSAL, INCLUDING MILESTONES, TARGETS AND INDICATORS

Component (1): Sub-Component (A): Climate Change Adaptation OF Water Sector "*Reuse of treated wastewater*"(PROJECT (1.1, 1.2, 1.3, 1.4):				
Projects Outcome	**Core Outcome Indicator**	**Baseline**	**Milestone**	**Project/Target/ 2019**
Increased water availability and efficient use through wastewater reuse & water	Quantity (m3) of Supplementary water available for agriculture, or number of families benefiting from the project	Subproject **(1.1)** 1,022,000 M^3	1,250,200 M^3/yr	1,317,200 M^3/yr
		Subproject **(1.2)** 17 MCM	18,500,000 M^3/yr	20,000,000 M^3/yr
		Subproject **(1.3)** 0	219,000 M^3/yr	438,000 M^3/yr
		Subproject **(1.4)** 0	219,000 M^3/yr	438,000 M^3/yr
		Total for all projects 18,022,000 MCM	Total= 20,188,200 M^3/yr	Total= 22,193,200M^3/yr
Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	Increased income, or avoided decrease in income	Subproject **(1.1)** $398 **/**household/month	$602**/**household/month	$806**/**household/month
		Subproject **(1.2)** $ 170 **/**household/month	$250/ household/month	$330/ household/month
		Subproject **(1.3**) 0	$150 **/**household/month	$300/ household/month
		Subproject **(1.4)** 0	$150 **/**household/month	$300 / household/month
	Number of beneficiaries *Average family size is 6 (2 Females, 4 Males)	Subproject **(1.1)** 40 families	55 Families"330 persons" (220 Males, 110 Females)	70 Family "420 persons" (280 Males, 140 Females)
		Subproject **(1.2)** 16 Families	23 Families "138 persons" (92 Males,46 Females)	30 Families "180 persons" (60 Females, 120 Males)
		Subproject **(1.3)** 0	35 Families "210" (140 Male, 70 Female	70 Families "420" (280 Male, 140 Female)

		Subproject **(1.4)** 0	35 Families “210” (140 Males, 70 Females)	70 Families “420” (280 Male, 140 Females)
Component (1): Sub-Component (B): Climate change adaptation of Agricultural Sector through rainwater harvesting& Permaculture, Projects “1.5,1.6”)				
Increased water availability and efficient use through Rain water Harvesting	Quantity (m3) of Supplementary Fresh water available for agriculture,	Subproject **(1.5)** 0	150,000 M3/Year	300,000 M3/Year
Increased adaptive capacity within relevant development and natural resource sectors	Natural Assets Protected or Rehabilitated	Subproject **(1.6)** 0	24 Farms	48 Farms
Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	Increased income, or avoided decrease in income	Subproject **(1.5)** 0	$1000 Farm/ Year	$2000 Farm/ Year
		Subproject **(1.6)** 0	$2500/ Farm/ Year	$5000/ Farm/ Year
	Number of beneficiaries Average family size is 6 (2 Females, 4 Males) benefit & participate in project activities	Subproject **(1.5)** 0	205 Families “1230 persons” (820 Males, 410 Females)	410 Families “2460 persons” (1640 Males, 820 Females)
		Subproject **(1.6)** 0	190 Families “1140 persons” (760 Males, 380 Females)	380 Families “2280 persons” (1520 Males, 760 Females)

Component 2: Climate Change Adaptation Capacity Building, Knowledge Dissemination, Policy and Legislation Mainstreaming (projects "2.1","2.2" &"2.3")				
Projects Outcome	**Projects Outcome**	**Projects Outcome**	**Projects Outcome**	**Projects Outcome**
Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	Number of Targeted population groups aware of Climate change risks on natural resources and the ecosystem.	Subproject **(2.1)** 0 *Assume each WUA has around 80 member, around 17% are women	24 WUA: "1920 persons" **Aggregated by gender** (326 Females, 1593 Males)	48 WUA "3840 persons" (3187 Males,653 Females)
Increased ecosystem resilience in response to climate change and variability-induced stress	Number of registered farmers in the Jordan valley will be registered users in the System Database (Each family has 6 members,2 women&4 Men)	Subproject **(2.2)** 16 WUA 26 Farmer family	23 WUA "1840 persons" (312 Females, Males 1528) & 33 Farmer Families "198 persons" (132 Males , 66 Females)	30 WUA "2400 persons" (1992 Males , 408 Females) & 40 Farmers Families "240 persons" (160 Males ,80 Females)
	Early Warning Systems installed	Subproject **(2.2) 0**	1	3
	Number of new micro-enterprises created linked to Agribusiness Industries	Subproject **(2.3) 0**	150	300
	Number of New direct& indirect Jobs related to Agribusiness in Jordan Valley	Subproject **(2.3)** 0	9000 Jobs (2700 for Females, 6300 Males)	19,800 Jobs (5400 for Females, 14400 Males)

F. Project / programme alignment with the Results Framework of the Adaptation Fund

Alignment of Project Objectives/Outcomes with Adaptation Fund Results Framework

TABLE 29: ALIGNMENT OF PROJECT OBJECTIVES/OUTCOMES WITH ADAPTATION FUND RESULTS FRAMEWORK

Project/ Objective(s)	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
Component 1 **Sub-Component (A): *Climate change adaptation of water Sector Reuse of treated wastewater" (project 1.1, 1.2, 1.3, 1.4):***				
■ Increasing the adaptation capacity to climate change in the water sector by reusing treated wastewater and thereby reducing the consumption of the scarce ground water. ■ To enhance community resilience and adaptation to climate change through improved and upgraded household generated income of poverty pockets and nomadic local Beduin communities	- % Increase in household income **Target: 35%** - Number of families with enhanced livelihoods Target : (240 Families) " Average family size is 6) aggregated by gender: **960 Males, 480 Females**	**Outcome 5:** Increased ecosystem resilience in response to climate change and variability-induced stress	**5**.Ecosystem services and natural assets maintained or improved under climate change and variability-induced stress	4,272,882
Component 1 **Sub-Component (B): Climate change adaptation of Agricultural Sector through *rainwater harvesting& Permaculture, Projects "1.5,1.6")***				
■ Implement watershed management with focus on water harvesting techniques to help the communities improve their livelihoods. ■ Building Resilient Food Security Systems through Extending Permaculture design and Technologies in The Jordan Valley and Beyond	- Total quantity of rainwater harvested. **Target :(300,000 m3/Year).** Number of families with enhanced livelihoods resulting from project activities. **Target : (410 Families " Average family size is 6) "3160 Males, 1580 Females"**	**Outcome 6:** Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas.	**6.2**. Percentage of targeted population with sustained climate-resilient livelihoods	1,627,118

<u>Component 2:</u> Climate Change Adaptation Capacity Building, Knowledge Dissemination, Policy and Legislation Mainstreaming (projects "2.1","2.2""2.3")				
▪ Educate & enhance the ability of remote communities (Poverty Pockets) to make informed decisions about climate change-driven hazards through	- Percentage of targeted population in Jordan Valley & Wadi Mousa aware of predicted adverse impacts of climate change, **Target:(3840 persons, aggregated by gender (3187 Males,653 Females)** - # of Early Warning Systems installed (3) systems - Number of WUA reached by the climate change early warning system to be informed of impeding hazard of cold or frost front or a heat wave in the Jordan valley **Target: (16)**	**Outcome 3:**Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level **Outcome1:**Reduced exposure at national level to climate-related hazards and threats	**3.1.**Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses	200,000
▪ Reinforce Early Warning System for Drought (Using Climate, Vegetation Cover, Water budget, and Crop Risk information)			**1.2** Development of early warning systems	550,000 1,150,000
▪ Design and produce realistic and implementable solutions to achieve an effective agribusiness management system in Jordan Valley. ▪ Mainstreaming new policies and legislations which incorporate Climate change adaptation measures into local and national strategies & plans	- Number of New direct& indirect Jobs related to agribusiness in Jordan Valle. **Target (19800 Jobs created) aggregated by gender** 5400 for Females, 14400 Males)	**Outcome 2:**Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental **Outcome 7:**Improved policies and regulations that promote and enforce resilience measures	**2.1** No. and type of targeted institutions with increased capacity to minimize exposure to climate variability risks **7.1**. No., type, and sector of policies introduced or adjusted to address climate change risks	

Component 1				
▪ Increased water availability and efficient use through wastewater reuse & Rainwater Harvesting ▪ Raise living standards of vulnerable remote poor communities.	– Total Quantity (m^3) of irrigation wastewater made available for agriculture Target: (22,193,200 M^3/yr) – %Increase in Income due to increased production of vegetables	**Output 5:** Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability **Output 6:** Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	**5.1** No. and type of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change. **6.1.1** No. and type of adaptation assets (physical as well as knowledge) created in support of individual or community livelihood strategies **6.1.2.** Type of income sources for households generated under climate change scenario	5,900,000.019
Component 2				
■ Better Informed society & highly aware communities with ability to adapt to climate change impacts.	Percentage (%) of targeted population aware of predicted adverse impacts of climate change Number of new micro-enterprises created linked to the agribusiness industries.	Output 3: Targeted population groups participating in in adaptation and risk reduction awareness activities	3.1.1 No. and type of risk reduction actions or strategies introduced at local level 3.1.2 No. of news outlets in the local press and media that have covered the topic	1,900,000
■ Setting a precedent for open governance and transparency in policy-making activities.	Number of laws & regulations amended in support of climate change adaptation	Output 7: Improved integration of climate-resilience strategies into country development plans	7.1. No., type, and sector of policies introduced or adjusted to address climate change risks 7.2. No. or targeted development strategies with incorporated climate change priorities enforced	

Alignment with Adaptation Fund Core Impact Indicators:

TABLE 30: ALIGNMENT WITH ADAPTATION FUND CORE IMPACT INDICATORS

Adaptation Fund Core Impact Indicators				
Date of Report				
Project Title	Increasing the resilience of poor and vulnerable communities to climate change impacts in Jordan through Implementing Innovative projects in water and agriculture in support of adaptation to climate change			
Country	Jordan			
Implementing Agency:	MOPIC			
Project Duration	4 Years			
	Baseline	Target at project approval	Adjusted target first year of implementation	Actual at completion
"Number of Beneficiaries"(absolute number)				
Direct beneficiaries supported by the Project				
Female direct beneficiaries	382	2408		
Youth direct beneficiaries	1390	4120		
"Early Warning Systems"				
Adopted Early Warning Systems Flood/Storm EWS *(1) risk knowledge,* *(2) monitoring and warning service,*	 0 0	 6 seminars/year 3		
"Assets Produced, Developed, Improved, or Strengthened"				
Sector	None	Water		
Targeted Asset	None	Construction of Drying ponds, Installation of a tertiary irrigation network & filtration unit at Tal Al Mantah project (1.3)		
Changes in Asset	None	Expansion of WWTP (Tal Al Mantah) to receive **600** cubic meter per day Rehabilitation of adjacent building to be used as training center		
"Increased income, or avoided decrease in income"				
Income Source	sale of agricultural produce	sale of diversified agricultural produce (Food & animal Feed)		
Income level (USD/month)	$170 / month	$ 300/month		
Number of households	295	1088		

G. Detailed budget with budget notes

Include a detailed budget with budget notes, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.

Breakdown of Projects' Field Execution Costs @ $ 703,000 was prepared with input from the Water Authority of Jordan who directly manages the operation of WWTPs in the governorates or has management contracts with water utility companies and thus are extracted from the real life operational costs borne by WAJ and/or utilities.

TABLE 31: BREAKDOWN OF PROJECTS FIELD EXECUTION COSTS:

Item	Unit Cost ($)/month or yr or pc	Units	Total (USD)	Budget Notes
Set up of 6 satellite field execution offices	$8112.6/yr Field Offices rent	4 yrs	48,676	Execution offices rental in support of subprojects (1.1), (1.2)(1.3),(1.4),(1.5),(1.6) (four JV offices (north, middle , Karameh, and Fifa), Wadi Mousa and permaculture Projects . Rent per Yr $2028
field management experts	3 experts @$1466.6/month	42 man months	$184,800	Field Technical Support Experts (2 experts for ww reuse irrigation (one JV and one for Wadi Mousa) and one agricultural economist)
Institutional management experts)	2 Experts @$2200/month	42 months	$184,800	Technical Experts (one for CIIP and one Institutional Support on CC Adaptation)
IT equipment and support	6 computers @$1000, 6 scanners/photocopiers@1000/piece and 6 printers1000/piece	One time purchase	$18,000	Computers and IT support equipment for 6 subproject field offices
Operational expenses for 6 field execution offices	$249	46 months	$68,724	Stationary, supplies, utility bills for offices, fuel for vehicles
Travel expenses	$500/month for 6 field offices	46 months	$138,000	Fuel for vehicles to and through project field sites in JV & Wadi Mousa
Project Vehicles	5@$12,000	LS	60,000	5 vehicles (2 vehicles for ww reuse filed Projects (JV& Wadi Mousa), 1 for permaculture project, 1 for rain water project , 1 for agribusiness subprojects)
Total for Field Execution costs				**$ 703,000**

Project Cycle Management Fee charged by the Implementing Entity (IE) (@8.5%)@ USD 723,000

TABLE 32: PROJECT CYCLE MANAGEMENT FEE CHARGED BY THE IMPLEMENTING ENTITY (IE)

Project Cycle Management Fee over 4y	% of $723,000	Amount $	Unit	Budget Total &Notes
1. Overall Coordination and Management	30	216,900		Sum of 1.a, 1.b , 1.c and 1.d below
1. a Project Coordinator		3100/month	48 months	$148,800 total salaries
1.b Administrative Officer		1660/month	41 months	$68,100 total salaries
1.c PMU office running costs (rent , electricity and heating)	-	-	In-kind contribution by MOPIC	PMU office rent and utilities
1. d Four staff members of EPP to work full time on the project including an M&E Specialist	-	-	In-kind contribution by MOPIC	Four staff members of EPP to work full time on the project
2. PFG (covering ESMP development and technical and stakeholder consultations) & Development and oversight of annual work plans.	20%	144,600	Annual work plan, annual budget planning and break down per sub project, and quarterly reports	*Project Formulation Grant (PFG) @ $ 29,000 *$28,900/Yr (Annual work plan, quarterly and monthly report production) over four years through technical expertise subcontracts in support of sub projects work plans preparation and implementation
3.Financial Management and Legal support	20	144,600	Subcontract to an audit firm with an accountant to oversee project accounts management of MOPIC and to produce annual audit report in English	Annual audit services for 4 yrs and Legal services (annual legal firm contract $10,150/yr and annual audit firm services $26,000/yr)
4.Evaluation and Knowledge Management support including Reporting on M&E	20	144,600	See Table below on NIE Fees breakdown and M&E	See Table below on Ninety Fees for detailed schedule for supervision of M&E
5.Overall Administration and support costs	10	72,300 (Sum of 5.a, 5.b and 5.c below)	Operational running costs	(Stationary for printing – photocpying, and Fuel for field inspections under M&E). See
5.a IT equipment and support for PMU		$37,846	46months for Part Time IT support and one time equipment purchase for PMU	$20,000 (2 computers, one printer, one photocopier bought once) and $17,845 part time monthly IT support @ $388/month)
5.b Stationary, supplies for PMU administration & reports printing		$249/month	46 months	$11,454
5.c.Vehicle and Fuel for Travel to project field sites		500/month	46 months	$23,000 (One Vehicle @12000 with Fuel at $239/month
Total for NIE ($)	**100%**	**723,000**		

Break-down of how implementing entity IE fees will be utilized in the supervision of the M&E function.

Note: MOPIC, as National Implementing Entity (NIE), will utilize part of its NIE funds for its role in project coordination, PMU hosting, thematic evaluations, knowledge management and dissemination and results publication.

TABLE 33: BREAK-DOWN OF HOW IMPLEMENTING ENTITY IE FEES WILL BE UTILIZED IN THE SUPERVISION OF THE M&E FUNCTION.

NIE Fees Breakdown of M&E Supervision	RESPONSIBILITY	BUDGET (USD)	TIME FRAME
Field Visits of Programme monitoring specialists	MOPIC	20,000	BI ANNUALLY
Training workshops on M&E and ESMP compliance	Specialized Firm	20,000	MAY 2015
Thematic evaluations	Specialized local firm/consultants	20,000	ANNUALLY
Mid term evaluation	Specialized local firm/consultants	13,000	MARCH 2016
Final evaluation	Specialized local firm	16,000	APRIL 2019
Knowledge management activities and publications	Royal Scientific Society	30,600	BI ANNUALLY
Total indicative cost		144,600	

Below is a Breakdown of Individual Projects Budgets' with Budget Notes.

TABLE 34: BREAKDOWN OF INDIVIDUAL PROJECTS BUDGETS WITH BUDGET NOTES

Total Cost of Project Components /Activities	USD	Budget Notes
Project (1.1) Wadi Musa WasteWater Reuse Project	**1,732,461.6**	the budgets costs below for wadi mousa ww reuse project were provided by PDTRA who is the owner of the stage one pilot ww reuse site in wadi mousa and based on current market costs . the operational costs were provided by the WWTP operating utility company while the agricultural costs were provided by the WW reuse site manager.
Annual maintenance needs of the filtration systems feeding the pilot with treated ww	36,723.16	(purchase of filtration media, & upgrade of effluent holding systems)
Maintenance for the existing 50 Dunums	40,254.23	The existing land is already cultivated with Barseem
Cultivating 100 new dunums with Berseem	72,740.11	inside the lands of the first project
Expansion of the Project Area	115,819.2	Procurement and installation of new irrigation systems for the expansion area
Livestock Breeding	142,923.72	Some of the equipments needed for livestock breeding : (1) The water stripes estimated price is 350 JD including building material & labor costs. (2) Troughs: every 20 Trough costs about 600 JDs.
Beekeeping and honey production facility	61,680.79	It is estimated that each hive can generate about ($150/yr).
Irrigation System Rehabilitation	64,950.56	For the existing pilot which is now more than 7 yrs old and needs replacement.
Cultivation of Native Trees	83,333.33	Along the road to the WWTP
Plantation of Medical Plants Aloe Vera & Gel extraction plant*	46,610.16	Seeds, seedlings and small crop processing plant
converting green fodder into silage plant	53,672.316	Compactors, bailers and silage system.
Converting produced fodder into feed grains	91,807.90	fodder processing to feed grains.
Dairy Products Plant	141,242.93	small sized plant * This is a small village type dairy production plant not a large scale one for processing dairy products (fermenters, cold storage, packaging and quality control
Aloe Vera Plantation pilot Plant	400,000	Plant set up and Production and operational costs
Four years project operational costs	380,703.2	Operation and maintenance costs, for WW reuse filtration, irrigation and pump systems, site engineer salary, fuel and utility costs for operating the pilots.
Project (1.2) North Jordan Valley WW Reuse Project	**1,170,000**	**The costs below were provided by JVA who manages JV, while the WWTPs operational costs were provided by Water Authority of Jordan (WAJ) as the WWTP plant operator**
General rehabilitation & upgrade of on farm	120,000	Procurement of mulch, farm turnout pumps including O&M and fuel

Total Cost of Project Components /Activities	USD	Budget Notes
infrastructure and maintenance systems		
Install the best available technology of water filtration systems	500,000	To assist farmers to switch from fresh water irrigation to TWW. This is a media filtration followed by an RO system to polish and filter the ww effluent before reuse and meet JS 893/2006
Technical Assistance Support	120,000	This Activity will include the following: As farmers in the north use fresh and not mixed water for irrigating their citrus and vegetable farms they will need a comprehensive TA in order to assist them make the change to treated wastewater , manage their new water quality, irrigation system, soil salinity so as not to negatively impact citrus trees. • Link operational irrigation systems to the storage pond of the wastewater treatment plants that is capable of utilizing all of the available effluent in peak months. • Support the farmers in the northern Jordan Valley to adapt to new water quality (wastewater) for irrigation of citrus farms, improve on-farm water management, especially to deal with water quality-related issues. • Awareness raising campaigns and further support to the agriculture advisory service are to be established to inform and consult the farmers • A comprehensive soil survey is recommended in relation to soil quality, baseline data and soil salinity management.
• Water quality monitoring	250,000	The monitoring program will include laboratory monitoring of (both micro-biological as well as selected physio-chemical parameters) are to be enforced and supported with ISO 17025 laboratories accreditation (Jordan Food and Drug Administration) and JVA/Ministry of Agriculture labs for crop, soil and water quality monitoring through .RSS, JFDA and JVA.
Installation of new Irrigation System	180,000	Existing system expansion and installation of purple coloured irrigation network as per national code for irrigation with treated wastewater effluent in place of the black colored fresh water irrigation system.
Project (1.3) Tal El Mantah WWTP Reuse	**840,420.5**	**The costs below were provided by JVA who manages JV , while the WWTPs operational costs were provided by Water Authority of Jordan (WAJ) as the WWTP plant operator.**
Rehabilitation and maintenance of Tal El Mantah WWT Plant*	183,615	Rehabilitation and maintenance needs of Tal El Mantah WWT plant to assure compliance with national standard 893/2006 for wastewater reuse in irrigated agriculture would require Cleaning of the flow equalization ponds, Reduce the suspended matter in the aeration ponds , Installation of a condenser to reduce the size of the sludge Installation of a (2 Ton) Crane in the blowers room, and a 2 meter door Providing the requested spare parts as (Motor Gear for the precipitation pond, Extra Air compressor, a compressor for biological filter) Maintenance of the Electrical Boards.
The rehabilitation of the adjacent building	84,745.76	The Building is intended to be used as a farmer training center & lab testing

Total Cost of Project Components /Activities	USD	Budget Notes
to the WWTP		
Installation of irrigation system at the reuse land plot	258,192	Installation of purple colored irrigation network as per national code for irrigation with treated wastewater effluent
Technical assistance WUA and local NGOs (including women based NGOS)	100,000	Training on use of reclaimed water for agricultural irrigation to replace fresh water supplies (includes public health, hygiene, management and O&M of irrigation network on farm,
Four years operational costs	213,866.84	Operation and maintenance costs, for ww reuse filtration, irrigation and pump systems, site engineer salary, fuel and utility costs for operating the pilots.
Project (1.4) WW Reuse of North Shouneh WWTP Treated Effluent	**530,000**	**The costs below were provided by JVA who manages JV, while the WWTPs operational costs were provided by Water Authority of Jordan (WAJ) as the WWTP plant operator.**
Install the best available technology of water filtration system	260,000	To assist farmers to switch from fresh water irrigation to TWW. This is a media filtration followed by an RO system to polish and filter the ww effluent before reuse and meet JS 893/2006 and to polish the effluent before distribution for reuse in irrigation.
Install on farm irrigation infrastructure	180,000	for farmers of the northern Jordan Valley switching to reclaimed water (purple irrigation pipes)
Technical Assistance Support	70,000	This Activity will include the following: Support the farmers in the northern Shouneh to adapt to new water quality (wastewater) improve on-farm water management, especially to deal with water quality-related issues. Awareness raising campaigns and further support to the agriculture advisory service are to be established to inform and consult the farmers A comprehensive soil survey is recommended in relation to soil quality, baseline data and soil salinity
Water quality monitoring	20,000	The laboratory monitoring program will include: (both micro-biological as well as selected physio-chemical parameters) which will be enforced and supported with ISO 17025 laboratories accreditation (Jordan Food and Drug Administration) and JVA/Ministry of Agriculture labs for crop, soil and water quality monitoring through RSS, JFDA and JVA
Project (1.5) Rain Water Harvesting Technologies in Poverty Pockets	**627,118**	**The costs below were provided by JVA who manages JV, and does feasibility assessment based on hydrogeological studies for locations to construct earthen rainwater collection dams**
Obtain rainfall data and rainwater harvesting potentials in the Mazraah/Haditha/Fifa region	20,000	This Includes Jordan's rainfall depth and its distribution over the different zones as well as hydrogeological and soil surveys.
Prepare engineering design and feasibility studies	20,000	for potential earthen dams in region
Construction of a rainwater harvesting dam	327,000	small earthen dam in khanzeerah area
Training.	90,000	For capacity building & Involving communities in planning and managing their watershed
Water quality monitoring	20,118	(both micro-biological as well as selected physio-chemical parameters) to be carried out by outsourced labs through JVA
Install new irrigation and filtration systems	150,000	drip irrigation network for irrigation with collected rainwater

Total Cost of Project Components /Activities	USD	Budget Notes
on farms		
4 yrs Operational cost	0	**IN KIND- BORNE BY JVA**
Project (1.6) Building Resilient Food Security Systems through Extending Permaculture Design and Technologies in The Jordan Valley and Beyond.	**1,000,000**	All costs were calculated based on a project period of 4 years. Cost estimates were provided by the Permaculture institute of Australia who applied the permaculture method on farms in Wadi Rum in the south of Jordan and real life costs from these farms.
Training on permaculture related Subjects (1- 16)	81,600	Course duration" 5 days" Cost of Course per person (400JD) there will be 17 participants, Three courses will be given per year
Permaculture Design Certificate	96000	Course duration, "2 weeks", Cost of Course per person (600JD), there will be 20 participants, Two courses will be given per year
Permaculture Pilots	200,000	Establish 2 Pilot farms one for the middle and North JV and one for the Fifa/Mazraah Ghour
Transformation of regular farms in JV into Permaculture Systems	397,800	Capacity building and field applications for change from mono to polyculture systems for participating farms
Labour costs	150,000	Farm labour utilizing new techniques of permaculture across Jordan Valley
Incidental equipment cost	74,600	(project partial cost share over four yrs)**- FOR PURCHASE OF COMPOSTING SYSTEMS**
Project (2.1)- National Policy Capacity Building Needs for Climate Change Adaptation of Jordan's Agriculture	**200 000 USD**	All costs were calculated based on a project period of 4 years costs were provided by the Royal Scientific Society who will implement this support activity
Awareness campaign	100,000 USD	6 training sessions/ year will be held for the local community, famers and WUAs about climate change-driven hazards affecting their areas
Cost of SMS system creation and operation:	100,000 USD	This system will enable the farmers to send SMS (via mobile customized interface) and specify the parameters they wish to inquire about (e.g crop type, land area, climate conditions…etc)
Project (2.2): Using ICT as an enabling tool for more effective climate change adaptation and development programmes	**550,000 USD**	All costs were calculated based on a project period of 4 years costs were provided by the Royal Scientific Society who will implement this support activity
ICT work	300 000 USD	(Portal, 2 way SMS and Mobile Application)
Training of local community	100 000 USD	(WUAs and farmers)and SMS scientific content
Climate change early warning System	150 000 USD	Develop a mobile application for early warning system which will help farmers to enquiry about irrigation times, types and amounts, latest news, climate change actions and behaviors
Project (2.3) Jordan Valley Water Forum Competitiveness Project	1,150,000	

Total Cost of Project Components /Activities	USD	Budget Notes
Consultant Fees	150,000	consultants in agribusiness, export assistance, extension services, changing cropping patterns to cash and CC resilient crops
Workshops, training	140,000	training workshops across JV by above consultants on agribusiness, export assistance, extension services, changing cropping patterns to cash and CC resilient crops
Other costs	160,000	Technical and procurement support towards enhanced business modeling of WUAs and the establishment of a regional revolving fund with seed money
Four JV regional grading, packing and cold storage facilities	570,000	Rental and set up of four regional cold storage centres where women from CBOs can get jobs sorting, grading and packing of produce for selling in central cities markets and export to regional markets @$142,500. This is highly needed for job creation, gender integration, and CC resilience assistance to local poverty pockets communities. Any investment cost beyond the budgeted amount will be via cost share by farmers through revolving fund loans). Engagement of women in these activities is a must.
Support for JFDA in ISO 17025 Accreditation	80,000	Towards a JVA Crop Certification Program, this will partially remove export barriers due to misconceptions and leads to improved quality control of the whole monitoring and crop production system
M&E Costs	50,000	

H. Disbursement schedule

Include a disbursement schedule with time-bound milestones.

DISBURSEMENT MATRIX

TABLE 35: DISBURSEMENT SCHEDULE

	1st disbursement - Upon agreement Signature	2nd Disbursement upon submission and AF acceptance of the first annual report and M&E plan	3rd Disbursement upon submission and acceptance of AF of first midterm report and progress	4th Disbursement Disbursement upon submission of draft final report and draft final M&E report	Total
Scheduled Date	30 June 2015	30 June 2016	30 June 2017	30 March 2019	4 Years
Project Funds (USD)	1,719,027	2,618,550	2,349,738	1,815,685	8,503,000
Implementing Entity Fee (USD)	146,166	222,648	199,795	154,389	723,000

Below is a table with detailed budget with budget output notes, and an explanation and a breakdown of the execution costs (detailed Budget per project is shown following this table)

TABLE 36: DETAILED BUDGET WITH BUDGET OUTPUT NOTES

List of Proposed Project Execution Activities	Output of the Execution Activities with disbursement schedule with time-bound milestones	USD Amount	Budget Notes
Component 1) Climate change adaptation of Agricultural & water Sector through Technology Transfer (The use of Non-conventional water resources (Reuse of treated wastewater, Rainwater Harvesting& Enhanced Crop Production through permaculture	**Reuse of treated wastewater:** Securing 22,193,200 M^3/yr as high quality treated wastewater for irrigated agriculture by January 2019.	4,272,882	4 ww reuse pilots (Wadi Mousa) and , North JV, North Shouneh and Tal Mantah in JV.
	Rainwater Harvesting: Securing 300,000 m3/Year amount of Rainwater harvested for poverty pockets (Southern JV) and local community groups by January 2019.	627,118	Construction of rain water collection earthen dam at Khnaizereh Valley
	Enhanced Crop Production through permaculture: Producing 22,322 Tons/year of fresh vegetables through Permaculture projects in the Jordan Valley by January 2019 .	1,000,000	Set up of two permaculture pilot systems for enhanced crop production in JV and assist all farmers in the Jordan valley
Component 2) Capacity building at both the national and local/community levels respectively, knowledge dissemination, policy and legislation mainstreaming.	- Percentage of targeted population in Jordan Valley & Wadi Mousa aware of predicted adverse impacts of climate change, Target : (3840 persons, aggregated by gender (3187 Males,653 Females) - Number of awareness sessions held to dissemination information & knowledge on how to enhance the water/ Agricultural sectors capacity to adapt to climate change and of appropriate responses. **Target : (6 sessions per year)** - Number of WUA reached by the climate change early warning system to be informed of impeding hazard of cold or frost front or a heat wave in the Jordan Valley **Target: (16WUA)** - Number of new micro-enterprises created linked to Agribusiness Industries. **Target : (300 enterprise)**	**1,900,000**	
Project/Programme Execution cost		**703,000**	
Total Project Formulation Grant		**8,503,000**	

ANNEX (1)
Detailed Budgets

Annex 1/ 2 : Needed maintenances Budget

Annex 1/ 3 : Expansion of the Project Area

Annex 1/ 3 : The detailed Budgets for livestock breeding, Fodder production &Beekeeping and honey production

Annex 1/ 5 : Estimated Costs for Irrigation System Rehabilitation for Wadi Mousa Pilot Project

Annex 1/ 6 : Irrigation system sub-main to farms

Detailed Budgets of Project (1.1)

The age of this infrastructure is ten years and it's still working but needs maintenance as follows:

Needed maintenances Budget	Cost
Renewing the sand filter unit which is consisted of 3 tanks, the capacity of each one 2500 liters, it is locally manufactured from metal sheet with a group of valves (12 valve 3 inches and 3 valves 6 inches).	10000 JD
Maintenance of distribution manholes and the main valves	2000 JD
Replacement of irrigation mainlines	2000 JD
Replacement of all obsolete fertilizer injectors	4000 JD
Maintenance for pressure regulators	2000 JD
Replacement of irrigation meters / 20 meter	6000 JD
TOTAL	**26000 JD**

Maintenance for the existing 50 Dunums cultivated with Barseem

100 dunums have been maintained from total of 150 dunums cultivated and 50 dunums still need to be maintained, and they are distributed on the farmers' lands as four dunums for each farmer, as the beneficiary farmers are about 12.

Need	Cost
Barseem seeds (250 kg)	12500 JJD
Irrigation network GR for 50 Dunums	15000 JD
Parts and accessories	1000 JD
TOTAL	**28500 JD**

Cultivating 100 new dunums with Berseem inside the lands of the first project

Barseem is considered to have the highest cash benefit crop for the farmers, so there is a group of farmers who want to participate in the project by cultivating barseem, they are already members in the Sad Ahmar Association and didn't benefit from the project before, as the association will convert a part of the lands that are cultivated with the winter crops such as Barley to be cultivated with barseem as it is more income-generating, the beneficiaries of this activity are about 20 farmers by 5 dunums for each farmer and total area of 100 dunums.

Needs	Cost
Modifying the main irrigation lines	8000 JD
GR Irrigation networks	30000 JD
Modifying the control units	5000 JD
Irrigation Meters	6000 JD
Barseem seeds	2500 JD
Total	**51500 JD**

Expansion of the Project Area

As the result of the continual increase of available reclaimed water quantities year after year, it's above mentioned elements would absorb the resultant wastewater quantities until early 2017 then an extension in farming would be needed to absorb the excess water quantities. Based on the on the directives of the responsible government agencies PDTRA to expand towards lands owned by citizens nearby the WWTP site which has a total area of 350 dunums as a maximum and therefore no expansion area is available because this site is surrounded by mountains from all sides. There are locally owned lands divided into 30 pieces and all of its owners want to use the resultant water from the station, the extension must be in these lands with fruit trees cultivation only to so that not to compete the previous project on waste water consumption as the needs of this site (which one) of water range from 700-900 cubic meters daily only.

Needs	Cost
pumping unit (120m3/hour)	8000 JD
Sand filter unit (1020m3/hour)	4000 JD
Pipeline (diameter: 170mm – Polyethylene- length 2000m)	2000 JD
Control unit (fertilizer meter- main valve) / 30 unit	15000 JD
Irrigation networks – Polyethylene 350 Dunums (for trees)	35000 JD
Total	**82000 JD**

The detailed Budgets for livestock breeding, Fodder production &Beekeeping and honey production:

Variable costs			
Type	**Price JD/sheep**	**No.**	**Type**
Ewes	200	250	50,000
Rams	20	250	5000
Total: 55,000 JD			
Labor costs JD/per year for the first year only			
Type	**Number of labors**	**Monthly wage/JD**	**Annual wages/JD**
Labor	4	250	12,000
Total: 12,000 JD			
Fixed equipment costs			
Equipment	**Number of Equipment**	**Price JD/ unit**	**Costs JD**
Troughs	20	30	600
Cement watering Channel	1	350	350
Steel water tank	3	120	360
macerator with Mixer	1	4000	4000
Total: 5310 JD			
Fixed Barn Costs			
Type	**Size m^2**	**Unit costs JD /unit**	**Estimated costs**
Ewes Barns	300	11.16	3348
Fattening Barns	200	5.54	1108
Rams Barns	25	24.36	609
Fodder Storage	24	25,375	609
Maternity Barn	25	25,000	600
Land	5000	-	Available from association
Administration caravan			3000
Total: 9274			

Livestock breeding			
Fodder production			
Estimated costs	**Price/ unit**	**Amount/ no/ tons**	**Type**
Barley	27tons	175	4725
Bran	13tons	77	1001
Soya	4.5tons	450	2025
Trefoil	16tons	370	5920
Straw	16tons	190	3040
Salt	400kg	0.5	200
Salt blocks	60 unit	3	180
Other elements	40	11,25	450
Water	For a year	2/year/sheep	420
Plastic Barrel	4 units	20	80
Plastic Bucket	5units	3	15
Muslin+ sterilizers	--	150/year	150
Antibiotics	--	500/year	500
Sponges +hormones	--	650/year	650
Plastic tarpaulin	Roll	250/year	250
Total: 19606			
The Total Cost: 101,190 JDs			

Cost for purchasing a Tractor	
Advantage	**Disadvantage**
- Ownership of an asset - Availability guaranteed - No transportation needed - Good maintenance could extend the useable years - Lower cost burden for farmers; Potential additional income through renting to external farmers	- Maintenance cost - Poor maintenance could shorten the usable years - Cost burden for WUA
Cost comparison	
Purchasing	
Initial cost (estimated average)	24,500
Rent per hour (JOD)	0
Use per year (hr)	1,350
Maintenance cost	10,200
Annual cost to WUA	4,800
Annual cost to farmers	5,400

Beekeeping and Honey production			
Fixed costs			
Unit	**No.**	**Price/ unit**	**Estimated costs**
Caravan and it's equipment	1	3000	3000
Sunshades	1	1200	1200

Honey Separator	2	65	1300
Beehives and their parts	100	200	20000
Levers	10	10	100
Chimney	10	10	100
Fencing			5000
Total: 30,700			
Variable assets costs			
Unit	**No.**	**Price/ unit**	**Estimated costs**
Wax frames	2500	2	5,000
Extra boxes	250	35	8,750
Suits	10	50	500
Brusher	10	5	50
Borders for the queens	10	7	70
Total: 14,370			
Administrative and labor costs			
Unit	**No.**	**Price/ unit**	**Estimated costs**
A technician for a year	1	300	3,600
Total: 3,600			
The total cost: 43,670 JD			

Estimated Costs for Irrigation System Rehabilitation for Wadi Mousa Pilot Project

Conveyance line from wastewater treatment plant to the pilot project area Work on the pump station: supply, install, test and provide maintenance with all accessories necessary, complete as per specifications Work on the sand filters: maintain valves, paint, and install rubber to stop the leak from sand filters, and provide maintenance the concrete base with all accessories necessary to complete the work.

ITEM DESCRIPTION	Total Cost J.D	Unit Price J.D	Material Origin	Working Pressure (bar)	QTY	UNIT
Pump station * One Vertical Multi-stage pump (Q=30 m^3/hr@ 3.5 bar) * Variable speed, Variable frequency drive (VFD) * Electrical Control Panel and protections * Pressure Vessel 100L * Pressure transmitter * Piping * Valves * Strainer * Non-return valves * Fittings * All materials required to complete the works	No.	1	3.5	Denmark	6,200.00	6,200.00
Fix leakage for 6" valve	No.	1	Flange valve		75.00	75.00
Fix leakage for reducer 8"-6"	No.	1			75.00	75.00
Gasket for 8" flange valve	No.	1			50.00	50.00
Sand Filters	No.	3	Epoxy coated		300.00	900.00

Irrigation system sub-main to farms Work on farm head units, valves and fittings: Supply, install, test and provide maintenance with all accessories necessary, complete as per specifications

ITEM DESCRIPTION	UNIT	QTY	Working Pressure (bar)	Material Origin	Unit Price J.D	Total cost J.D
Farm Head Unit						
3"- Flanged Flow meter	No.	15	10	China, Poland	320.00	4,800.00
3"- Disc filter	No.	23	20	KSA	250.00	5,750.00
3" - Pressure regulator	No.	11	20	Italy	650.00	7,150.00
1.5" - Venturi fertilizer	No.	14		USA	150.00	2,100.00
Cartridge (Disc) for 3" disc filter	No.	9		KSA	75.00	675.00
Accessories for 3" pressure regulator	No.	10		Local	20.00	200.00
Accessories for 1.5" Venturi fertilizer	No.	15		Italy	35.00	525.00
Pressure gauge	No.	84	20	Italy	9.00	756.00
Valves						
4"- Flanged valve	No.	3	20	Italy	350.00	1,050.00
4" - Threaded valve	No.	1	20	Italy	150.00	150.00
3" - Flanged valve	No.	1	20	Italy	250.00	250.00
3"- Threaded valve	No.	6	20	Italy	75.00	450.00
Fittings						
Clamp saddle with reinforced ring 125* 2"	No.	1	16	KSA	6.50	6.50
PE Male adapter 90x3"	No.	9	16	KSA	8.50	76.50
PE Coupling 110mm	No.	2	16	KSA	23.00	46.00
PE Coupling 90mm	No.	2	16	KSA	15.00	30.00
PE Elbow 3"	No.	2	20	White Iron	25.00	50.00
Nipple 3"	No.	1	20	White Iron	25.00	25.00
Air release valve 2"	No.	1	10	KSA, Italy	50.00	50.00

Farm units Work on farm units: Supply, install, test and provide maintenance as per specifications and as shown on drawings, HDPE pipes (working pressure 16 bar) for irrigation system, pipes shall include all fittings such as elbows, tees, unions, adapters, reducers, “Y” connections and all accessories necessary to complete the work such as chasing, cutting, excavation and refilling. LDPE (working pressure 4 bar) polyethylene pipes with all accessories necessary to complete the work for irrigation laterals.

ITEM DESCRIPTION	UNIT	QTY	Working Pressure (bar)	Material Origin	Unit Price J.D	Total cost J.D
HDPE Pipes – Farms						
HDPE pipe ø 90 mm - 16 bar, Purple	M	250	16		5.50	1,375.00
LDPE Pipes – Farms						
LDPE pipe ø 20 mm - 4 bar 1.8 mm wall thickness, Purple	M	2000	4		0.14	280.00
LDPE pipe ø 20 mm - 4 bar inline emitter pipe GR, 12 lph/m, Purple	M	65200	4		0.18	11,736.00
Rubber 20mm	No.	2000			0.05	100.00
Elbow 20mm	No.	2000			0.05	100.00
Coupling 20mm	No.	2000			0.05	100.00
End plug 20mm	No.	2000			0.05	100.00
PE Male adapter 63x2"	No.	20	16	KSA	4.30	86.00
PE Male adapter 50x1.5"	No.	12	16	KSA	3.20	38.40
PE Elbow 63x2"	No.	20	16	KSA	6.50	130.00

ESTIMATED GRAND TOTAL FOR IRRIGATION SYSTEM REHABILITATION : 45,985 JOD
Equivalent to ~USD 70,620

ANNEX (2)
Stakeholders Consultations & Meetings

Annex 2/ 9 : A: Project (1.1) Consultations at Wadi Mousa with Sad Ahmar Board of Directors on May 12, 2014

Annex 2/ 11 : Sad Ahmar members Consultation at Wadi Mousa on May 17, 2014

Annex 2/ 14 : B: Stakeholders Consultations This meeting included consultation for projects (1.2), (1.3),(1.4) & (1.5)

Annex 2/ 15 : C: Community consultation session for the wastewater reuse at North Shouneh WWTP, project (1.4)

Annex 2/17 : D: WUAs consultation meeting at Fifa/ Mazzrah/ Khnaizereh/ Haditha Meeting on June 20, 2014 Project (1.5) – Rain Water Harvesting

Annex 2/18 : Consultation meeting at Al Jawasreh Area for the Permaculture Project (1.6)

Annex 2/22 : E: Participants lists for Consultation meeting for Project (2.3) Jordan Valley Water Sustainability and Agribusiness Competitiveness

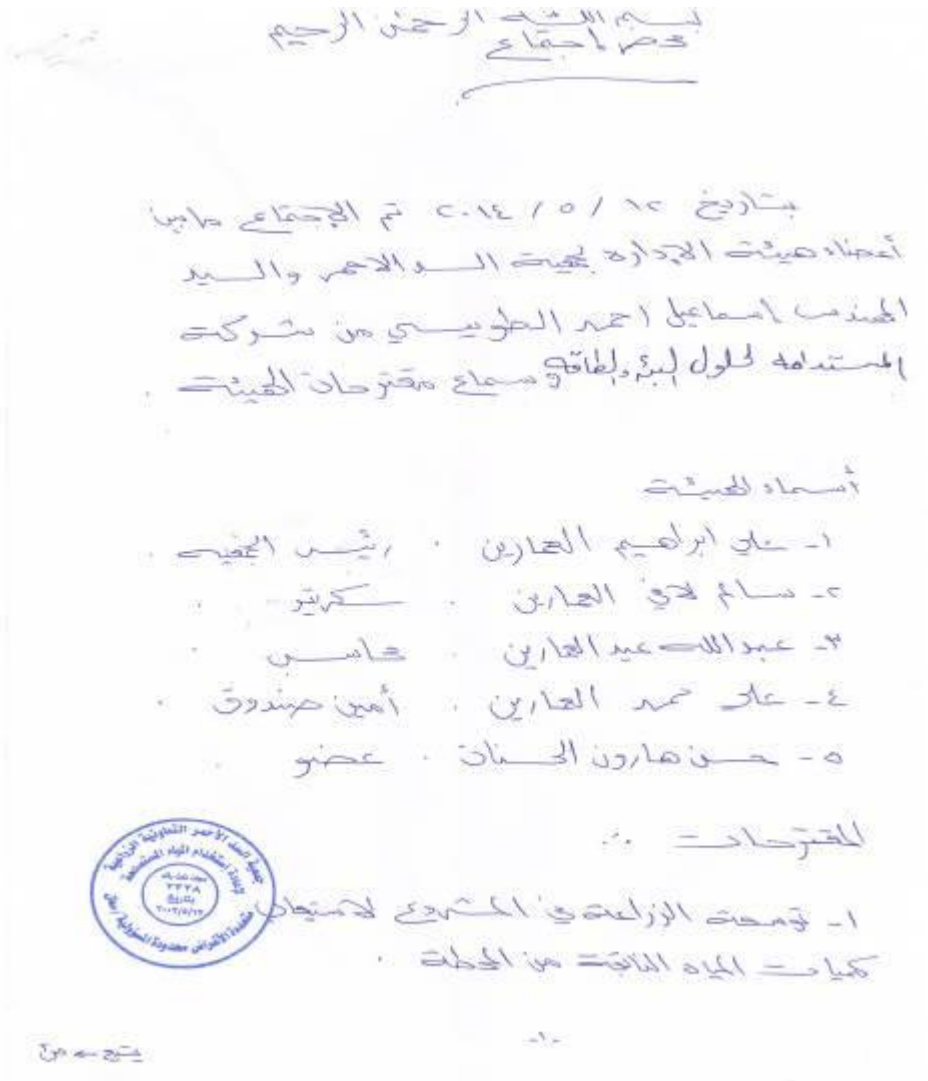
A: Project (1.1) Consultations at Wadi Mousa with Sad Ahmar Board of Directors on May 12, 2014

Minutes of meeting:

Date: (12th of May 2014)

An initial consultation meeting was held by MOPIC consultants - sustainable Environment & Energy Solutions (SEES) and the steering committee (5 members "whose signatures exist in the arabic version) of Sad Al Ahmar society (WUA) to describe the project activities and document issues. The meeting aimed to explain project, document all the Env and Social issues & stakeholder feedback and requests related to Project (1.1).**Following is a summary of the demands:**

- Implement new supporting projects such as production of animal Feed.
- Maintenance of current infrastructure for the project.
- Support the (WUA) with income generating projects.
- Activate the Revolving Fund
- Implement specific project activities in Support Women.
- Below is the sheet in Arabic of this Translation



بسم الله الرحمن الرحيم
محضر اجتماع

بتاريخ ١٢ / ٥ / ٢٠١٤ م تم الاجتماع مابين
أعضاء هيئة الإدارة لجمعية السد الاحمر والسيد
المهندس اسماعيل احمد الطويسي من شركة
المستدامة لحلول الطاقة وسماع مقترحات الهيئة

أسماء الهيئة

١- علي ابراهيم العارين . رئيس الجمعية
٢- سالم لافي العارين . سكرتير
٣- عبدالله عيد العارين . عاسب
٤- علي حمد العارين . أمين صندوق
٥- حسن هارون الحسنان . عضو

المقترحات :-

١- توسعة الزراعة في المشروع لاستيعاب
كميات المياه الناتجة من المحطة .

تابع محضر اجتماع

٢- اقامة مشاريع مساندة لإنتاج الأعلاف (ثروة حيوانية) .

٣- صيانة البنية التحتية في المشروع .

٤- رفد الجمعية بمشاريع انتاجية لزيادة دخل الجمعية .

٥- تفعيل وتشغيل الصندوق الدوار .

٦- عمل مشاريع للقطاع النسائي .

توقيع الهيئة الادارية .

علي ابراهيم العمارين رئيس الجمعية

سالم لافي العمارين السكرتير

عبدالله عيد العمارين المحاسب

عايد [illegible] العمارين امين الصندوق عايد محمد

حسين [illegible] الحسنات عضو

جمعية السد الأحمر التعاونية الزراعية لإعادة إستخدام المياه المستصلحة محدودة المسؤولية / معان
مسجلة تحت رقم ٢٣٣٨ بتاريخ ٢٠٠٣/٥/١٣

-٢-

Sad Ahmar members Consultation at Wadi Mousa on May 17, 2014

Date: (17^{th} of May 2014)

Another Meeting was held at Sad Al Ahmar society (WUA) in Wadi Mousa with members of the community to discuss the ww reuse project and proposed agricultural projects. Around 41 persons from the local community attended this meeting; **the attendees were 31 men & 10 women farmer members from the area's WUA.** Whose signatures exist in the Arabic version below. Below is the sheet in Arabic of this Translation.

بسم الله الرحمن الرحيم

محضر إجتماع

بتاريخ ١٧ / ٥ / ٢٠١٤م تم الاجتماع مع المهندس اسماعيل الطويسي المكلف من قبل شركة المستدامة للحلول البيئية والطاقة المكلفة من قبل وزارة التخطيط وسماع مقترحات وآراء أعضاء جمعية السد الأحمر حول تطوير المشاريع الخاصة بإعادة استخدام المياه.

المقترحات:

١- صيانة البنية التحتية في المشروع القائم حالياً.

٢- توسعة الرقعة الزراعية في المشروع لاستيعاب كميات المياه الناتجة عن المحطة والاستفادة منها.

٣- عمل مشاريع الثروة الحيوانية (تربية أغنام + نحل).

٤- حل مشكلة تسويق البرسيم بعمل مصانع لتصنيع الإنتاج.

٥- مطالبة القطاع النسائي بعمل مشاريع منتجة لهن (...).

٦- تفعيل وتشغيل الصندوق الدوار.

إنتهى المحضر

١- محمد ابراهيم مضاعا

٢- محمد علي العمارين

٣- سالم محمد

٤- سليم علي العمارين

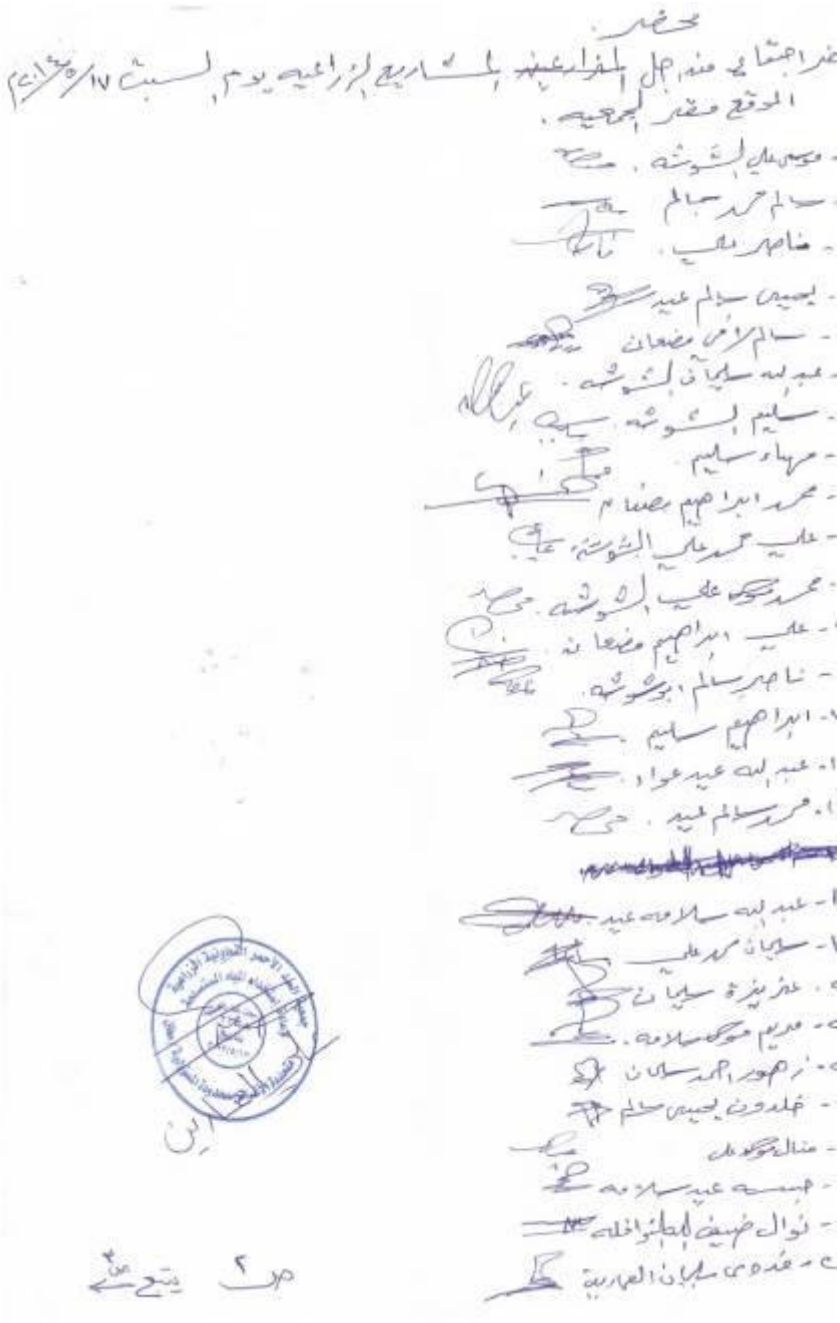
٥- يحيى سالم العمارين

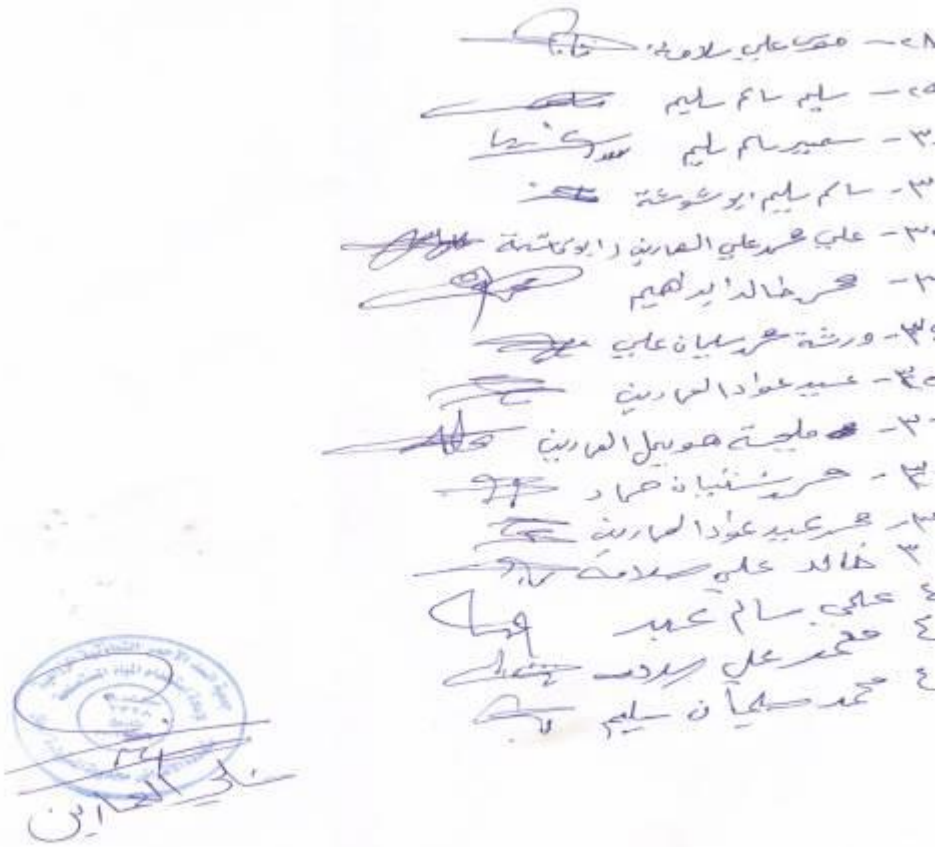
٦- ناصر علي العمارين

٧- سالم لافي العمارين

٨- علي محمد علي العمارين

٩- ناصر سالم العمارين





B: Stakeholders Consultations **This meeting included consultation for projects (1.2), (1.3), (1.4) & (1.5)** On Sunday, 18/05/2014, 2:00pm

B: Jordan Valley Water Forum Steering Committee Consultation Meeting on May 18, 2014

This meeting included consultation for projects (1.2), (1.3), (1.4) & (1.5)

No.	Topic
1	Greeting of General Secretary of Jordan Valley Authority for the attendees
2	Presentations of the proposed project programs is as follows: -Hydroponics and compost -Tal-Al Mantah WWTP. Project (1.3) -Reservoirs and desert ponds. (Water Harvesting 1.5) -Treated wastewater reuse in northern Jordan Valley. Project (1.2)
3	Other topics.

Meeting record (7)

The Directional Committee of the Forum on water in the Jordan Valley

Location: Meeting halls on the third floor

Date & Time: 05/18/2014 at 2:00

Attendance:

- HE Secretary General of the Jordan Valley Authority Engineer Saad Abu Hammour.
- **Dr. Ms Amal Hijazi, Env and social consultant**.
- Mr. Zuhair Jwayhan / Chairman of the Board of Directors for the Jordanian Association of Exporters and producers of vegetables and fruits.
- Dr. Khalil al-Absi/ Jordan Valley Authority.
- Mr Solaimon Sawalha, representative of the Ministry of Agriculture.
- **Ms Waad al-Jaafreh/ Ministry of Planning.**
- **Ms. Sana Qutaishat/ Jordan Valley Authority.**
- **Ms Lubna Hashash** / Agriculture Credit Corporation.
- Four Representatives from water users' associations: (These represent the local community each from the area they present):
    1. Mr. Raef Ebeidawi. Northern Jordan Valley Regional Representative of Water User Associations in this area
    2. Mr. Walid Al FaqeerMiddle Jordan Valley Regional Representative of Water User Associations in this area.
    3. Mr. Ayed Al-RawashdehFifa, Mazraa, Haddetha Regional Representative of Water User Associations in this area
    4. Mr. Ahmed Abdul Karim Al-Salem Al-Edwan. Southern Jordan Valley / Kafrian Regional Representative of Water User Association in this area

Meeting record (7)

The Directional Committee of the Forum on water in the Jordan Valley

No.	Topic
1	Greeting of General Secretary of Jordan Valley Authority for the attendees
2	Dr. Amal presents the proposal to the Climate Change Adaptation Fund Fund Valued at :$ 9.26 million earmarked for CC Adaptation projects. This project will be managed by the Ministry of Planning as implementing entity and Jordan Valley Authority as one of the executing entities. This project aims to adapting to climate changes by: - Institutional support (CC database, Agricultural Risk Fund, CC early warning system). - Reuse of treated wastewater. - Rain Water Harvesting. - Permaculture and enhanced agribusiness on farm management and production(administrative and technical support)
3	HE Secretary-General of JVA talked about : - Need to improve Tal Al-Mantah WWTP and use its treated effluent . - There are 150 acres owned by Jordan Valley Authority behind the building of Tal Al-Mantah WWTP which will be cultivated with crops according to JS 893/2006 with females and WUAs involvement.
4	The General Secretary of Jordan Valley Authority explained that in addition of Tal Al-Mantah WWTP, there is another WWTP at North Shouneh with 125 acres for as reuse plot (around the half size of the station).
5	Mr. Zuheir Jweihan (Fruits and Vegs exporters Association representative) talked about the detailed report about the organic agriculture and the integrated agriculture, and this one of the aspirations at the Jordanian Association for Fruit and Vegetables exporters and producers.
6	Mr. Ayed Al Rawashdeh (Khnaizereh WUA)requested the possibility of providing the following :Technical assistance in the integrated management for farms. - Compost for the factory of Southern Valley. - Reservoirs and rainwater collection dams and ponds. - Center for Grading , Packaging, and Cooling.

C: Community consultation session for the wastewater reuse at North Shouneh WWTP, project (1.4)

Following is the list of Participants who attended this consultation

Organization	الجهة	الإسم	Gender
Islamic Religiuos affairs department	مديرية الأوقاف	محمد سعدالعامر	Male
Retired	متقاعد	إسماعيل موسى أبراهيم	Male
Retired	تربية/متقاعد	محمد عز ابو عيد	Male
Jordan Valley Authority	سلطة وادي الأردن	المهندس قيس عويس	Male
Jordan Valley Authority	سلطة وادي الأردن	المهندس محمود القماز	Male
Department of Muaz Ibn Jabal Area	مديرية معاذ بن جبل	عبد الرحمن ذيب إبراهيم	Male
Directorate of Archeology for Northern Jordan Valley	مدير أثار الأغوار الشمالية	نضال كايد هندي	Male
Department of Muaz Ibn Jabal Area	بلدية معاذ بن جبل	المهندس غسان عبيدات	Male
Jordan Valley Authority	سلطة وادي الأردن	المهندس عدنان غرايبة	Male

Director of Muaz Ibn Jabal Department	رئيس بلدية معاذ بن جبل	المهندس محمود أبو جابر	Male
North Shouneh Land Registration Director	مدير تسجي أراضي الشونة الشمالية	حمد سليمان بن عبد الرحمن	Male
Municipalities Engineering Director	مدير هندسة البلديات	المهندس احمد بن ياسين	Male
Local Mayor of Baqura	مختار الباقورة	ماجد نواف عبد اللطيف المنسي	Male
Local Mayor of Al Mhadleh	مختار عشيرة المحادلة	محمود خليل إبراهيم خليل	Male
Queen Rania center for environmental Sciences & Technology/ Just University	مدير مركز الملكة رانيا العبد الله لعلوم وتكنولوجيا البيئة/جامعة العلوم/أربد	الدكتور منجد الشريف	Male
Ministry of Education	مديرية التربية والتعليم	مازن عز الإبراهيم	Male
local Mayor of Al Musharegah	مختار عشيرة المشارقة	صالح عبد الوحد تعشري	Male
Al Shouneh Agriculture Society	جمعية الشونة الزراعية	محمد أحمد طارق	Male
Governer of Tabeqet Fahl	رئيس بلدية طبقة فحل	المهندس وجدي مساعدة	Male
Ministry of Education / Northern Jordan Valley	التربية والتعليم /الاغوار الشمالية	منذر يوسف بلعاوي	Male
Manager of water treatment operation division	رئيس قسم تشغيل محطات التنقية	المهندس ماجد أحمد جودة	Male
Water Authorities/ Studies Division	دراسات/سلطة المياه	محمد خير عبابنة	Male
Al Shouneh Agriculture Society	جمعية الشونة الزراعية	ثائر ظاهر نايف	Male
MOPIC	وزارة التخطيط/مديرية المشاريع	المهندس على عبيدات	Male
Royal Scientific Society	الجمعية العلمية الملكية	المهندس وائل سليمان	Male
Water Authority	سلطة المياه	المهندس محمود العلاونة	Male
Ministry Of Tourism	وزارة السياحة	المهندس ايمن أبو جلمة	Male
Natural Resources Authority	سلطة المصادر الطبيعية	الدكتور هاشم أحمد الزعبي	Male
Natural Resources Authority	سلطة المصادر الطبيعية	صالح النعيمات	Male
Head of Northern Jordan Valley Security Check	رئيس مركز امن الاغوار الشمالية	المقدم سميح القطاونة	Male
Researcher at/ water Research Center/ University of Jordan	باحثة في مركز البحوث المائية/الجامعة الأردنية	مها محمد حلالشة	Female
Water Authority	سلطة المياه	سعاد أسعد	Female
Royal Scientific Scociety	الجمعية العلمية الملكية	المهندس احمد صوالحة	Male
Water Authority	سلطة المياه	المهندس محمد الكوز	Male
USAID	الوكالة الإمريكية للتنمية الدولية	رمزي سبيلا	Male
USAID	الوكالة الإمريكية للتنمية الدولية	الدكتورة امل حجازي	Female
Environment Society of Jordan	جمعية البيئة الأردنية	زياد محمد المراونة	Male

Ministry Of Agriculture	مدير الأراضي والري/وزارة الزراعة	المهندس عبد الله النعيمات	Male
Ministry of Environment	وزارة البيئة	المهندس بلال الشقارين	Male
Civil Defense	الدفاع المدني	حسان أحمد حمد العربي	Male
Ministry of Public works & Housing	وزارة الأشغال العامة والإسكان	المهندسة لبنا سامي عميرة	Female
Ministry of Public works & Housing	وزارة الأشغال العامة والإسكان	المهندسة أوريلياكوريا	Female
Water Authority	سلطة المياة	المهندس زيد الكيلاني	Male
Water Authority	سلطة المياة	المهندس أياد قاقيش	Male
Water Authority	سلطة المياة	المهندس عيسى منذر	Male
Directorate of Health in Northern Jordan Valley	مديرية صحة الاغوار الشمالية	الدكتور بلال بني هاني	Male
Water & irrigation Authority	سلطة المياه والري	المهندس محمد منصور	Male

(D): WUAs consultation meeting at Fifa/Mazzrah/Khnaizereh/Haditha Meeting on June 20, 2014 Project (1.5) –Rain Water Harvesting

Requests raised by WUA representative in Southern Jordan Valley consultations related to project (1.5)

The attendees were:

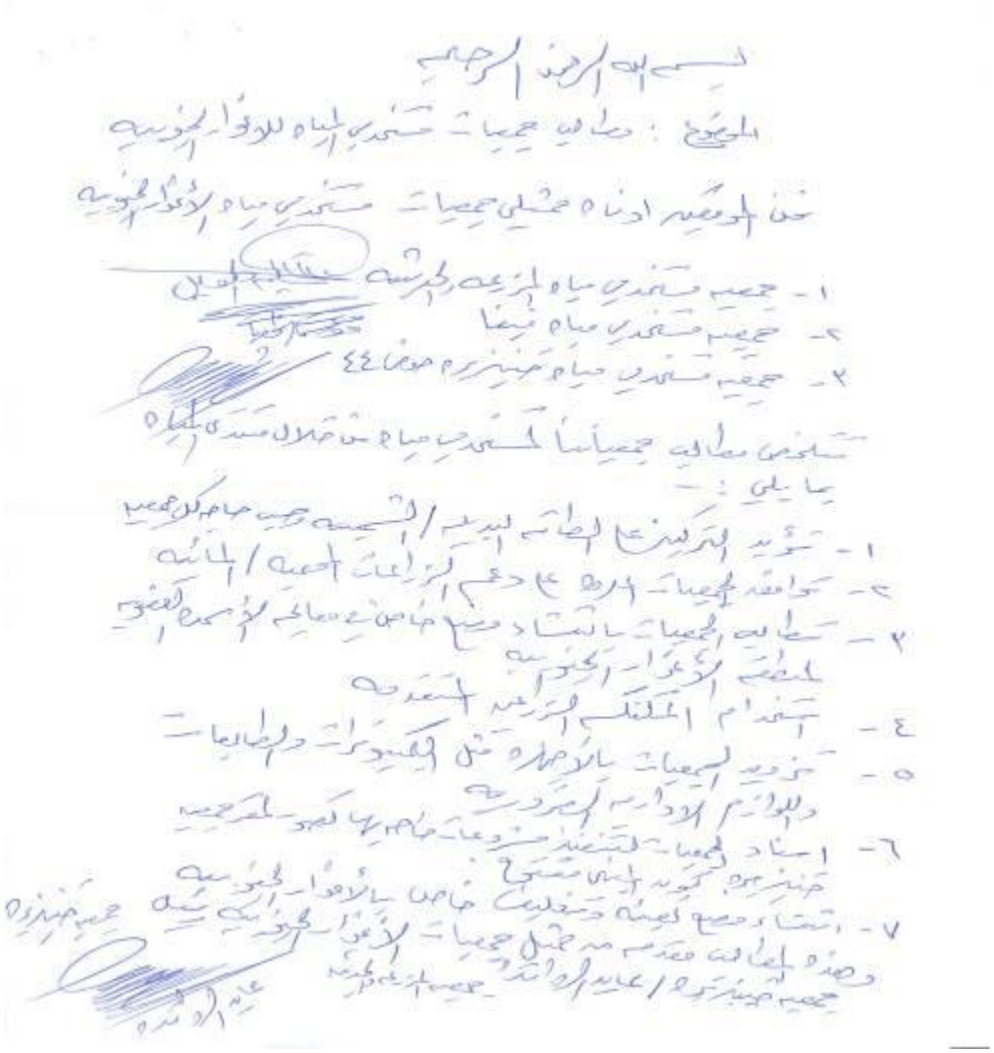
Water User Association (WUA) representative in Al Mazraha & Hadeetha Area

Water User Association (WUA) representative in Fifa

Water User Association (WUA) representative in Khanzeerah WUA # 44

Summary of Requests:

- Rainwater Harvesting Reservoirs & Earthen Dams
- Supporting irrigated Agriculture production
- Agricultural Automation
- Support association through providing computers, printers, office furniture etc…..
- Financially support association to implement different projects related to water & agriculture awareness workshops.
- Establish grading & packaging and cooling unit for vegetables & fruits.



Consultation meeting at Al Jawasreh Area for the Permaculture Project (1.6):

List of Participants who attended the consultation on 11th of May 2014

Name	Gender	Occupation
Hayel Abu Yaheya	Male	Supervisor of the Permaculture pilot/ Resident of Jawasreh area.
Abdulla Al Jebali	Male	Farmer/organic Agriculture
Awatef Ahmad Al Tallaq	Female	House wife/ Kafrain area
Amneh Ahmad Al Tallaq	Female	House wife/ Jufeh area
Naela Abu Yaheya	Female	House wife/ Kafrain area
Naeem Abu Yaheya	Male	Helps at Permaculture pilot/ Kafrain area
Fadia Abu Yaheya	Female	Helps at Permaculture pilot/ Kafrain area
Feryal Al Oushosh	Female	Member of CBO and Ganitor at Girls School/ Al Jawasreh Area
Ibrahim Ayed	Male	Works at Amman Manucipality branch at Kafrain area
Mohammad Ayed	Male	Works at Al Kafrain Municipality

Another consultation meeting was held for permaculture and Agribusiness projects on the 13th of December, 2014 with Jordanian Association for Environmental Quality (farmers males& females & members of local CBOs & NGOs of Northern Jordan, the middle, Al Kafrian Valley ,and Fifa, Al Mazra'a, Hadeetha valley.

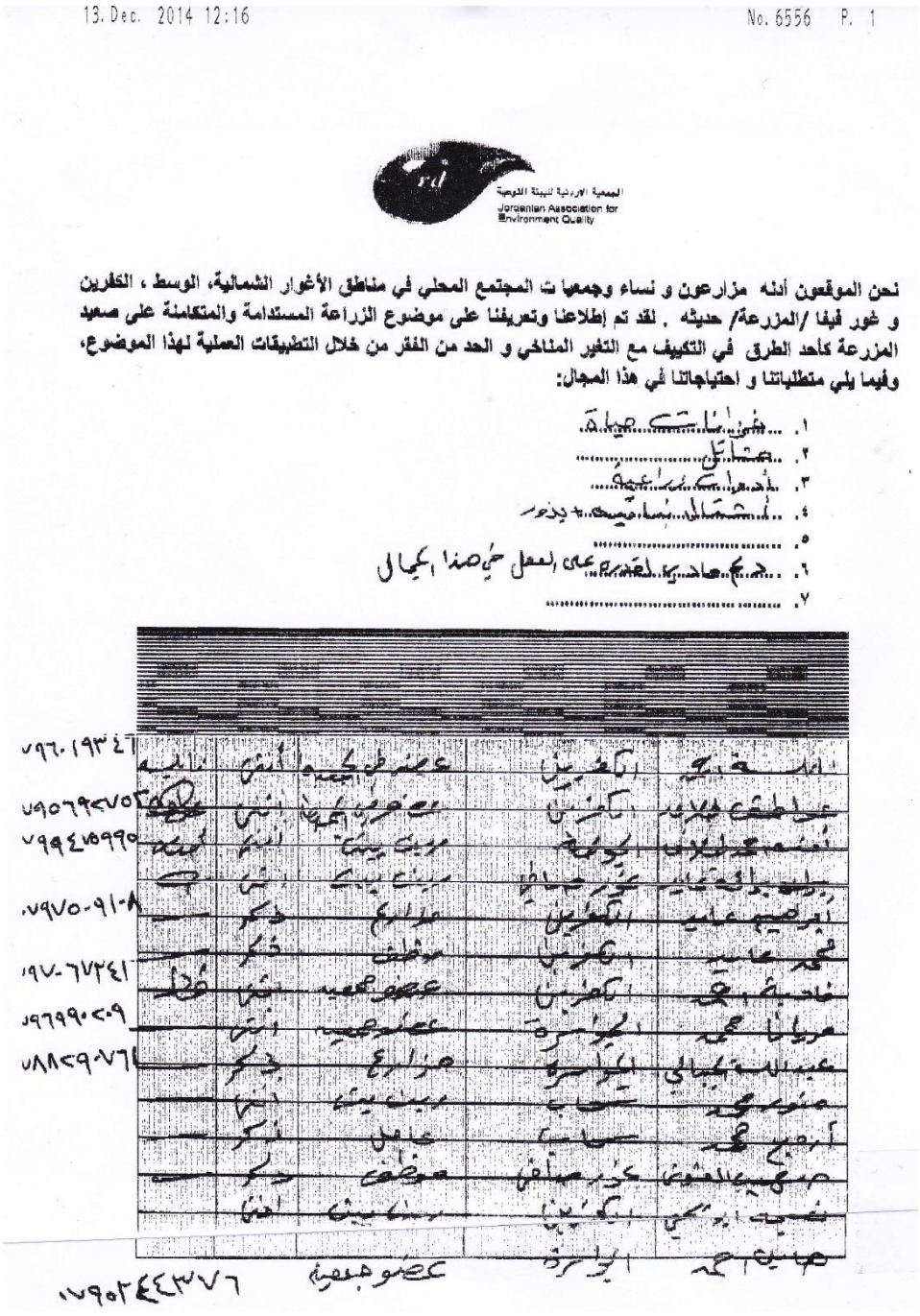
We the under signed below have been introduced to the project concept of Permacuture & Sustainable Agriculture as means for poverty alleviation & adaptation to climate change(the signatures are in the original sheets in Arabic below, this is the translation in English of the meeting minutes & attendees list);

We came with the following requests during the consultation session:

1. Water Tanks needed inside farms (water storage systems)
2. Nurseries
3. Agricultural Equipment
4. Seeds & seedlings for plants
5. Financial Support in parallel with capacity building

Name	Gender	Organization/ Occupation	Location in Jordan Valley
1. Naela Ahmad	Female	Member of Association	Al Kafrain
2. Awatef Talaq	Female	Member of Association	Al Kafrain
3. Amenah Talaq	Female	House wife Association Member	Al Jofeh
4. Bara'a Ayed	Female	House wife	Al Safi Valley
5. Ibrahim Ayed	Male	Farmer	Al Kafrain
6. Mohamad Ayed	Male	Employee	Al Kafrain
7. Fadia Ahmad	Female	Member of Association	Al Kafrain
8. Meryanah Mohamad	Female	Member of Association	Al Jawasreh
9. Abdulla Al Jebali	Male	Farmer	Al Jawasreh
10. Menwar Mohamad	Male	House wife	Sahab
11. Urmeh Mohamad	Male	Worker	Sahab
12. Suhaib Al Ushoosh	Male	Employee	Al Safi Valley
13. Naeimah Abu Eyaheya	Female	House Wife Association Member	Al Kafrain
14. Hayel Ahmad	Male	Member of Association	Al Jawasreh
15. Feryal Al Ushoosh	Female	Employee	Al Jawasreh
16. Ibtesam	Female	House Wife Association Member	Al Jawasreh
17. Nisreen Yousef	Female	House Wife Association Member	Al Jawasreh
18. Ayat Ahmad	Female	Agriculture Student	Al Shooneh
19. Hiyam Ali	Female	Agriculture Student	South Shooneh
20. Nihad Al Duesat	Female	House Wife Association Member	Al Jawasreh
21. Haya Al Ushoosh	Female	House Wife Association Member	Al Jawasreh
22. Sameera Al Asmar	Female	House Wife Association Member	Al Jawasreh
23. Majedah Azziz	Female	House Wife Association Member	Al Jawasreh

Name	Gender	Organization/ Occupation	Location in Jordan Valley
24. Amani Al Hindawi	Female	House Wife Association Member	Al Jawasreh
25. Hanan Al Jaarat	Female	House Wife Association Member	Al Jawasreh
26. Basmah Al Ushoosh	Female	House Wife Association Member	Al Jofeh
27. Ola Khaliefah	Female	House Wife Association Member	Al Jawasreh
28. Adoolah Omar	Female	House Wife Association Member	South Shooneh
29. Fairooz Al Yamani	Female	House Wife Association Member	Al Jawasreh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الجمعية الاردنية لنوعية البيئة
Jordanian Association for Environment Quality

نحن الموقعون أدناه مزارعون و نساء وجمعيات المجتمع المحلي في مناطق الأغوار الشمالية، الوسط ، الغفرين و غور فيفا /المزرعة/ حديثه . لقد تم إطلاعنا وتعريفنا على موضوع الزراعة المستدامة والمتكاملة على صعيد المزرعة كأحد الطرق في التكيف مع التغير المناخي و الحد من الفقر من خلال التطبيقات العملية لهذا الموضوع، وفيما يلي متطلباتنا و احتياجاتنا في هذا المجال:

١. ...
٢. ...
٣. ...
٤. ...
٥. .....
٦. ...
٧. .....

الجمعية الأردنية لنوعية البيئة
Jordanian Association for Environment Quality

نحن الموقعون أدناه مزارعون و نساء وجمعيا ت المجتمع المحلي في مناطق الأغوار الشمالية، الوسط ، الكفرين و غور فيفا /المزرعة/ حديثه . لقد تم إطلاعنا وتعريفنا على موضوع الزراعة المستدامة والمتكاملة على صعيد المزرعة كاحد الطرق في التكيف مع التغير المناخي و الحد من الفقر من خلال التطبيقات العملية لهذا الموضوع، وفيما يلي متطلباتنا و احتياجاتنا في هذا المجال:

١. .....
٢. .....
٣. .....
٤. .....
٥. .....
٦. .....
٧. .....

٠٧٧٠٦٦٨١٣				
٠٧٥٦٥١١٨٦				
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٠٧٩٨١٤٤٩١٦				
٠٧٩٩٣٥٧٠٦٢				
٠٧٩٧٣٥٩٣٦٥				

خبرون محمد اليعاني الجواسره عضو مجلس انثى

(E): Participants lists for Consultation meeting for Project (2.3) Jordan Valley Water Sustainability and Agribusiness Competitiveness

Submitted	Gender	Organization/ Occupation
Adnan Ahmad Fendi Alwaked	Male	Head of Al-A'adaseh (pump 2)
Ali Ibrahim Ali Al-Hussein	Male	Head of Northern Shouneh (pump 3,4)
Raef Obaidawi	Male	Head of Northern Shouneh (pump 5)
Abdallah Asa'd Al-Hourani	Male	Head of Al-Manshiyeh (pump 14)
Sulaiman Ghezawi	Male	Head of Tel Al-Arb'een (pump 22)
Ashraf Al Ghezawi	Male	Head of Sheikh Hussein (pump 28)
Nawaf Kareem Rayahneh	Male	Head of Al-Mashare' (pump 33)
Mithqal Al – Zenati	Male	Head of Wadi Al-Riyan (pump 36)
Zaki AlRabab'ah	Male	Head of Wadi Al-Riyan (pump 41)
Hafez Al Shobaki	Male	Head of Abu Sido (pump 50)
Waleed Al Faqeer	Male	Head of Al Kareemeh (pump 55)
Omar Masalha	Male	Head of Ghor Kibd (pump 78)
Tawfeeq Al-Satri	Male	Head of Ghor Kibd (pump 81)
Ali Mustafa	Male	Head of Ghor Kibd (pump 91)
Hussein Quttaineh	Male	Head of Ghor Kibd (pump 95)
Shlash Bader Al-Adwan	Male	Sh'aib dam/ Southern Shouneh
Ahmad Abdul Karim Salem al Adwan	Male	Al Kafrain
Awad Zaid Adwan	Male	Al- Ramah
Talal Farhan	Male	
Saleem Huwaimel	Male	Farm and Hadeesah
Sabry Ahmad Thala'een	Male	Ghor Al Safi
Mousa Salem Khoutaba	Male	Fiqa
Ayed saleh Al-Rawashdeh	Male	
Abdelkarim Shhab	Male	Farmer
HE Engineer Saad Abu Hammour	Male	SG JVA
Ali Soboh	Male	MoWI
Zakaria Zohdi Al-Haj Ali	Male	MoWI
Suha Al-Mughrabi	Female	MoWI
Eng Basem Telfah	Male	WAJ
Adnan Al khadam	Male	Farmer's Union
Saleh Al-Kharabsheh	Male	SG MoPIC
Ziad Obaidat	Male	MoPIC
Wa'ad Al-Ja'afrah	Male	MoPIC
Ahmad Al-Jazzar	Male	MoPIC
Radi al-Tarawneh	Male	SG MoAgriculture
Suleiman Al-Suwalha	Male	Ministry of Agriculture
Toufiq Al-Habashneh	Male	Farmer's Loan Association
Abdullah Freij	Male	Farmer's Loan Association
Dr Khalil Al Absi	Male	JVA

Submitted	Gender	Organization/ Occupation
Ms Niveen Al Kfouf	Female	JVA
Fouad A'ajailat	Male	JVA
Mashhoor Harb	Male	JVA
Mahmoud Al-Qmaz	Male	JVA
Ghassan Obaidat	Male	JVA
Mousa Al-Huwarat	Male	JVA
Mohammad Al-Faheeli	Male	JVA
Ahmad Al-Azzam	Male	JVA
Ali Al-Omri	Male	JVA
Anwar Al-Adwan	Male	JVA
Sanaa Qtaishat	Female	JVWF
Khairy Ammari	Male	JVA
Guy Honoré	Male	GIZ Water Programme Director
Ali Adwan	Male	GIZ
Hisham Al-Salamat	Male	GIZ
Sameer Abdel-Jabbar	Male	GIZ
Nour Habjouka	Female	GIZ
Emad Al-Khalil	Male	GIZ
Scott Greenwood	Male	GIZ/ California State University
Benjamin Herzberg	Male	WBI
Lili Sisombat	Female	WBI
Hnin Hnin Pyne	Female	WBI
Olivier Boudart	Male	EU
Amal Hijazi	Female	Environmental Engineer
Vicky Swider-Al Halteh	Female	Event Manager
Dalia Naber	Female	Photographer
Naif Seder	Male	freelance consultant/ISSP
Basel Shehadeh	Male	
Baker Balawneh	Male	
Zuhail Al-Zo'bi	Male	Secretary General office
Ghassan Shehadeh	Male	Secretary General office

Annex (3)
Environmental Impact Assessment Approvals

Annex 3/ 25 : North Shouneh WWTP in JV and Reuse Pilot Location and Activities (Project

Annex 3/ 30: Wadi Mousa WWTP Reuse Pilot & Activities (project 1.1)

Annex 3/ 32 Northern Jordan Valley (Irbid, Dougara and Shalalah) WWTP and Reuse Location and Activities (project 1.2)

Annex (3): Environmental Impact Assessment Approvals for Wastewater Treatment plants & their effluent wastewater reuse systems in the proposed project areas as approved by the donor/lender agency who is funding the design, feasibility & construction of the related wastewater treatment plant & the final approval of the EIA committee at Ministry of Environment according to regulation 37/ 2005

North Shouneh WWTP in JV and Reuse Pilot location and activities

USAID
FROM THE AMERICAN PEOPLE

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
BUREAU FOR ASIA AND THE NEAR EAST
WASHINGTON, D.C. 20523

RECORD OF ENVIRONMENTAL DECISION
ANE 06-33 Jordan ROD EA North Shouneh WWT&R

Country Code-SO: 278-010

SO Name: Enhanced Integrated Water Resources Management

Country or Region: Jordan

Activity Name: Environmental Assessment, Wastewater Treatment Facilities for Small Communities in Jordan, Task 3, North Shouneh, August 2005, Record of Decision (ROD)

Funding Begin: 2004 **Funding End:** 2008 **Funding Amount:** $4,973,548

Approval Issue: **Environmental Assessment, Approved**

CLEARANCES:

ANE Bureau Environmental Officer
Approval: John O. Wilson — Dec 22, 2005 (Date)

Acting Mission Director
Approval: (signed) Anne Aarnes — December 12, 2005 (Date)

Deputy Mission Director
Approval: (signed) Michael T. Harvey — December 6, 2005 (Date)

Regional Legal Advisor
Approval: (signed) Monica Smith — December 5, 2005 (Date)

Mission Environmental Officer
Approval: (signed) Amal Hijazi — November 28, 2005 (Date)

OVERVIEW

Consistent with the approved scoping statement for an environmental assessment (ANE 05-144, approved July 11, 2005), USAID/Jordan plans to implement a low-cost, low-maintenance wastewater treatment and reuse (WWT&R) in North Shouneh and submits this Environmental Assessment (EA) in its support. The scoping statement identified potentially significant direct, indirect, and cumulative environmental impacts: 1) during construction (excavation, site erosion, air pollution from dust, health and safety, noise, removal of vegetative cover, alteration of surface hydrology); 2) during operation and maintenance (methane generation, sludge production, traffic, wildlife, pests, unplanned events, and risks to treatment plant); and 3) wastewater reuse (health and safety, soil and crop contamination).

The approved scoping statement was approved with the conditions that there is a participatory process to review and refine the nitrate standard for treated wastewater reuse in agriculture or discharge into wadis and national rivers, and that the results from that process becomes part of the final design of the proposed WWT&R project. Per clarification by Amal Hijazi and Ramzi Sabella, it was demonstrated that higher standards are more costly to build and operate, especially in the smaller communities. The draft feasibility study made the argument that in light of the quantities of treated wastewater reuse involved and potentially insignificant environmental impacts, that the less stringent interpretation of the standards should be applied. A workshop was conducted on the subject with the standards committee and other participants from WAJ. As a result of that workshop, Jordanian Authorities are revising the standards and are discussing context-specific standards (e.g., proximity to flowing wadis, depth of groundwater, seasonal variations).

The design of the North Shouneh Plant has the flexibility to achieve different levels of Nitrate depending on the existing standard level or a future level if amended. Therefore, the final design for North Shouneh took into consideration the potential for a change in standards. In conclusion, the treatment plant is designed to meet the current Nitrate standard, but has the ability to operate at a lower cost to meet a more relaxed nitrate standard if that is approved in the future.

DECISION **Environmental Assessment, Approved**

File No: ANE 06-33 Jordan ROD EA North Shouneh WWT&R

DISTRIBUTION:

Mission Environmental Officer
ROD File

USAID
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ANE 06-33 Jordan IEE/EA ROD North Shouneh

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
~~BUREAU FOR ASIA AND THE NEAR EAST~~
~~WASHINGTON, D.C. 20523~~

REQUEST FOR APPROPROVAL OF ENVIRONMENTAL ASSESSMENT
ROD Jordan Wastewater Treatment Facilities for Small Communities in Jordan, Task 3, North Shouneh

PROGRAM/ACTIVITY DATA:

Country Code-SO: 278-010

SO Name: Enhanced Integrated Water Resources Management

Country or Region: Jordan

Activity Name: Environmental Assessment, Wastewater Treatment Facilities for Small Communities in Jordan, Task 3, North Shouneh, August 2005

Funding Begin: August 2005	**Funding End:** August 2008	**LOP Amount:** $18,000,000
		Sub-Activity Amount:
ROD Prepared by: Barney P. Popkin		**Date:** September 20, 2005

BACKGROUND:

The Water Authority of Jordan with the support of USAID plans to implement a low-cost low-maintenance wastewater treatment and reuse (WWT&R) project in North Shouneh. The WWT&R project in North Shouneh is part of the wider activity, Wastewater Treatment Facilities for Small Communities in Jordan (the "Small Communities Project"). According to the initial environmental examination (IEE) prepared by USAID Jordan in August 2004, the project requires a full environmental impact assessment (EIA).

The Small Communities Project will design, supervise and construct a proven low-cost/low-maintenance, wastewater treatment plant (WWTP) to serve North Shouneh (a residential community that lacks sewage collection networks), develop local capacity to operate and maintain the facility in a sustainable manner after the project ends, turn over the operation and maintenance of the facility to local bodies (e.g., Municipality, Village Councils, Private Sector), and eventually reuse the treated wastewater. This will serve as a model for other areas in Jordan. The project will span four years.

Currently, approximately 15,000 residents in the town of North Shouneh rely on cesspits (not septic tanks). These pits are generally permeable leading to seepage of septage and potential groundwater contamination. Nevertheless, residents need to empty their cesspits every couple of months (depending on permeability, storage volume and family size) because they frequently overflow. Tanker trucks in the area get paid by households to empty the cesspits. Although tanker drivers are required to discharge the septage in designated dumpsites, they frequently do so haphazardly in these and other locations, causing environmental and health pollution problems.

The scoping statement for the EA identified potentially significant direct, indirect and cumulative environmental impacts during: (i) construction: excavation and site erosion, air pollution from dust, health & safety, noise, removal of plant cover, alteration of surface hydrology; and (ii) operation and maintenance: methane generation, sludge production, traffic, wildlife, pests, unplanned events and risks to treatment plant; and (iii) water reuse: health & safety, soil and crop contamination. The Jordanian Ministry of Environment has already communicated its approval of the EA Statement.

ENVIRONMENTAL RECOMMENDATION:

USAID/Jordan funded the attached "Environmental Assessment (EA), Wastewater Treatment (WWT) Facilities for Small Communities in Jordan, Task 3, North Shouneh, August 2005," which was performed consistent with the approved Scoping Statement for the EA. The Scoping Statement issues were addressed, potential significant environmental impacts identified, and appropriate mitigation measures developed and evaluated for implementation. The Government of Jordan (GOJ) was provided with a copy of the draft EA and feedback was solicited. Approval by the GOJ was received via official communication that requested their comments be incorporated as part of the revised final EA. An appendix to the EA was created for incorporation of the GOJ comments. In light of the above USAID/Jordan recommends approval of the EA.

APPROVAL OF RECOMMENDED ENVIRONMENTAL ACTIONS:

CLEARANCE:

Mission Director
Approval: Anne Aarnes — Anne Aarnes — 12/12/2006 — Date

Deputy Mission Director
Approval: Michael T. Harvey — Michael T. Harvey — 12/06/05 — Date

Regional Legal Advisor
Approval: Monica Smith — Monica Smith — 12/5/05 — Date

Mission Environmental Officer
Approval: Amal Hijazi — Amal Hijazi — NOV. 28, 2005 — Date

CONCURRENCE:

Bureau Environmental Officer — John O. Wilson — Date: DEC 22, 2005
Approved: ☑
Disapproved: ☐

بسم الله الرحمن الرحيم

THE HASHEMITE KINGDOM OF JORDAN

Ministry of Environment

AMMAN

المملكة الأردنية الهاشمية

وزارة البيئـــــــة

عمـــان

Ref. : 4-7-553

Date : 20-2-2006

الـرقم :

التاريخ :

الموافق :

Mr. Mehran Meserlian
Project Manager
CDM International Inc.

Subject: Reuse for Industry, Agriculture and Landscaping (RIAL) Project Wadi Musa Environmental Review.

Dear Sir,

Reference is made to your letter RIAL-GOJ 0071 dated on January 18, 2006 regarding the above mentioned project. I would like to inform you that the Final Review Report of project has been approved by the EIA Reviewing Committee.

Sincerely yours

Khaled Irani

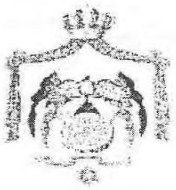
Minister of Environment

هاتف ٥٥٦٠١١٣ - فاكس ٥٥٦٠٢٨٨ - ص.ب ١٤٠٨ عمان - ١١٩٤١ - الأردن
Tel. 5560113 - Fax 5560288 - P.O. Box 1408 Amman - 11941 - Jordan
E-mail: moenv@moenv.gov.jo
Web site : www.moenv.gov.jo

بسم الله الرحمن الرحيم

THE HASHEMITE KINGDOM OF JORDAN
Ministry of Environment
AMMAN

المملكة الأردنية الهاشمية
وزارة البيئـــــــة
عمـــان



Ref: 1.1/4309
Date: 17/11/2005

الرقم :
التاريخ :
الموافق :

Mr. James Franckiewicz
Director, Office of Water Resources
& Environment
USAID

Subject: The Small Communities Wastewater Treatment Plants project at North Shouneh.

Dear Mr. Franckiewicz,

In reference to your letter dated 30 Oct 2005 regarding the above mentioned subject, we would like to inform you that we agree on the related draft EA document. However, the draft EA document should be read together with your attached response to the National EIA Committee's comments.

Sincerely,

Khaled Anis Irani

Minister of Environment

CC: EIA Director

ماتف ٥٩٦٠١١٣ - فاكس ٥٦٦٠٢٨٨ - ص.ب ١٤٠٨ عمان - ١١٩٤١ - الأردن

There was also a study financed by the Federal Republic of Germany through KFW, Titled" Feasibility study for the Re-use of treated wastewater in Irrigated Agriculture in the Jordan Valley"for the Benefit of Water Authority of Jordan. This study was prepared by GITEC Consult GmbH, AHT International GmbH, and Consulting Engineering Centre.

THE HASHEMITE KINGDOM OF JORDAN

Ministry of Water and Irrigation

Water Authority of Jordan

Design and Construction Supervision of Wastewater Collection and Treatment Systems in Greater Irbid - Stage II

Wadi Shallala

Central Tender 86/2000

Stage A – Final Engineering Design and Tender Documents

Final Environmental Assessment

Funded by

Kreditanstalt für Wiederaufbau (KfW) &The Government of Jordan

April, 2003

The Joint Venture

FICHTNER

BINNIE BLACK & VEATCH

PFI

consolidated consultants
engineering & environment

Annex (4)
Pertinent Standards & Regulations

JS 893/2006 Reclaimed Water Specifications

1) FIELD (DOMAIN)

This standard specification specializes with the conditions that should be available in the treated wastewater that could be drained or reused according to the demonstrated methods aspects in this specification.

2) DEFINITIONS

2.1: Wastewater: Domestic wastewater that might include industrial liquid wastes that is allowed to be drained to the wastewater networks according to the official connecting conditions of the authorities concerned.

2.2: Reclaimed Water: treated wastewater which is intended to be used according to this specification unless this wastewater is mixed with other resources.

2.3: Green Areas: Areas that are specified for aesthetic purposes but not for promenade purposes.

2.4: Mechanical treatment systems: Systems that use mechanical methods for treating wastewater such as activated sludge, RBC (Rotating Biological Contactors) and trickling filters.

2.5: Natural treatment systems: systems that treat wastewater naturally by aerobic, anaerobic or maturation ponds.

2.6: Disinfections: process which removes or decreases pathogenic micro-organisms or pollution indicating ones that might exist in water through using disinfectants such as chlorine, ClO_2, UV, ozone or any disinfectant adopted by authorities concerned.

2.7: Industrial products: products used for industrial purposes such as wood and olive trees.

2.8: Field products: products planted in wide areas and harvested yearly which include the following:

2.8.1: Fodder Products: products planted for animals feeding purposes such as alfalfa, sweet corn, sudani grass.

2.8.2: Crops Products: products planted for its carbohydrates grains to be used for feeding humans and animals such as: wheat, barley and corn.

2.8.3: Bean Products: products used for their seeds after drying such as lentil, fenugreek and lupine.

2.8.4: Fiber products: products planted for their fibers such as cotton and linaceae.

2.8.5: Oil products: products planted for their oil such as, sesame and soya beans.

2.8.6: Sugar products: crops planted to extract sugar such as sugerbeet and sugarcane

2.9: Cooked vegetables: vegetables usually eaten after cooking which includes: aubergine, zucchini, beans, cauliflower, potato, okra, peas, spinach, and artichoke, turnips, Jew's mallow.

2.10: Vegetables eaten raw: include the following vegetables: Tomato, cucumber, green pepper, cabbage, onion, carrot, radish, lettuce, mint, rocket, legume, strawberry, water melon muskmelon, parsley and coriander.

3) GENERAL CONDITIONS

3.1: Reclaimed water specifications are divided into two main parts:

A- Reclaimed water for wadi discharge purposes.
B- Reclaimed for reusing purposes.
Reclaimed water should conform to specified conditions for every part and according to the final planned use.

3.2: It is not allowed to dilute reclaimed water by mixing it in the treatment plant with pure water to achieve the stated conditions in this specification.

3.3: In case reclaimed water is used for purposes other than those stated in this specification (such as cooling or fire fighting), a standard specification concerning such use is to be used after appropriate researches carried out bearing in mind health and environmental effects.

3.4: Official authorities concerned for operating and developing wastewater treatment plants should always attempt to improve treated water quality to standards that might exceed these stated in this specification for the best use of reclaimed water and environmental conservation purposes.

4) STANDARD (STIPULATIONS / STIPULATING)

4.1: Reclaimed water for the purpose of charging streams of water, valleys or spread areas of water:

4.1.1: Reclaimed water is allowed (permitted) to be thrown in those areas when its quality agrees with specifications and standards mentioned in Table 1. It is forbidden to throw water into the valleys leading to the Gulf of Aqaba.

4.1.2: When the reused water flows in lands which rise over or lead to groundwater reservoir adequate arrangements should be taken to prevent seepage of reused water into groundwater.

4.1.3: When throwing treated wastewater (in what way mentioned in 4.1) exposed to direct contact with people (citizens) it is preferred to use one of the suitable processes of disinfection to protect public health. In case of using chlorine as a disinfectant, the residual chlorine should not exceed 1.0 ppm.

4.1.4: Waste stabilization ponds effluents are allowed to exceed the amounts pertaining to E. Coli when throwing water into valleys which lead to dams where water is stored up and used totally for the purpose of irrigation. However, where this water is used before reaching the dams, standards pertaining to reclaimed water irrigation purposes should be maintained.

Table 1: Allowable limits for treated wastewater discharged into streams, valleys or lakes

Standards	Allowable concentration
GROUP A	
BOD_5 (mg/1)	60*
COD (mg/1)	150*
DO (mg/1)	>1
TSS (mg/1)	60*
pH (unit)	6-9
NO_3 (mg/1)	80
T-N (mg/1)	70
E. coli MPN or CFU / 100ml	1000
Intestinal Helminth Eggs (egg/1)	< or =1
FOG (mg/1)	8.0
GROUP B	
Phenol (mg/1)	<0.002
MBAS (mg/1)	25
TDS (mg/1)	1500
Total PO_4 (mg/1)	15
Cl (mg/1)	350
SO4 (mg/1)	300
HCO^3 (mg/1)	400
Na (mg/1)	200
Mg (mg/1)	60
Ca (mg/1)	200
SAR	6.0
Al (mg/1)	2.0
As (mg/1)	0.05
Be (mg/1)	0.1
Cu (mg/1)	0.2
F (mg/1)	1.5
Fe (mg/1)	5.0
Li (mg/1)	2.5
Mn (mg/1)	0.2
Mo (mg/1)	0.01
Ni (mg/1)	0.2
Pb (mg/1)	0.2
Se (mg/1)	0.05
Cd (mg/1)	0.01
Zn (mg/1)	5.0
Cr (mg/1)	0.02
Hg (mg/1)	0.002
V (mg/1)	0.1
Co (mg/1)	0.05
B (mg/1)	1.0
CN (mg/l)	0.1

* BOD value is calculated after the process of filtration is carried out for the waste stabilization ponds or other treatment plants which include polishing lagoons.

* Amounts may be doubled for waste stabilization ponds or other treatment plants which include polishing lagoons.

4.2: Reclaimed water for reuse purposes:
This water is used for charging groundwater and for irrigation purposes.

4.2.1: Reuse for the purpose of artificial groundwater recharging:

4.2.1.1: Treated wastewater may be used for the purpose of artificial groundwater recharging whenever its quality is in agreement with the standards shown in table 2.

4.2.1.2: This water should not be used for recharging groundwater which is utilized for drinking water purposes.

4.2.1.3: Appropriate Technical studies should be carried out before using this water for recharging groundwater specified for irrigation so as to show that this water will not affect ground water basins specified for drinking purposes.

Table 2: Allowable limits of water quality which may be used for artificial groundwater recharging purposes

Standards	Allowable Amount
GROUP A	
BOD_5 (mg/1)	15
COD (mg/1)	50
DO (mg/1)	>2
TSS (mg/1)	50
pH (unit)	6-9
Turbidity (NTU)	2
NO_3 (mg/1)	30
NH_4 (mg/1)	5
T-N (mg/1)	45
E. Coli MPN or CFU/ 100ml	<2.2
Intestinal Helminthes Eggs (egg/1)	< or 1
GROUP B	
FOG(mg/l)	8.0
Phenol (mg/1)	<0.002
MBAS (mg/1)	25
TDS (mg/1)	1500
Total PO_4 (mg/1)	15
Cl (mg/1)	350
SO4 (mg/1)	300
HCO^3 (mg/1)	400
Na (mg/1)	200
Mg (mg/1)	60
Ca (mg/1)	200
SAR	6.0
Al (mg/1)	2.0
As (mg/1)	0.05
Be (mg/1)	0.1
Cu (mg/1)	1.5
F (mg/1)	2.0
Fe (mg/1)	5.0
Li (mg/1)	2.5
Mn (mg/1)	0.2
Mo (mg/1)	0.01
Ni (mg/1)	0.2
Pb (mg/1)	0.2
Se (mg/1)	0.05
Cd (mg/1)	0.01

Standards	Allowable Amount
Zn (mg/1)	5.0
Cr (mg/1)	0.05
Hg (mg/1)	0.001
V (mg/1)	0.1
Co (mg/1)	0.05
B (mg/1)	1.0
CN (mg/l)	0.1

4.2.2: Reuse of reclaimed water for irrigation purposes.

4.2.2.1: Reuse of reclaimed water for irrigation purposes requirements consists of two main groups: standards and guidelines:

- Standards are those mentioned in table 3 which oblige the operating agency to be committed to producing water conforming to those standards according to the uses mentioned in the specification.
- Guidelines are those values mentioned in table 4 and considered as inferential values. In case of surpassing them the operating agency should carry out scientific studies, which aim at clarifying the effect of such water on public health and environment and suggest practical procedures to avoid any kind of harm on them.

4.2.2.2: This water should not be used to irrigate vegetables eaten uncooked (raw).

4.2.2.3: Sprayer must not be used for the purposes of irrigation except in golf yards. Such sprayers have to be used at night. They should be movable and should not be used during daytime

4.2.2.4: Irrigation should be stopped two weeks before reaping (harvesting) the harvest if reclaimed water was used to irrigate fruitful trees. Falling fruits and those touching the soil should be eliminated.

Table 3: Stipulating characteristics and standards which should be maintained for treated effluents reused for irrigation

Permitted limits according to aspects of uses.	

Standards and characteristics	Permitted limits according to aspects of uses			Roses
	Cooked vegetables, parks, playing ground and side ways in populated areas	Fruit trees, highway trees and green areas	Field crops, industrial crops and forest trees	
	A	B	C	
BOD_5 (mg/1)	30	200	300	15
COD (mg/1)	100	500	500	50
DO (mg/1)	>2	-	-	< 2
TSS (mg/1)	50	200	300	15
pH (unit)	6-9	6-9	6-9	6.9
Turbidity (NTU)	10	-	-	5

5.2: Operating authorities are responsible for taking composite samples every 2 hours for 24 hours according to the succession illustrated in schedule No. 5 meanwhile monitoring authorities are responsible for collecting samples in the manner these suitable.

5.3: Succession of collecting samples for monitoring and operating agencies shall be according to schedule No. 5.

5.4: Samples are to be taken kept transmitted and analyzed according to the Standard Methods for the Examination of Water and Wastewater issued by the American Public Health Authority and American Society for Water Research and Pollution Control and its appendixes or any other accredited analysis methods if not available in the above reference.

5.5: As for mechanical treatment plants that include polishing ponds and waste stabilization ponds, BOD5 is calculated after filtration.

5.6: Geometric mean is used to calculate heat resistance facial coliforms results or E.Coli at evaluating reclaimed water quality.

5.7: As for evaluating total nitrogen content in the reclaimed wastewater, geometric mean is used but for not less than 5 samples.

5.8: Heat resistance faecal coliforms test results are considered to be an alternate for E.Coli test results when technical instrument are not available.

5.9: In case of specifying new criteria unstated in these specifications, the Specification and Metrology foundation is to be referred to.

5.10: In epidemic cases, monitoring and operating authorities should investigate the intestinal pathogens presence in water resources.

6) EVALUATING PROCEDURES

6.1: For the purpose of evaluating reclaimed water quality which will be used according to demonstrated methods in this specification, time intervals illustrated in schedule No. 5 are to be accredited.

6.2: If any of the criteria concerning discharge of reclaimed water to wadies or streams is exceeded, an extra emphatic sample is to be taken from reclaimed water, if laboratory results of the two samples do not comply with the standards, the concerned authority should be notified to correct the situation as soon as possible.

6.3: If any exceeding of the standards of the reuse of reclaimed water appears, a confirmative additional sample is to be taken from reclaimed water. If the laboratory results do not comply with the standards, the authority concerned should be informed to correct the situation. If the case lasts for more than three months, the use of treated wastewater which surpasses the standards should be stopped until quality is stable.

Table 5: Number of samples and tests required for quality control of treated wastewater

Treatment Plant	Sampling succession		Assessment Duration
Type	Operating Agency	Monitoring Agency	
Mechanical WWTP	Routine tests: 8/M* Phys.&Chem. Tests: 3/D** Helminth eggs: 4/M* E.Coli :8/M**	Routine tests: 2/M Phys.&Chem. Tests: 2/M Helminth eggs: 2/M E.Coli: 2/M	3 Months
Natural Treatment	Routine tests: 4/M* Phys.&Chem. Tests: 3/D** Helminth eggs: 2/M* E.Coli : 4/M**	Routine tests: 1/M Phys.&Chem. Tests: 1/M Helminth eggs: 1/M E.Coli : 1/M	6 Months

* Composite samples
** Grab sample

Routine tests: NO3, BOD, COD, TSS, NH4 and T-N.
Physical & chemical tests: pH, DO, Res. Chlorine, Turbidity and Temperature.

Annex (5)
Environmental and Social Risk Management Plan (ESMP) for the Project

Annex 5/ 42 : General Environmental and social Commitment

Annex 5/ 42 : Compliance of Project/ Program components & activities with Environmental & Social Principles

Annex 5/ 49 : Compliance with the National Laws & Regulations

Annex 5/ 53 : Environmental & Social Management System

Annex 5/ 54 : Environmental and social Policy Delivery Process:

Annex 5/ 54 *: Screening of Environmental and Social Risks by the Implementing Entity*

Annex 5/ 59 : Environmental and Social Assessment:

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A. General Environmental and social Commitment

Introduction and Executive Summary

With less than 150 m^3 of water available per capita and per annum, Jordan is one of the four most water scarce countries in the world. Available water resources per capita are falling, while water demand and the water shortage will drastically increase in the future due population growth and forced migrations for neighboring countries. Jordan's water resources are overexploited, which threatens sustainable supply to the population, industry and agriculture. Groundwater levels have dramatically declined showing that groundwater exploitation has been unsustainable. Water management in Jordan is supply-based and, despite significant improvements in water-supply infrastructure, a critical and serious supply-demand imbalance remains..

The potential decrease in precipitation in Jordan as a result of climate change could worsen the existing problems. Jordan is one of the countries being most severely affected by the impact of climate change. The National Climate Change Policy and Sector Strategic Guidance Framework of the Hashemite Kingdom of Jordan (2013-2020) and the Third national Communication to the UNFCC in November 2014, scenarios for the period 2011–2099 reveal an obvious increase in temperature from 1 – 4 °C and a decrease in precipitation ranges from 15 – 60 % in the majority of the studied sites, which results in increased harvest risks. Extreme events (i.e. flash floods, intense rain, snow storms, drought etc.) are predicted to be more frequent.

Climate change leads to unprecedented impacts on lives and livelihoods and can have negative effects on both the local coping capacity and the environment in areas impacted. The Government of Jordan (GoJ) has developed a comprehensive water strategy entitled "Water for Life" for the period 2008 to 2022. The Strategy was updated in 2012. It mainly focuses on effective water demand management, effective water supply operations, and institutional reform. The Strategy has climate change as part of its vision and as one of its principles. Jordan has already identified a list of no-regret measures that are required urgently to address the water sector problems in the short and medium term. Several specific adaptation measures in the water sector have been identified within the main areas mentioned above in several studies.

Most of the interventions recommended this proposed project come in line with the TNC in relation to supplementing irrigated and rainfed agriculture which can be cost-effective in farming systems, especially where irrigated agriculture is not feasible. For example, supplemental irrigation (the watering of rainfed crops with small amounts when rainfall fails to provide sufficient moisture) has proven to be a drought-proof strategy in most areas.

Increase of water available for supplementary irrigation can be achieved through treated wastewater reuse, and on-farm rainwater harvesting and management system, i.e. small farm ponds for micro-irrigation using drip or sprinkler irrigation systems. Larger rainwater storage structures can also be constructed to provide supplementary irrigation water to a number of small farms or fields by using the micro-dams.

Conservation agriculture, on the other hand is very efficient, leading to increased crop yield. In this adaptation measure, several techniques are used to enhance soil water storage. Water conservation is usually enhanced through mulching and crop residue retention through zero or minimum tillage, stubble mulch tillage, strip tillage and crop rotation. Conservation agriculture, however, requires extension programs such as training and provision of equipment.

The Ministry of Planning and International Cooperation (MOPIC), as NIE for AF activities in Jordan, will have the responsibility to ensure compliance with the Adaptation Fund Environmental and Social Policy (ESP). It will manage this by coordinating on timely delivery of relevant materials and reports to the Ministry of Environment and ensuring that activities are screened and that implementing entities provide relevant baseline training at project inception, and during implementation and by ensuring that all project monitoring, evaluation, reporting, gender, stakeholder integration and governance processes are able to detect such risks in a timely manner so that they are managed accordingly.

Community livelihoods and Socio-economic benefits have been on the core of the focus areas of the CC adaptation measures of the Third National Communication to the UNFCC November 2014.This Environmental and Social Risk Management Plan (ESMP) has been developed to ensure that the project activities do result in any adverse social or environmental impacts and that any unintended adverse impacts are avoided, and that, where this is not the case, they are timely detected and appropriately mitigated.

In accordance with Article (23) of the Jordanian Environmental Law # 52 FY 2006, the EIA Regulation number (37) for 2005 governs Environmental Impact Assessment of projects. The Regulation provides direction for conducting environmental impact assessments for all types of projects including the main issues to be covered by an EIA, reporting procedures, and the approval process. “Every institution, company, plant or any party that, after the enforcement of the provisions of this law, exercising an activity which has a negative impact on the environment, shall be obliged to prepare a study of the environmental impact assessment for its projects, and refer same to the Ministry in order to make the necessary resolution in this effect”.

Environmental and social risks of the infrastructure aspects which have been already constructed but whose treated effluent is going to be tapped on under this project (except for the earthen dams) have been adequately identified and their risks assessed by the Ministry of Environment and copies of their ESIAs have been attached to the proposal however risks and issues related to ww reuse were discussed in the scoping sessions under this ESMP. Managing these risks was discussed in the consultation scoping sessions with key stakeholders and technical experts addressed as Managing these risks is integral to the success of the project activities and achieving the desired outcomes by evaluating them against the prevailing national laws and regulations and the 15 Environmental and Social Principles (Principles) of the ESP. The Table 37: AF Check List of Environmental and Social Principles in part II K details these responses to risks identified and how they will be corrected /or prevented.

This Environmental and Social Management Plan (ESMP) has been prepared by accredited environmental team managed by MOPIC in its capacity as NIE and donor/lender aid coordination entity. The cost of undertaking this ESMP was borne by MOPIC through the project formulation funds Stakeholder consultations were held in an open and transparent manner with appropriate social and gender sensitive consideration for issues (ie holding separate gender meetings and where the language of discussion was in Arabic (the native language with signatures and registrations of issues of concern were documented in Arabic then translated for the ESMP purposes). Environmental and social risks were rated and their mitigation measures were adequately and timely addressed through monitoring and management plans/responsibilities and the frequency of actions documented to ensure that once funds are secured no changes in subprojects design becomes required.

B. Compliance of Project/ Program components & activities with Environmental & Social Principles

During the design and planning for the project activities, the compliance & adherence of these activities' with the ESP's Environmental & Social Principles were taken into consideration.

The Environmental Monitoring and Management Plan (EMMP) for these WWTPs and their reuse pilots demonstrates that as part of the EIA completion requirement it ensured adherence with national laws and regulations which begins with the first element of the ESMS ie the identification of risks through screening and begins with adherence to AF ESP principle # 1 which is screening against domestic and international law and the 14 other principles.

The 15 principles are ensured in the National EIA and accompanying (EMMPs) thus satisfying the AF ESP Guidance and its Principles as described in the Compliance with AF ESP Principles Table 37 below. The documentation of the screening process and the results are detailed in this ESMP and their **Potential impacts and risks management required for further assessment and compliance and required corrective or preventive actions were detailed in Table 24 of Part II K**.

TABLE 37: COMPLIANCE OF PROJECT/ PROGRAM COMPONENTS & ACTIVITIES WITH THE CC AF ESP PRINCIPLES

Principle	*Compliance of Project/ Program components & activities with the CC AF ESP*
Principle 1: ***Compliance with the Law.***	The principle is triggered. The programme is classified as an environmental Category B requiring partial assessment. The proposed scope of sub-projects will largely result in positive environmental impacts, and the minor, site-specific impacts mainly from small-scale works can be mitigated with integration of appropriate measures and implementation of common sense good practice measures. Compliance of subproject activities with applicable domestic and international laws through adherence to national and internationally approved regulations and standards will ensure compliance with the AF ESP. The EIAs describe the legal and regulatory framework for the project activities that may require prior permission (such as planning permission, environmental permits, construction permits, permits for water extraction, emissions, and use or production or storage of harmful substances describe the baseline conditions and the plan to achieve compliance with the relevant requirement during construction and operation of any given project.
Principle 2: Access and Equity.	This is guaranteed under the EIA Regulation # 37 FY 2005 and Environmental law # 52 FY 2006, health and water laws as well as under the construction law, labour by laws and human rights national centre's oversight to ensure fair and equitable access to benefits in a manner that is inclusive and does not impede access to basic health services, clean water and sanitation, energy, education, housing, safe and decent working conditions, and land rights. Disputes are ensured via the grievance and redress mechanism disputants equally. Furthermore, the project will be designed in a way that will not impede access of any group (farmers and beduins) to the essential services and rights mentioned in the principle.
Principle 3: Marginalized and Vulnerable Groups	Before initiating the project in Wadi Mousa, USAID in cooperation with the Hashemite Fund for Badia Development funded a Socio-economic Assessment for the Wadi Mousa Wastewater Re-use Implementation Project in 2003 prepared by a socio-economist. The study identified the risks associated with: tribal rights and tensions , and looked at land deeds and rights, the social structure and families, who has the most right to work at the pilot, community leaders who should manage community perceptions and alert the project team to sensitivities. The project will continue to adhere and monitor social changes and be sensitive to the marginalized and vulnerable groups such as the beduins in Wadi Mousa and the expatriate labor force in Jordan Valley. Impacts on marginalized and vulnerable groups will be continuously assessed and considered such that they do not experience adverse impacts from the project that are disproportionate to those experienced by others. The fact that project beneficiaries are either farmer owners in JV or members of the WUA Sad Al Ahmar in Wadi Mousa will ensure governance, stakeholder participation and that nobody is disadvantaged and that fair and equitable treatment when it comes to profits is allocated this will be ensured through the supervision of MOPIC/PU, JVA and PTDRA..
Principle 4: ***Human Rights.***	Jordan is signatory to UN Human Rights declarations and has active NGO s and civil society programs that monitor human rights as well as international organizations doing that. The Projects by the Fund shall respect and where applicable promote international human rights and monitoring mechanisms to report to the United Nations system.
Principle 5: ***Gender Equity and Women's Empowerment***	The subproject activities supported by the AF Fund shall be designed and implemented in such a way that both women and men (a) are able to participate fully and equitably; (b) receive comparable social and economic benefits; be socially sensitive and (c) do not suffer disproportionate adverse effects during the development process. In response to international commitments, mainly the provisions of Article 18 of the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), the Jordan National Commission for Women (JNCW) prepared the Kingdom's Fifth National

	Periodic Report for subsequent submission to the CEDAW Committee was prepared with the active participation of many public institutions and non-governmental organizations, which provided the required information and data needed to prepare the report. The report depicts the achievements of the Hashemite Kingdom of Jordan in its quest to eliminate discrimination against women, as well as the efforts being exerted to mainstream gender into the process of activating constitutional and legal rights in the framework of implementing CEDAW articles and the progress achieved during the period from July 2005 (when the Combined Third and Fourth reports were submitted) until November 2009 in the economic, social, cultural political and civil rights areas, through a review of the CEDAW articles one by one in order to assess the achievements made for women in all the CEDAW domains, supported by some indicators. A preliminary version of the present report was studied and refined by all the official and non-governmental organizations' commissions during several workshops addressing all the Convention's articles before it was adopted in its final form. When Jordan ratified the Convention on 1/7/1992, it entered a reservation to Article 9/2, which stipulates that «States Parties shall grant women equal rights with men with respect to the nationality of their children», as well as Article 15/4, relating to «the movement of persons and the freedom to choose their residence and domicile», and paragraphs c, d and g of Article 16, related, respectively to «the same rights and responsibilities during marriage and at its dissolution»; «the same rights and responsibilities as parents, irrespective of their marital status; and «the same personal rights as husband and wife.» The following should be considered in the project implementation: • The concept of gender mainstreaming for better understanding by the water sector employees. Males and females alike. • Women dimension should be mainstreamed from the beginning of the first phase of needs assessment, plans, project identification, monitoring as well as the evaluation process, to ensure that objectives have been adopted and equally reflected in increasing women productivity as well as enabling them to control and access resources and benefits. • Women's direct participation and consultation should be insured within the process of identifying needs and opportunities as good governance programs require. • Female employees should design objectives of the projects hand in hand with male employees to guarantee gender mainstreaming and creating "change**"** in the mentalities and attitudes, as a goal to achieve positive impact on female and male employee performance related to water management in the field. • Efforts should be directed towards the exploration of restrictions that hinder women playing an active role in water management, as well as ensuring feasible improvements in the implementation systems which need specific training skills and techniques. • Such awareness will supposedly increase the chances for female employees to possess higher positions, since their percentage in this level is low and does not exceed 10%. Such actions will hopefully have positive impacts in better managing and controlling activities on various local levels. Women who are unable to take decisions within their families are vulnerable to being discriminated against regarding training and promotion opportunities.
Principle 6: ***Core Labour Rights***	The project activities to be supported by the Fund will meet the core labour standards as identified by the International Labour Organization. The **Decent Work Country Programme in the Arab region in Jordan in 2006.** Since the completion of the first Jordan Decent Work Country Programme (2006-2009), Jordan was selected as one of nine countries globally, and the only country in the Arab region, to pilot the Global Jobs Pact that was adopted by the International Labour Conference in June 2009. The Global Jobs Pact contains a portfolio of policies to promote jobs and protect people, based on the Decent Work agenda. The Jordan Decent Work

	Country Programme 2012-2015 seeks "to support national initiatives aimed at reducing decent work deficits and strengthening national capacity to mainstream decent work in social and economic policies. "Jordan and ILO: Since joining the ILO in 1956, Jordan has ratified 24 Conventions including seven out of eight fundamental Conventions. The ILO's three priorities in Jordan are: • To expand decent work opportunities for young Jordanian men andwomen through the promotion of better working conditions, non-discrimination and equal rights at work • To extend a minimum level of social security to the most vulnerable groups of society through the Social Protection Floor as part of a more comprehensive social security system in Jordan. • To enhance employment opportunities with a focus on youth employment. • To achieve these objectives, the ILO is working with the Government of Jordan, workers and employers to advance the national employment agenda and enhance access to decent work opportunities. It represents the common commitment of the ILO and its partners to collaborate on specific objectives in the areas of employment promotion, rights at work, social protection, social dialogue, pay equity, youth employment, labour inspection, child labour among others. **Workers' Rights** Jordanian law prohibits most workers from working more than the customary 48 hours a week, and 54 hours for hotel restaurant and cinema employees. Employees are entitled to one day off each week, and workers may not work more than 16 hours in any continuous period or more than 60 hours' overtime per month Workers in the private sector and in some state-owned companies have the right to establish and join unions, although unions must be registered to be considered legal. Over 30 percent of the work force is organized into seventeen unions, which comprise the General Federation of Jordanian Trade Unions. The Constitution prohibits anti-union discrimination, and unions exercise their right to bargain collectively. Labor disputes are usually resolved through mediation or arbitration, and during this time strikes are prohibited. If a settlement cannot be reached through mediation, the Ministry of Labor may refer the dispute to an industrial tribunal by the agreement of both parties. If only one party agrees, the Ministry of Labor refers the dispute to the cabinet and then to Parliament. Labor law prohibits employers from dismissing a worker during a labor dispute. **Children's Rights** The government is committed to ensuring the rights of children. Education is free for all primary and secondary school students and compulsory until age 15, and corporal punishment in schools is prohibited. Jordanian labor laws prohibit children under the age of 16 from working except as apprentices, who at age 13 may begin part-time training for up to six hours per day. Poverty has contributed to the problem of child street peddlers, and the Ministry of Social Development has formed a committee to address the problem. In most cases, the children are removed from the streets, returned to their families or to juvenile centers, and their families are sometimes provided with a monthly stipend. **Women's Rights** Jordan's constitution protects women by explicitly stating that all Jordanians are equal before the law, have the right to assume public office and the right to work. In 1974, women were given the right to vote and the right to run in general elections. In September 1996, a National Committee for Women was formed in order to formulate general policies related to women in all fields. The committee also defines the priorities, charts plans and programs for women in both the governmental and non-governmental sectors. In June 1996, working mothers were provided with additional legal protection. The new labor law that went into effect includes an article that prohibits employers from terminating their jobs or giving them notice about termination if they are past their sixth month of pregnancy or on maternity leave. It also gives mothers ten weeks of paid maternity leave, compared with the previous allowance of

	eight weeks, as well as an hour a day for breast-feeding during the first year after delivery and a year's unpaid leave to care for their newborns.
Principle 7: Indigenous Peoples.	The Fund shall not support projects/programmes that are inconsistent with the rights and responsibilities set forth in the UN Declaration on the Rights of Indigenous Peoples and other applicable international instruments relating to indigenous peoples **This is protected under the National Tribal Law of Jordan** The United Nations Development Fund for Women (UNIFEM) indicated that tribal law in Jordan was abolished in 1975 (UN 2006, 17) **where as** far as the role of the state is concerned it should be noted that Jordan tends to respect tribal law and customs and allows much autonomy to its tribes in conducting their own internal affairs. In fact, the Jordanian legal system informally recognizes the existence of tribal law side by side with civil law. For instance, a conflict between two families would be dealt with in court but at the same time the families would try to solve their case through tribal processes of conflict resolution (temporary truce, mediation, arbitration, compensation, reconciliation, etc.).
Principle 8: Involuntary Resettlement	Project activities supported by the Fund shall be designed and implemented in a way that avoids or minimizes the need for involuntary resettlement.(the national law enforces that when limited involuntary resettlement is unavoidable, due process should be observed so that displaced persons shall be informed of their rights, consulted on their options, and offered technically, economically, and socially feasible resettlement alternatives or fair and adequate compensation). **No involuntary resettlement is to take place under this project or its activities.** This principle aims to avoid or minimize involuntary resettlement where feasible or by exploring all alternatives. It covers assistance to people displaced by the improvement or restoration of their living standards, their ability to generate revenue or enhance their production levels. Population relocation and involuntary land acquisition will be prohibited.
Principle 9: Protection of Natural Habitats	The project activities supported by the AF Fund would involve unjustified conversion or degradation of critical natural habitats, including those that are (a) legally protected; (b) officially proposed for protection; (c) recognized by authoritative sources for their high conservation value, including as critical habitat; or (d) recognized as protected by traditional or indigenous local communities. Jordan is signatory to the main international charters dealing with bio-diversity and conventions such as convention on international trading in the wildlife animals and plants that are threatened with extinction (CITES) that was adopted in Washington on 3.3.1973, and the biological diversity convention that was adopted in the city of Rio De Janiro on 5.6.1992, and the convention relating to wet lands (which is of an international significance) in its capacity as the habitat of water birds (RAMSAR) that was adopted in the city of Ramsar on 2.2.1971, and the Carthage Protocol for restorative safety that was adopted on 29.1.2000. A list of international agreements in which Jordan is signatory to was presented in Table 39 below.
Principle 10: Conservation of Biological Diversity	Projects activities supported by the Fund shall be designed and implemented in a way that avoids any significant or unjustified reduction or loss of biological diversity or the introduction of known invasive species. **The Royal Society for The Conservation of Nature** (RSCN) is an independent voluntary organization that is devoted to the conservation of Jordan's natural resources; it was established in 1966 under the patronage of Her Majesty Queen Noor with the late King Hussein as Honorary President. RSCN has the mission of protecting and managing the natural resources of Jordan, for it is responsible for protecting wildlife and wild places and is one of the few voluntary organizations in the Middle East with such a public service mandate. The organization's principal activities include:

	• Setting up protected areas to safeguard the best wildlife and scenic areas • Breeding endangered species to save them from extinction. • Enforcing governmental laws to protect wildlife, control illegal hunting • Raise awareness in environmental issues through educational programs. • Socio-economic development of rural communities. • Promoting the sustainable use of natural resources.
Principle 11: Climate Change	Project activities supported by the AF Fund shall not result in any significant or unjustified increase in greenhouse gas emissions or other drivers of climate change. Jordan has issued in November 2014 a Third national Communication to the UNFCC and has a " National Climate Change Policy of the Hashemite Kingdom of Jordan 2013-2020" This policy has been developed with a dual objective in mind. The first was to strengthen Jordan's capacity to respond to the detrimental impacts of Climate Change expected to add a multiplying effect to current challenges in sectors like water and agriculture. The second was to strengthen Jordan's global stewardship in addressing options to reduce emissions while achieving sound and sustainable developmental objectives especially in the various sectors of energy. Reaching a national consensus on this policy has not been easy, and that is a positive factor by itself. Extensive debates and exchanges of ideas are always an indicator of seriousness of participating parties to have the best possible outcomes. A policy document on Climate Change should encompass national sectoral priorities packaged in a way that is integrated with the national and global responsibilities to contribute to addressing Climate Change threats at all levels, specially adaptation and mitigation. During the consultation process for this policy, national stakeholders were engaged including women and beduins in a healthy discussion that reflected the importance of the topic and the need to optimize the policy document to a level that guarantees maximizing Jordan's role in the global fight against Climate Change and providing best conditions for gaining opportunities for enhancing Jordan's technical, human and institutional capacities to adapt to Climate Change impact. Jordan is a mere contributor to the global GHG emissions with only a marginal emission rate of 0.01% of total global emissions. However, committed to its role and reputation as a global pioneer in the implementation of the various UN conventions, Jordan believes it has a major responsibility in addressing Climate Change challenges while adhering to its national priorities and developmental objectives. The outcomes of the UNFCCC negotiations in the future will probably put more responsibilities on the shoulders of developing countries and we want to make sure that Jordan is prepared for the new phase with a clear plan. Being a pioneer is not new to Jordan as it was the first Non-Annex I country to produce an Initial National Communication back in 1997 and has been an active member in almost all Climate Change and other UN Conventions' global treaties, partnerships and programmes.
Principle 12: Pollution Prevention and Resource Efficiency	Project activities supported by the AF Fund shall be designed and implemented in a way that meets applicable international standards for maximizing energy efficiency and minimizing material resource use, the production of wastes, and the release of pollutants Covered under the Jordan Environmental Law # 52 for 2006 and the Natural Resources Authority Law 2002 Ministry of Agriculture Law (No. 44, 2002).

Principle 13: Public Health	Project activities supported by the AF Fund shall be designed and implemented in a way that avoids potentially significant negative impacts on public health. Public health protection is assured under the Public Health Law (No. 54, 2002).According to the new Public Health Law No.54, issued by a Royal decree in 2002, the Ministry of Health is responsible for all health matters in the Kingdom, and in particular: • Protecting health through providing preventive and curative services as well as monitoring responsibilities • Organizing and supervising health services provided by the public and private sectors • Providing health insurance for citizens within available resources • Establishing educational and training health institutions managed by the MOH Article 4 of the Law defines areas of work for the Ministry including health promotion and healthy lifestyles, disease control, prevention of nutritional deficiencies, maternal and child health, school health, health of the elderly and prevention and control of no communicable diseases. The Law contains provisions on the practice of medical and health professions, private health care institutions, mental health and drug addiction, communicable diseases, immunization, pharmaceuticals, water and sanitation.
Principle 14: Physical and Cultural Heritage	Project activities supported by the AF Fund shall be designed and implemented in a way that avoids the alteration, damage, or removal of any physical cultural resources, cultural sites, and sites with unique natural values recognized as such at the community, national or international level. Projects/programmes should also not permanently interfere with existing access and use of such physical and cultural resources. The Antiquities Law (No. 21, 1988). The principle is not triggered, as the proposed scope of sub-projects is not expected to impact any known physical cultural resources. Jordan's cultural heritage is divided into Antiquities (Any object, whether movable or immovable ,which has been constructed, shaped , inscribed, erected, excavated, or otherwise produced or modified by humankind earlier than the year 1750 A.D) , and heritage which is protected by the Antiquity Law No. 21 for the year 1988 and its amendment . Recently on 2003, Interim Law No. (49) For the Protection of Urban and Architectural Heritage was approved. The law deals with heritage sites constructed after the year 1750 for its importance either with regards to the structural technique, or its relation to a historically important personality, or its relationship to important national or religious events. A new directorate was created at the Ministry of Tourism and Antiquities to implement this law. This principle is considered within the scope of the ESMP screening process as well as during implementation. Furthermore if any chance finds are encountered during implementation, the government's national procedures will be applicable and the national procedures for archaeological chance finds will be followed during implementation
Principle 15: Lands and Soil Conservation	Project activities supported by the AF Fund shall be designed and implemented in a way that promotes soil conservation and avoids degradation or conversion of productive lands or land that provides valuable ecosystem services. Ministry of Agriculture Law (No. 44, 2002) ensures conservation of land and soils coupled with the provisions under the environmental protection law 52 FY 2006.

Compliance with the National Laws & Regulations; and International Laws and Agreements

Below is an outline of the existing environmental legislations, standards & requirements in addition to international agreements and conventions in which Jordan is party to.

Major relevant regulatory Bodies:

- Ministry of Environment (MoEnv).
- Ministry of Health.
- Civil Defense Directorate.
- Department of Antiquities.
- Ministry of Public Works and Housing.
- Ministry of Municipal and Rural Affairs.
- Ministry of Transport.

A summary of responsibilities of governmental authorities is outlined in the following section and in Table (38).

TABLE 38: SUMMARY OF RESPONSIBILITIES OF RELEVANT REGULATORY AUTHORITIES

Authority	Responsibility
Ministry of Environment	The EIA Directorate in the Ministry is responsible for licensing of the projects. The projects are referred to the EIA Directorate, and submitted to a Central Licensing Committee that consists of representatives of the relevant governmental authorities such as Ministries of Environment, Health, Water and Agriculture. An approval from the committee is required for licensing, which may have conditions attached to it, before the relevant authorities can grant permission. Refer to figure on Environmental and Social Risks Screening for Risk Management below to view this process. Permitting prior to operation (EIA report is required) and Inspection during operation is mandatory.
Ministry of Labor	Permitting prior to operation (after the occupational health and safety measures are considered). Inspection during operation.
Ministry of Health	The Environmental Health Directorate has the responsibility to check on the compliance of all industries with the health protection requirements. Disease Prevention and Safety Directorate, Occupational Health Division conduct periodical inspection programs on all industries in Jordan. Inspection during operation.
Water Authority	According to the Water Authority Law No. 18, 1988, WAJ is responsible for water distribution network in the Kingdom and supplying projects with the required quantity of water needed. Additionally, WAJ is responsible for monitoring water quality (surface and ground water and industrial discharges). Permitting prior to construction (identification of intersection with water piping distribution system). Supplying water needs for the project.
Department of Antiquities	The Law of Antiquities (No. 21, 1988) calls for immediate reporting of any found remains. The Department then has the right to assess the significance of any discovered remains/antiquities and puts its recommendations accordingly. Permitting in case of existence of Archaeological remains (EIA report would be needed).
Ministry of Energy and Mineral Resources	Supplying electricity needs for the project.
Civil Defense	Civil Defense Directorate grants approval on safety measures for industries and projects including emergency plan, occupational health and safety plans, and storage and handling of hazardous materials. The Directorate issues its final approval after an inspection visit has taken place to the project facilities to ensure conformity with the set requirements. Approval for construction plans. Permitting prior to operation.

Environmental Legislations

Water &Wastewater: Water Authority Law (18/88) – Water (Annex 4) – is described as the most far-reaching statute pertaining to water pollution. Article 3 of this law created Water Authority of Jordan (WAJ), and article 5 provides full responsibility to Ministry of Water and Irrigation (MWI) for all water and sewage systems and for establishing a water policy. Article 6 charges WAJ with its responsibilities.

The Public Health Act (1971) also serves as the basis for the regulation of wastewater discharges and water quality in Jordan. Pursuant to the Public Health Act, standards for the discharge of wastewater have been established. These are discussed in Section 3.2. Article 4 of the Control of Spoiled Sites Regulations (1978) reiterates some of the above Public Health Act provisions and further establishes the right of the president of the municipality, based on the health inspector's recommendation, to take such actions as may be deemed appropriate against the violator. The Town and Country Regulations Act (1966) allows Local or Regional Councils to take action against the operator of any wastewater system that is found to be a nuisance and order that the nuisance be corrected within a specified period of time.

Air Quality, Noise & Waste Management: Air quality is regulated under the Public Health Act (1971), The Control of Spoiled Sites Regulations (1978) and The Traffic and Transportation Law (1984). Noise is regulated under the Town and Country Planning Act (1966), the Control of Spoiled Sites Regulations (1978), the Local Authorities Act (1955), the Monitoring and Organization of Public Markets Regulations (1961), the Traffic and Transportation Act (1984), the Public Health Act (1971), and the Environment Law. Solid waste management is regulated under several statutes, including the Public Health Law, Control of Spoiled Sites Regulations, the Town and Country Planning Act, and the Environment Law.

Terrestrial ecology & antiquities: Terrestrial ecological resources are afforded protection under the Agriculture Law (1973) and the Hunting and Protection of Wild Animals and Birds regulations No 113 (1973). Agriculture Laws No. 20 and No. 113 (1973) contain chapters on plant and forestry protection, registration of crops and pesticides, orchard and nursery regulations, fertilizer use, soil conservation, and range-land administration. Under Article 9 of the Law of Antiquities, it is unlawful to destroy, disfigure, or cause any harm to antiquities, including causing changes in features, disconnecting any part thereof, altering it, sticking advertisements or attaching any plates to them.

Labor & Occupational Safety: The construction and operation of the wastewater treatment plants will be affected by Labor Law No. 8 for 1996 including all of its subsequent amendments. Article (12) of Chapter 3 of the Labor Law pertains to nationalities and work permits. Articles under Chapters 4 and 7 relate to contracts and wages. Articles under Chapter 8 specify, among other things, working hours, leave and juvenile employment. Articles under Chapter 9 (titled "Safety and Occupational Health") cover the obligations of the employer to provide a safe working environment for his workers, increased risks on the job and for the public, precautions and measures to be followed in the workplace, and protective and therapeutic medical care. Articles under Chapter 10 (titled "Work Injuries and Occupational Diseases") provide for issues related to work injuries and occupational diseases for those employees who are not covered under the provisions of the Social Security Law of Jordan.

The Jordan National Building Codes also establish design principles and minimum requirements needed to ensure public safety of structures, provide sound and efficient electro-mechanical services and to safeguard against earthquake risks.

Relevant standards: At present, there are two approved sets of water and waste water treatment standards that are of relevant to this project:

- The Jordanian Standard for Reclaimed Domestic Water - No. 893/2006.
- The Jordanian Standard for Sludge – Uses of Sludge in Agriculture - No. 1145/1996 Wastewater treatment and reuse.

JS893/2006 on "Reclaimed Domestic Water" has two primary components: i) reclaimed water discharged to streams, wadis or water bodies and ii) reclaimed water for reuse. Reclaimed water for reuse standard in turn has two subsets. The full standard is attached in Annex 6. Reclaimed water specifications under this standard are divided in to two main parts and should conform to specified conditions for every part and according to the final planned use and it is not allowed to dilute reclaimed water by mixing it in the treatment plant with pure water to achieve the stated conditions in this specification.

A: Reclaimed water for Wadi (valley) discharge

B: Reclaimed water for reuse purposes

Jordanian Standard 202/2007 Note: No treated industrial wastewater will be utilized or reused under this project noting that industrial effluents are not allowed into municipal wastewater treatment plants. There is no official translation of JS 202/2007 to English S

Sludge: JS1145/1996 on "Uses of Sludge in Agriculture" describes sludge treatment methods and presents sludge quality standards for reuse in agriculture (see full standards in Appendix B).

Other Standards

- There are also several other Jordanian regulation, guidelines and standards pertinent to the EIA
- Air Quality Standards
- Jordan Ambient Air Quality Standards (JS: 1140/2006).
- Maximum Allowable Limits of Air Pollutants Emitted from the Stationary Sources (JS: 1189/1999).
- Water Quality Standards
- Jordanian Standards for Treated Domestic Wastewater (JS: 893/2006).
- Jordanian Drinking Water Standards (JS: 286/2001).
- Jordanian Standards for Industrial Wastewater (JS: 202/1990).
- General Environmental Law and Regulations
- Environmental Protection Law (No. 52, 2006).
- The Antiquities Law (No. 21, 1988).
- Regulations for Protection of Birds and Wildlife and Rules Governing their Hunting (Regulation No. 113, 1973).
- Public Health Law (No. 54, 2002).
- Guidelines for Prevention of Noise, 1997.
- Water Authority Law (No. 18, 1988).
- Agricultural Law (No. 44, 2002).
- Penalty Law (No. 16, 1960).
- Civil Defense Law (No. 12, 1959).
- Natural Resources Organization Law (No. 12, 1968).
- Towns and Villages Law (No. 18, 1988).
- Administration of the Ministry of Energy and Mineral Resources Act (No. 26, 1985).
- Traffic Law (No. 47, 2001).
- Labor Law (No. 8, 1996 as amended).
- Social Security Law (No. 19, 2001)
- Investment Law (No. 68, 2003).

- Municipality Law (No. 55, 1954).
- Administration of Public Property Law (No. 17, 1974)
- Regulations No. (1) for the year 2006: Instructions for the elimination of unsanitary occurrences related to health harms generated from workers communities residential units.
- JS 286: 2001 – Drinking water standards
- JS 431: 1985 - Storage precautionary requirements for storage of hazardous material
- JS 1140: 1996 – Ambient air quality (aimed at industries)
- JS1052, 1053 and 1054: 1998 and JS 703: 1990 - Motor vehicle emissions
- JS 1059: 1998 - Motor vehicles noise levels
- JS 1401 and 1404: 1998 - Environment management systems
- JS 1411 and 1412: 1998 - Guidelines for environment auditing
- JS 525: 1997 - Heat levels allowed to be exposed to in the work environment
- JS 524: 1987 - Lighting levels in work environment

The following other regulations have also been issued pursuant to the Environment Protection Law:

- Nature Protection.
- Environment Protection from Pollution in Emergency Cases.
- Water Protection.
- Air Protection.
- Marine Environment & Coastal Protection.
- Natural Reserves & Parks.
- Management, Transport and Handling of Harmful & Hazardous Substances.
- Management of Solid Waste.
- Soil Protection.
- Charges & Wages.

TABLE 39: INTERNATIONAL ENVIRONMENTAL AGREEMENTS

Title	Signature Date
International plant protection convention	24/4/70
Protocol to amend the convention on wetlands of international importance especially as waterfowl habitat (RAMSAR)	15/3/84
Convention concerning the protection of the world cultural on natural heritage.	5/5/75
Convention on international trade in endangered species of wild fauna and flora.	8/1/81
Convention on biological diversity.	11/6/96
Convention on combating desertification	1996
Kyoto protocol on climate change	2003

C. Environmental & Social Management System

The Environmental & Social Management Planning System (ESMS) and its accompanying Environmental Monitoring and Management Planning System (EMMPs) are designed to ameliorate risks and ensure that: adequate capacity building for risk management is provided at project start-up; activity forecasts are screened for potential risks and that associated disbursement is not approved where these arise; project reporting processes have a particular focus on detection of environmental and social risks; the project oversight and governance

processes are designed to ensure that risks are avoided where possible and appropriately mitigated in the unlikely event of these occurring; and stakeholders are aware of the grievance and redress mechanism to raise concerns relating to risks with the project to the PSC and the NIE Steering Committee should concerns relating to risks not be adequately addressed by the Executing Entities

Projects Start-up: During the project start-up phase, the NIE will engage directly with the EEs and other project partners on the operating procedures that will apply to the management of the project activities, this will be necessary to ensure compliance with National and AF policies and procedures.

Where the environmental and social assessment identifies environmental or social risks, these were accompanied by an environmental and social monitoring and management plan that identifies those measures necessary to avoid, minimize, or mitigate the potential environmental and social risks. These EMMPs also identify the responsible executing entity.

Where minor risks are posed that can be easily mitigated via early detection, the EE may be required to develop and implement a subproject-Environmental and Social Risk Management Plan, commensurate with the severity of the risk associated with the relevant activity to be endorsed by the Ministry of Environment's Environmental Assessment Directorate . The EEs and/ or sub-Executing Entities will need to show that costs associated with this can be provided within the project budget, and this will need to be approved by the NIE.

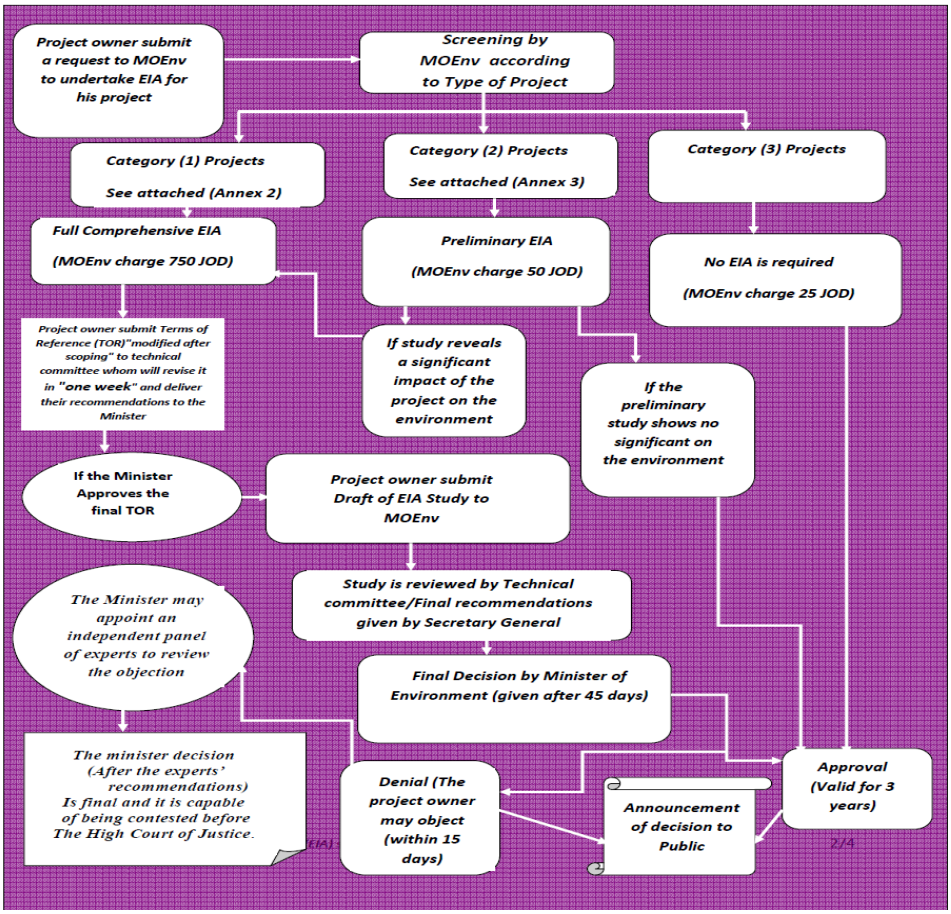
Focus will be placed on this Environmental and Social Management Plan which has been prepared according to AF's ESP. A dedicated capacity building session will be held at the onset of the project to ensure that the EEs and other project partners are able to competently detect environmental and social risks in a timely manner to be able to better design for future project planning, monitoring, evaluation and reporting processes. In this regard, attention will be given to ensuring that project activities do not impact adversely on any priority, threatened species, biodiversity or cultural heritage areas or ecosystem support areas, and that there are no negative impacts on local communities, including vulnerable groups (women, elderly, children refugees and people with special needs) and indigenous people (beduins). No such adverse impacts are anticipated as a result of adherence to ESP Principles and conclusion of the ESIAs of each sub project (WWTPs and reuse pilots) and rainwater harvesting sub project.

D. Environmental and Social Policy Delivery Process:

Screening of Environmental and Social Risks by the Implementing Entity:

All proposed projects were screened with support from both the implementing and executing entities and with engagement of public stakeholders to identify potential risks and determine their potential to cause environmental or social harm. The screening process sought to identify potential environmental and social risks and their impacts, considered all potential direct, indirect, trans-boundary, and cumulative impacts in the projects areas of influence that could result from a proposed project i.e. the screening determined the extent to which the projects require environmental and social assessment (ESA), and the extent to which they require mitigation, and management plans and the extent to which they comply with the Fund's environmental and social principles and applicable national environmental Laws.

Environmental & Social Screening for Risk Management System in Jordan:



ANNEX (2): Projects, which need a comprehensive EIA, study:

1- Raw petroleum Refining.

2- Electricity generating plants.

3- An establishments designed as permanent stores
or as landfills for the irradiant nuclear wastes.

4- Iron and steel factories.

5- Establishments for extracting, treatment, conversion the asbestos and the substances which asbestos part of its structure.

6- Integrated chemical industries such as:

- *Petrochemicals.*
- *Fertilizers, pesticides and peroxides industries.*
- *Chemical products, petrochemicals and petroleum storage facilities.*

7- Roads, airports and rails constructing projects.

8- Hazardous wastes treatment plants and disposal from these wastes.

9- Establishing the industrial cities.

10- Extraction industries:

- The excavating processes for water and the geo- thermal digging except the digging for investigating the soil.
- Mining processes and relevant industries.
- Natural fortunes extraction.

11- Generating energy industries.

- The industrial establishments which producing electricity, vapor, hot water.
- The industrial establishments which conveying gas, vapor, hot water and electrical energy.
- *Natural gas surface storage.*
- *Flammable gases storage under ground surface.*
- *Fossil fuels surface storage.*

12- Tanning (leathers) factories.

13- Sugar factories.

14- Yeast factories.

15- Building up Marine ports.

16- Establishing ships and boats for industrial and recreational purposes.

17- Sea dumping for using the land in industrial and recreational uses.

18- Glass factories.

19- Establishing slaughterhouses (abattoirs).

ANNEX 3: Projects need initial EIA study

1- Agriculture Projects:

- Poultry Farms if the capacity exceed 30.000 birds,
- Caws Farms if the capacity exceed 50.000 caws.
- Sheep Farms Caws Farms if the capacity exceed 1.000 sheep.

2- Minerals treatment projects:

Iron and steel works including galvanizing, varnish factories.

Establishments producing non-irony minerals including production, purification (washing), liquefying, demonetizing (pulling) and galvanizing processes.

- Compressing Bullions.
- Treatment of minerals surfaces and covering (coating).
- Boilers, cisterns, tanks, industrialized from minerals plates.
- Establishments for felting and scorching (roasting). Raw minerals
- Complexes industry and aligning (collecting).

3- Food Industries:

- Oils, animal and vegetarian fats.
- Bottling, Packaging the animal and vegetarian products.
- Milk products industry.

4- Fabric, leather, wood, papers and tissues industries.

5- Rubber industry.

6- Infrastructure projects including housing projects.

7- Other projects:

- Municipal landfills
- Landfill for disposal from junk.
- Sports activities centers.
- Junk storage establishments.

8- Any additions, amendments on the projects that mentioned in this annex.

The whole programme is classified as Category B or equivalent to Category II in Jordan, whereas project activities were categorized according to the scale, nature and severity of their potential environmental and social impacts. Screening the wastewater reuse activities in Wadi Mousa project 1.1 or those of mixed water quality reuse for irrigation in Jordan valley (fresh water mixed with treated wastewater) such as projects 1.2, 1.3, 1.4 and the small rainwater harvesting earthen dams under project 1.5 (*where these projects may have a potential adverse impacts that are small in scale, less widespread, reversible and*

*are easily mitigated with preventive and control measures governed by AF Check List of Environmental and Social Principles in Table 24 of Part II K and against the Environmental & Social Screening for Risk Management System in Jordan****) has classified them under the AF classification as Category B or Jordan's EIA as Category II.***

Those projects of technical assistance nature fall under a Category C or Category III for Jordan such as the permaculture project (1.6) with no adverse environmental or social impacts.

For component 2 Projects (2.1, 2.2 & 2.3) which are of institutional capacity building nature have no adverse environmental or social impacts and are thus categorized as Category C for the CC AF classification, and Category (III) based on Jordan criteria for screening projects under its EIA Regulation Number (37) for 2005.

At this stage, it is envisaged that the small earthen rainwater harvesting collection dam(s) under sub activity 1.5 which is categorized as Category B per AF classification or Category II per national EIA regulation and will require authorizations which will need to be provided in writing before the above mentioned small scale construction activities can take place, and are to be approved by Ministry of Environment and the NIE as per the ESMP which has addressed their environmental and social impacts through technical and community consultations, and their respective monitoring and mitigation measures during construction, operation and de-commissioning stages.

Any other project activities not identified under this proposal that may require an Initial Environmental Assessment (Category B/ or its equivalent Category II) or full Environmental Impact Assessment (EIA) Category (A)/ or its equivalent Category(I) as per the national EIA Regulations (described in Section II.E) will not be supported, due to administrative costs and potential delays.

For Category B projects above which have the potential to cause environmental or social harm (have been subjected to an environmental and social assessment that identified environmental or social risks, including any potential risks associated with the Fund's environmental and social principles set forth above. Stakeholder consultation meetings recently held for the sake of this ESMP re-introduced these projects, discussed potential impacts identified from the screening process and consulted with technical teams and communities the mitigation and corrective measures, their frequencies and entities responsible for monitoring and oversight during execution. (A copy of the environmental and social assessment approvals and their clearances by the Ministry of Environment are attached in Annex "3"). The ESIAs have (i) considered all potential direct, indirect, trans-boundary, and cumulative impacts and risks that could result from the proposed project; (ii) assessed alternatives to the relevant subproject as part of the relevant ESIA process including the no go option and (iii) assess possible measures to avoid, minimize, or mitigate environmental and social risks of the proposed project.

Risk Screening and Management System:

(a) Programme Level Risk Management and Screening

To ensure prompt and efficient implementation, the Programme will be implemented according to the following project administrative structure and management.

MOPIC as NIE will be responsible for overall Project coordination, management and reporting. The **PMU within MOPIC**, comprising of a Project Director, and support staff will be responsible for day-to-day Project coordination, management and implementation oversight. This will

involve, *inter alia*: (i) providing support to the National Steering Committee (NSC), planning and supervision of Project activities, coordination amongst institutional partners and donors, organizing annual joint missions, etc.; (ii) overall fiduciary oversight of the Project, including Project monitoring, financial management (FM), audits, safeguards compliance, etc.; (iii) Project reporting to the Government and AF secretariat at GEF, including the preparation and dissemination of Project progress reports; (iv) Project related information and communication activities; and (v) management and implementation of Subcomponent 2B, which involves building capacities for emergency preparedness and risk management systems in Jordan.

Executing Entities (EEs) will be responsible for the implementation of sub projects and delivery of services to be financed through the Project, in close collaboration with the beneficiary communities. This will involve (i) the identification of priority needs, the costing of alternative programs affordable within the financial envelope allocated through the respective subproject, an arbitrage amongst the various alternatives, and the final consolidation of the priority list of eligible expenses; (ii) detailed programming of technical requirements, procurement of works, good, and services according to the current regulatory thresholds; and (iii) management of activities, including consultation with the communities and work supervision.

The **Beneficiary Communities** will contribute to the implementation of, and selection of priority activities through participatory processes which are outlined in the Project and which includes guidelines for ensuring participation of women, youth and groups that are considered vulnerable. Local social organizations (NGOs, CBOs, charities, etc.) will be expected to facilitate the process. Selection criteria for these groups will also include whether they explicitly represent the interests of women and youth, farmers, and other related beneficiaries. The local communities and organizations will also be consulted throughout Project implementation and will be able to track progress and results through the publication and dissemination of relevant Project information.

Whenever a Contractor is hired to construct facilities or infrastructures, it is the responsibility of the Contractor to implement and operate the ESMP, where the Contractor should strictly adhere to the suggested mitigation measures and ESMP programs, and define new aspects and mitigate impacts under the supervision of the PMU. On the other hand, the PMU should ensure the project compliance with the legal requirements and the ESMP recommendations. Also, the MOPIC is responsible for monitoring the environmental and social aspects, the project conformance/non-conformance, performance auditing, and the construction completion evaluation. Environmental Audit should be carried out by external environmental auditors.

It is recommended that an ESMP Implementation Committee to be established for the project. For compliance with AF ESP's effective implementation, this Environmental and Social Management Plan (ESMP) has been developed to ensure that the national environmental policies and those of the AF's 15 ESP Principles are adequately taken into account, and that the activities of programme's sub projects are in compliance with these policies.

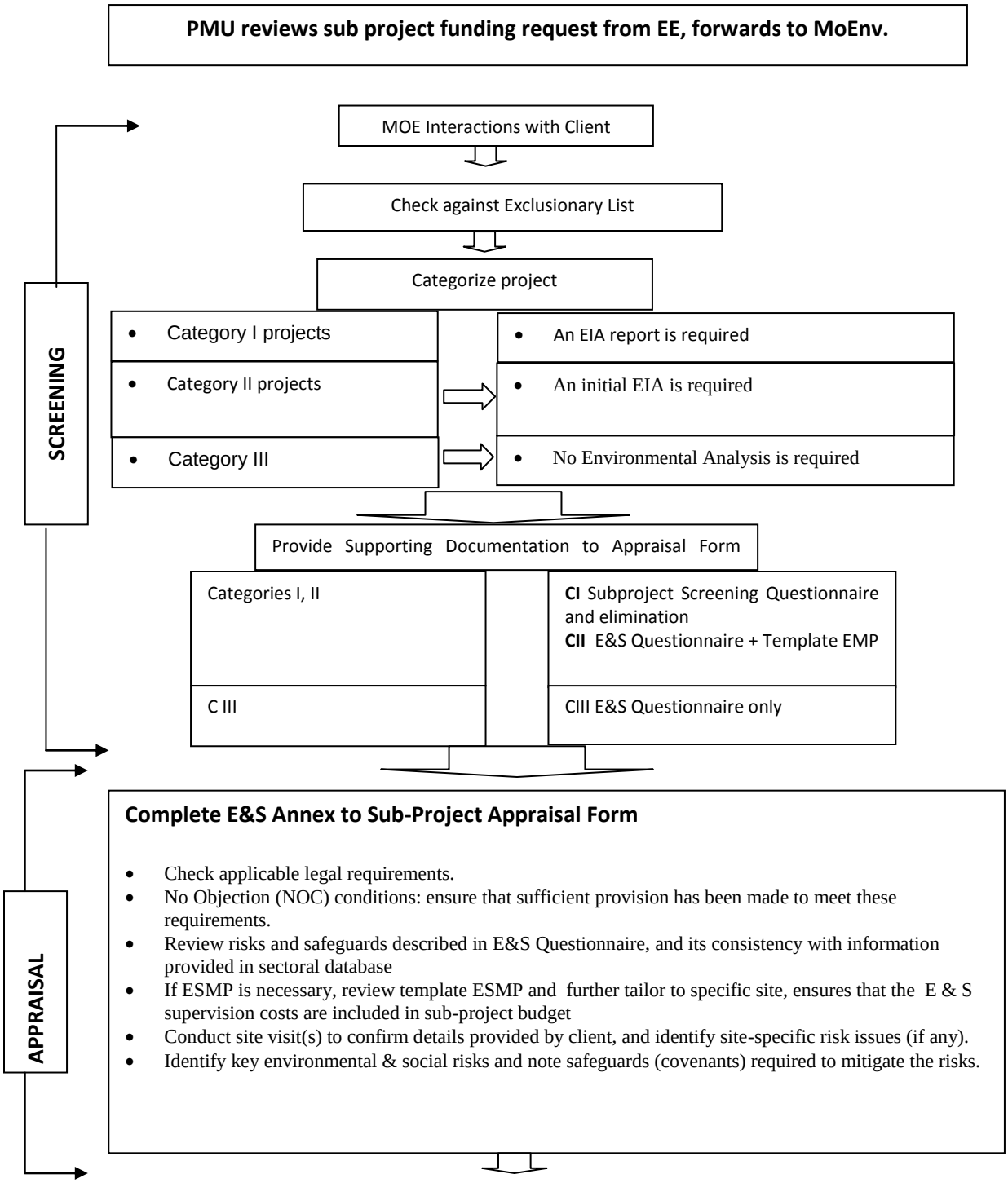
For greater efficiency, the implementation of the ESMP is integrated with the process of funding approval. The ESMP provides that, at the national level, an annual evaluation is made to assess the cumulative impacts that were considered negligible at the level of individual projects, and to modify mitigation measures if need accordingly.
The ESIA/ESMP is based on a two-step approach:

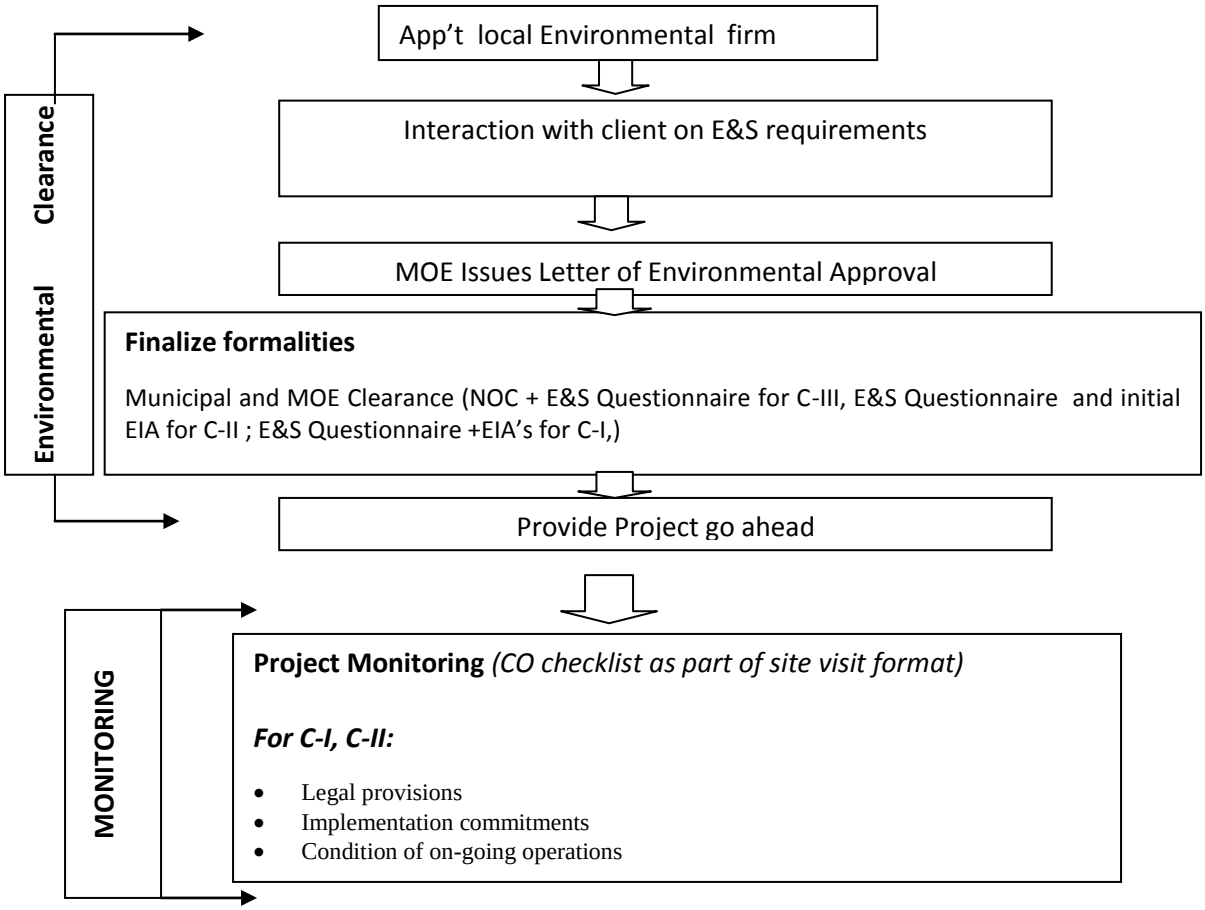
1. Make an environmental ("screening") to determine the environmental category of the programme as a whole and sub projects to be financed;
2. Implement the appropriate procedure relative to the determined category (Category B for this programme). Where the four categories are described below and their modes of operation:

a. Important impact (Category "A" according to the WB and Category “1” according to the Government of Jordan) or excluded activity under the negative list: project is excluded;
b. Average impact (Category "B" according to the WB and Category “2” according the Government of Jordan) EMP is completed and the tender documents signed in accordance with the Jordanian regulations; (This CC Adaptation Programme for Jordan falls under this Category).
c. Negligible or absent impact (Category "C" according to the WB and Category “3” according to the Government of Jordan): no impact assessment is required; and

MOPICs PMU in close coordination with the Ministry of Environment will ensure that the activities of the programme’s sub projects have no significant negative or long-term social or environmental impact. Following the methodology of the ESMP ensures that the Executing Entities avoid, reduce or mitigate the negative impacts to an acceptable level.

Procedure Flow for Programme Level E&S Risk Screening System at sub-project identification





At the Programme level, an **ESMP Management Committee** will be initiated by the MOPIC PMU to hold the responsibilities relevant to the following objectives:

1- To ensure that roles, responsibilities and authorities are defined documented and communicated.

2- To monitor, audit and evaluate the project environmental and social aspects as per an aspects register.

3- To monitor, audit and evaluate the efficiency of ESMP implementation and operation.

4- To evaluate and update the aspects register.

5- To ensure efficient implementation of the ESMP programs and procedures.

This can be achieved by the following operational objectives:

a. Ensuring that the ESMP requirements are established, implemented, and maintained in accordance with the stated legal requirements and approved standard.

b. Reporting on the performance and effectiveness of the ESMP to top management and using this reporting as the basis for Management Review.

One of the major assignments of the ESMP Management Committee is to establish the baseline conditions for the monitoring program with relevant measures taken to establish, as far as possible, the ambient conditions.

The detailed duties of the proposed ESMP Management Committee

Pre-Construction (Planning) Phase	Develop Environmental Management (EM) Statement prior to each construction/sub-project implementation phase. These statements should detail to the EM procedures applicable to mitigate anticipated impacts. - Ensure efficient implementation of the Precautionary ESMP Mitigation Programs and Procedures with regard to the sites and construction activities selection/designation criteria. - Ensure effective communication and cooperation with local communities - Monitor, audit and evaluate the project environmental and social aspects - Monitor, audit and evaluate the efficiency of ESMP implementation and operation. - Evaluate and update the aspects register. - Reporting to the PMU.
Implementation (Construction) Phase	Ensure efficient implementation of the ESMP mitigation programs and procedures. - Coordinate and follow up with responsible governmental and non-governmental agencies working in the field of environmental conservation. - Ensure continuous and efficient communication with sub-projects partners and local communities and ensure they are heavily involved in the implementation. - Implement the ESMP monitoring programs and evaluate compliance with the ESMP mitigation programs and procedures through: - Monitoring, auditing and evaluating the project environmental and social aspects as per the aspects register. - Monitoring, auditing and evaluating the efficiency of ESMP implementation and operation. - Evaluating and updating the aspects register. - Give a special attention to the issues of public and workers safety, and insure the continuous application of these measures during the construction of management and tourism support facilities. - Reporting to the PMU.
Operation and Adaptation Phase	- Ensure efficient implementation of the ESMP mitigation programs and procedures. - Coordinate and follow up with responsible governmental and non-governmental agencies working in the field of environmental conservation. - Ensure continuous and efficient communication with sub-projects partners and local communities and ensure they are heavily involved in the implementation. - Implement the Sub-projects Screening Procedures in coordination and cooperation with the Ministry of Environment, JVA and the PDTRA. - Implement the ESMP monitoring programs and evaluate compliance with the ESMP mitigation programs and procedures through: o Monitoring, auditing and evaluating the project environmental and social aspects as per of the aspects register. o Monitoring, auditing and evaluating the efficiency of ESMP implementation and operation. o Evaluating and updating the aspects register. - Give a special attention to the issues of alternative livelihoods adopted by local communities. - Evaluate the suitability of mitigation measures, and update and adapt the ESMP based o the monitoring and evaluation findings. - Identify project sustainability tools. - Reporting to the PMU.

Sub-Project Screening Checklists and Safeguard Review Procedures

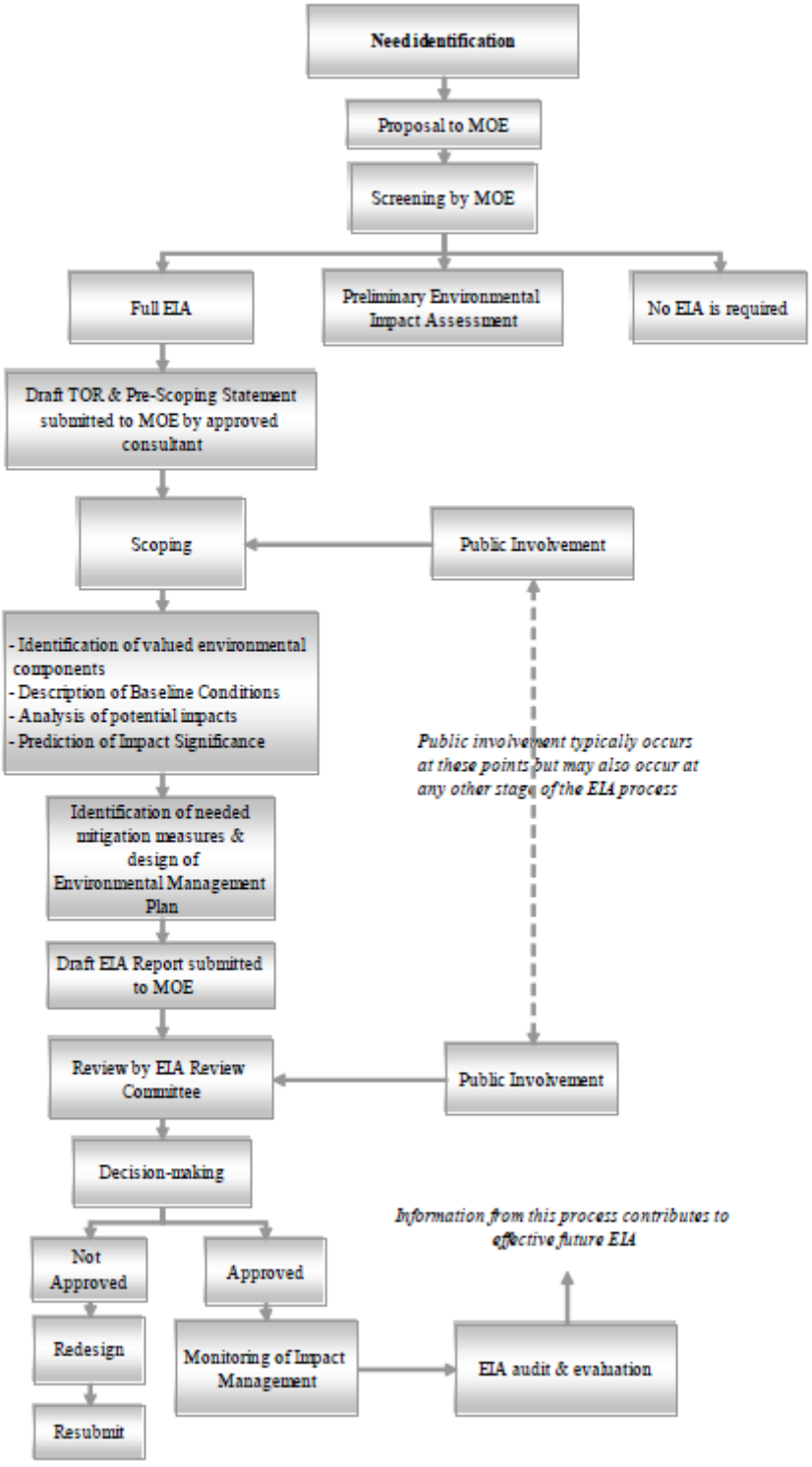
It should be noted that for the sub-project of rainwater harvesting - small earthen dams construction which is not yet clearly identified, a sub-project environmental screening checklist and procedures is established to identify the environmental screening for such sub-project. So, in order to ensure environmental soundness, each identified sub-project will be subjected to well establish screening procedures that comply with Jordanian EIA Regulation No. (37) for year 2005 and with AF ESP 15 principles. The design of the sub-projects screening procedure took into consideration the existing management and administrative responsibilities delegated by the Jordanian polices and those that are ongoing.

Specific Environmental Review Procedures for the Progrmme Sub-Projects Level:

Eligible activities for the wastewater reuse activities and permaculture sub projects (at the subproject level) are not anticipated to trigger relocation of households or communities; acquisition of private owned lands (temporarily or otherwise); potential adverse impacts on livelihoods including those that may occur through restriction of access to resources.

As for the small earthen dams, it is anticipated that the subproject level activities will be carried out on public/state owned lands. If the need arises to address unexpected issues that might arise, even in the context of state owned lands (i.e., presence of squatters or other encumbrances). In the unlikely situation that squatters, refugees and/or encumbrances are found on government land used for a given subproject. In such events, a Resettlement Policy Framework (RPF) will be prepared to address any adverse impacts that may arise.

The Flow chart below outlines the risk assessment mechanism at sub project level, then in the scoping sessions and ESIA a typical sub project risk screening form is used for the assessment of the Valued Environmental and Social Components Risks Evaluation, and a snap shot of “A Risk Analysis template is then used to assess these risks in terms of their (Deviation, causes, effects, measures to be taken, status and responsible party)”.



Sub Project Screening Flow Chart

A typical sub project risk screening form is shown below and used in the Valued Environmental and Social Components Risks Evaluation.

Environmental Components (VECs)	Anticipated Impacts	Expectancy (High, Medium, Low) (Judgement)
Physical Environment		
Soils and local geomorphology	Erosion of lands down slope from roadbed or borrow area	
	Landslides, slips, and slumps	
	Degradation of riverbanks through excavation and erosion	
	Contamination from waste materials	
Water Resources	Creation of stagnant water pools	
	Increased sediments into streams	
	Clogging of drainage works	
	Changes in water quality	
	Changes in runoff and flooding conditions	
	Introduction of hazardous wastes to the water resources	
	Overexploitation of aquifers	
Waste Water	Contamination of surface water resources	
	Way of affecting agricultural areas	
	Nuisance (Odor, insects, etc.)	
Solid Waste	Generation of huge amount of solid waste	
	Waste accumulation and dumping	
	Nuisance (Odor, insects, etc.)	
	Final disposal/treatment technology (disposal, burning, sanitary incineration, sanitary land filling, sorting, recycling, composting, etc.)	
	Contamination of surface water resources	
Air Quality	Dust during construction	
	Odor problems	
Acoustic Environment	Noise disturbance	
Biological Environment		
Natural Habitats	Violations of protected areas regulations and rules	
	Deterioration and fragmentation of fragile biological habitat	
	Alteration of surface morphology and water runoffs schemes	
	Increased human access to remote areas	
Fauna and Flora	Persecution, indirect killing and disturbance of wildlife	
	Threats to rare and endangered species	
	Disturbance to river and pools fish (stream bottoms)	
	Loss or degradation of vegetation	
	Over grazing and extensive wood cutting	
	Disturbance to breeding and migratory bird species	
	Over exploitation of biological products	
Social Environment		
Aesthetics and Landscape	Marred landscapes	
	Debris	
Human Health	Transport of hazardous substances	
	Traffic accidents	
	Pedestrian accidents	
	Water born diseases (improper wastewater disposal)	
	Respiratory diseases (dust emissions)	
	Nuisance (Odor ad noise)	
Human Communities	Public environmental awareness and education	
	Social status change	
	Loss of buildings, property, or economic livelihood	

Environmental Components (VECs)	Anticipated Impacts	Expectancy (High, Medium, Low) (Judgement)
	job creation (direct and indirect)	
	Conflicts over water use rights	
	Multiple land use demands on restricted water sources	
	Political and social problems associated with upstream land use and pollutant discharges	
	Disruption due to greater traffic flows	
Archaeological and Cultural Heritage Resources		
Archaeological/Cultural Sites	Direct and indirect destruction of archaeological and cultural heritage resources	
	Increased/decreased protection of archaeological and cultural heritage resources	

A Snap Shot of the Risk Analysis template which is then used to assess these risks in terms of their (Deviation, causes, effects, measures to be taken, status and responsible party) is shown below.

Overview:

Risk Analysis	*Risk assessment course*
Object	*Example check list*
Sponsor	*RSS*
Date (final version)	06/06/2006
Team	Name Signature
Scope	*Overfilling*
Assumptions	
Documents/Annexes	
Remarks	
Summary	

Probabilities:

Probabilities			
	Keyword	**Frequency**	**Definition / Examples**
A	frequent	daily	Hazards occurring at each batch if no measures are taken. Examples: - charging powders in flammable solvent, - exposure during handling of liquid or solid chemicals, - ignition effective electrostatic discharge (if nothing is done against charging
B	moderate	once per week	Pump failure, failure of data acquisition, weighing error, wrong set point setting
C	occasional	once per month	Imprecise communication between production and e.g. tank farm, failure of utilities, failure of a motor

Effect:

Risk Analysis	*Risk assessment course*			
Object	*Example check list*			
Effects				
	IV	**III**	**II**	**I**
	negligible	**marginal**	**critical**	**catastrophic**
Life / Health	injury, ambulant treatment	injury requiring hospitalization	injury with long-term disability	fatality
Environment	no effect	only on-site effects of released chemicals	pollution outside site, recovery within one month	long-term pollution of water, soil
Property	not significant	production line to be repaired	loss of plant/production line	loss of factory,

Scenarios:

Risk Analysis	***Risk assessment course***									
Object	***Example check list***						**before meas.**		**after meas.**	
Nr	**Deviation**	**Causes**	**Effects**	**Measures**	**Status**	**Responsible**	**S**	**P**	**S**	**P**
1	Overflow of the tank	Error in the planning and failure of LIS+/- 01 during filling of the tank	Loss of containment, fire or explosion				I	E		

Risk 1:

Risk Matrix before Measures				
Object:	***Risk assessment course; Example check list***			
A: frequent				
B: moderate				
C: occasional				

Risk 2:

Risk Matrix after Measures				
Object:	***Risk assessment course; Example check list***			
A: frequent				
B: moderate				
C: occasional				

INITIAL ENVIRONMENT AND SOCIAL SCREENING FORM

Municipality or Executing Entity Name:

Proposed Subproject:

Objective of Subproject:

Estimated Cost ($):

I. ENVIRONMENTAL ASSESSMENT

	Environmental Assessment	Y/N	If Yes, please specify details	Environmental Management Next Steps and/or Measures
1.	Does the subproject consist of procurement of pesticides and/or rodenticides?			If yes, please stop here and prepare a Pest Management Plan, including mitigation measures.
2.	Does the subproject consist of procurement of (non-pesticide/rodenticide) goods only and no civil works/construction activities?			If yes, please stop here and prepare and attach a "guidance for use" mitigation sheet for goods procurement
3.	Is the subproject constructed on or near a known archeological site?			
4.	Will the subproject result in cutting of trees?			
5.	Will the subproject have any impact on the ground water level or quality?			
6.	Will the subproject generate any air emissions?			
7.	Will the subproject generate any of the following? i. Industrial Waste Water ii. Leakages iii. Any other (please specify) *If Yes, please provide details of mode of disposal (e.g. river, lake, drain,*			

	Environmental Assessment	Y/N	If Yes, please specify details	Environmental Management Next Steps and/or Measures
	open land, horticulture use in factory).			
8.	Will the subproject generate hazardous solid waste? *(e.g. sludge, oils, waste chemicals etc.) If yes, please provide details of mode of disposal.*			
9.	Will the subproject involve handling of hazardous / dangerous chemicals in its operations? *If yes, please provide list of chemicals handled.*			
10.	Will the subproject construction and/or operation cause noise pollution?			
11.	Will the subproject construction and/or operation have any impact on auto and/or pedestrian traffic? *If Yes, please provide an initial traffic study.*			
12.	Will the subproject construction and/or operation result in odors and/or smoke?			
13.	Will the subproject cause any fire hazards (e.g. fuel storage)? *If Yes, please provide details of emergency management systems.*			
14.	Will the subproject involve use of water in its operations? *If Yes, please provide source of water supply and water efficiency measures adopted (e.g. reuse/ recycling).*			
15.	Will the constructing of small rainwater harvesting dams be ecologically disruptive, causing cause water stress in the receiving water system downstream, and changing the biodiversity of the region ?			
16.	Will the subproject lead to an increased demand on energy? *If Yes, please provide sources and the use of any renewable source if applicable.*			

II. SOCIAL ASSESSMENT

	Social Assessment	Y/N	If Yes, please specify details	Social Management Next Steps and/or Measures
17.	Will the subproject involve (a) involuntary taking of land resulting in: (i) relocation or loss of shelter (ii) loss of assets or access to assets; (iii) loss of income sources or means of livelihood, whether or not the affected persons must move to another location; If yes please specify			If yes, please prepare Resettlement Policy Framework for details on mitigating these impacts.
18.	Will the subproject cause any conflict among the local community? *(e.g. over water resources; energy resources, land use or etc.) If yes, please provide details of mitigation*			
19.	Will the subproject provide new employment for the local community,			

	Social Assessment	Y/N	If Yes, please specify details	Social Management Next Steps and/or Measures
	women, youth and disabled persons?			
21.	Will the subproject involve child labor?			
22.	Will the subproject provide equal access to job opportunities for women and men?			
23.	Will the subproject support poverty alleviation?			
24.	Will the subproject cause any health hazards to employees or nearby community?			
25.	Will the subproject lead to propagation of vector or enhance waterborne diseases?			
26.	Will the subproject generate any increased demand for services?			
27.	Will the subproject enhance the level of education/capacity building among the local community, women, youth or disabled persons?			
28.	Will the subproject cause cultural impacts on the local community or affect their behavior?			
29.	Will the subproject affect the physical conditions of the community either positively or negatively?			

I. POLLUTION CONTROL EQUIPMENT / TECHNIQUES AND ASSOCIATED COSTS (*Please provide details of pollution control equipment, treatment and disposal facilities provided for the proposed Subproject, as well as a detailed breakdown of associated* **costs.)**

II. In the case of the earthen dams, and as the exact location and characteristics of these water collecting structures have not yet been fully identified, (*pls provide details on a meaningful risk screening to avoid any risk, including the impact on seasonal streams and flood areas which tend to be ecologically highly valuable).*

III. SOCIAL ASPECTS *(Please provide details of initiatives adopted to employ labor from the local community and to avoid use of child labor or forced labor either directly or through contractors, as part of the subproject.)*

IV. PAST TRACK RECORD

(Has this Municipality/facility or any other facility under the same management been associated with environment related legal violations (viz. notices been issued by concerned authorities) or public protests / legal action in the past 3 years? If yes, please provide details.)

The initial screening by the E&S Safeguards Specialist at MOPIC can include the following questions:

- Will this subproject require the acquisition of private land (temporarily or permanently) for its development?
- Will restriction of access to natural resources (e.g. pasture, fishing locations and forests) occur for households and communities as a result of this subproject?
- Will this subproject result in the involuntary relocation of individuals, families, or businesses?
- Will this subproject result in the temporary or permanent loss of economic activities, like crops, fruit trees, businesses, household infrastructures (such as granaries, outside toilets and kitchens, etc.)?
- Will this subproject result in adverse impacts on individuals or entities encroaching on state lands?

With respect for screening for **physical cultural resources**, the initial screening form shall include the following:

- Will this subproject involve significant excavations, demolition, movement of earth, flooding or other environmental changes?
- Will this subproject be located in, or in the vicinity of a place with spiritual or cultural meaning, has historic value, or might contain historical artifacts?

Also with respect to screening for Conservation of Biodiversity and Protection of Natural Habitats, the initial screening form shall include checking the following:

- Any unnecessary excavation processes and off-road activities especially at fragile and sensitive habitats and utilize the existing roads instead of making new ones whenever applicable.
- Any accumulation of excavation piles during rainy season.
- Removal of green cover.

- Accumulation of excavated material through synchronizing excavation and filling processes.
- Accumulation of excavation materials and other solid wastes.
- Planting or seeding of crops and exotic species.
- After work completion, are all work areas should be smoothed and graded in a manner to confirm the natural appearance of the surrounding landscape.

Safeguards supervision will include quality assurance on subproject EMP monitoring and reporting, field visits to selected subprojects, as well as inclusion in a yearly fiduciary audit, which will include post-review of a subset of subproject EMPs with regards to design as well as implementation.

Responsibilities

The responsibility for the ESMP implementation at the programme level will be with the Project E&S specialist seconded by MOEnv to the PMU to oversee compliance with the ESMP for the various phases of the work. This responsibility includes overseeing: (a) implementing the mitigation measures and monitoring the performance of these measures, (b)implementing national environmental policy, (c) executing the monitoring programs and (d) controlling the operation of all environmental protection activities.

Permitting Requirements

The variety of proposed subprojects will require specific permits and regulatory approvals. The table below provides an indicative guide to the range of permits and approvals that may be required to implement the subproject and their respective component parts.

Summary of Responsibilities of Relevant Regulatory Authorities for oversight of risk screening implementation during the programme implementation

Authority	Responsibility
• Ministry of Environment	(ESMP report is required for cross checking adherence to monitoring and mitigation plans during programme implementation). •Permission prior to construction activities. •Inspection during operation and infrastructure decommissioning phases.
• Ministry of Labor	• Permission prior to operation (after occupational health and safety measures). • Inspection during operation.
• Ministry of Water and Irrigation Water Authority of Jordan (WAJ)	• Permission prior to construction. • Water and ww quality monitoring during subproject life.
• Ministry of Health	• Inspection during construction and operation phases.
• Department of Antiquities	• Permission in case of existence of Archaeological sites (ESIA report would be needed if antiquities are found).
• Civil Defense Directorate	• Approval for construction plans. • Permission prior to operation.
• Ministry of Public Works and Housing	• Approval for crossing highways and main roads • Approval prior to the operation of the rain water earthen dam facility and ww effluent reuse facility infrastructure works

TABLE 40: RISK EVALUATION OF ISSUES AND CONCERNS RESULTING FROM THE SCREENING AND IDENTIFIED DURING PUBLIC DISCLOSURE & CONSULTATION FOR THE OPERATIONAL PHASE OF THE WASTEWATER REUSE IN IRRIGATED AGRICULTURE USING DIRECT EFFLUENT FROM WADI MUSA WWTP; MIXED WATER QUALITY IN THE JORDAN VALLEY & RAINWATER HARVESTING COLLECTION EARTHEN STRUCTURES (SMALL DAMS).

Issue of Concern	Significance	Potential Impact	Environmental & Social Principles
Accidental & intentional Contamination of the natural resources	Negative–Medium	Yes	*Pollution Prevention*
TWW accidental discharge from the plant due to spills, overflows and seepages	Negative–Medium	Yes	*Resource Efficiency, Public Health*
High salinity of TWW may harm citrus trees & other types of plants	Negative–Medium	Yes	*Conservation of Biological Diversity*
The quality of TWW not meeting the standards.	Negative–Medium	Yes	*Compliance with the law*
Providing farmers with insufficient TWW quantities	Negative–Medium	YES	*Access and Equity*
Design Capacity of TWWP not being able to treat increased quantities of WW in emergency situations.	Negative–high	YES	*Pollution Prevention & Resource Efficiency*
Large influxes of refugees from Syria and Iraq increasing the demand for TWW & affecting the farmers water share	Negative–high	YES	Marginalized and Vulnerable Groups, Access and Equity
People rejecting the use of TWW for irrigation due to cultural beliefs	Negative-Medium	yes	*Social & Religious Beliefs of Indigenous People*
Lack of adequate monitoring / testing of TWW	Negative-Medium	Yes	*Compliance with the law*
Lack of adequate monitoring of crops irrigated with TWW	Negative-high	yes	*Conservation of Biological Diversity*
Groundwater Contamination	Negative-Medium	yes	*Pollution Prevention & Resource Efficiency*
Contamination from sludge reuse and disposal	Negative-Medium	yes	*Pollution Prevention & Resource Efficiency*
Soil contamination	Negative-Medium	Yes	*Land & Soil Conservation*
Noise from construction of earthen dams and on close residential areas.	Negative-Medium	Yes	*Occupational Safety and Health,*
Odor resulting from WWT plant activities	Negative-Medium	Yes	*Occupational Safety and Health,*
Rainwater harvesting activities on habitats that may receive less rainwater	Negative-medium	Yes	Natural Habitats and Biodiversity (flora and fauna)
Dust and gaseous emissions generated from construction of earthen dams and gaseous emissions from operation activities.	Negative-Medium	Yes	*Climate Change*

Issue of Concern	Significance	Potential Impact	Environmental & Social Principles
Noise from operation activities of WWTPS on workers.	Negative-medium	Yes	*Occupational Safety and Health, Core Labor rights*
Dust and gaseous emissions generated from operation activities on workers.	Negative-medium	Yes	*Occupational Safety and Health, Core Labor rights*
Finding Historical sites during excavation works " construction of earthen Dams"	Negative-high	YES	Physical & Cultural Heritage
Congestion of traffic situation in the area during earthen dams construction	Negative-low	Yes	Public Health
Compensation for land owners whose lands will be taken to build the dam	Negative-low	Yes	Involuntary Resettlement
Not giving the priority for employment from local community.	Negative-medium	Yes	Access & Equity

Roles and Responsibilities for ESMP implementation:

- NIE – lead capacity building for risk screening and identification.
- EE - Executing Entities and partners.
- Ministry of Environment – Participates in and develop competencies to give effect to risk screening and mitigation measures implementation.

Environmental and Social Assessment:

For the projects being proposed that have the potential to cause possible environmental or social harm (i.e. all Category B projects), the implementing entity has ensured that the below environmental and social assessment identifies any environmental or social risks, including any potential risks associated with the Fund's environmental and social principles set forth above. The assessment (i) considered all potential direct, indirect, transboundary, and cumulative impacts and risks that could result from the proposed project(s); (ii) assessed alternatives to the project(s) including the No-Go option; and (iii) assessed possible measures to avoid, minimize, or mitigate environmental and social risks of the proposed project(s). These environmental and social assessments have been completed before the project proposal submission to the Adaptation Fund.

For Category B project(s) ie the wastewater reuse activities in Wadi Mousa and in Jordan Valley, a timeline for completing the environmental and social assessment impacts mitigation has been incorporated in the ESIAs approval and agreement with the Ministry of Environment where the NIE -implementing entity - will follow up and report on compliance through the annual project performance reports. A copy of the environmental and social assessment approvals will be provided to the secretariat.

For these Category B Projects:

- Table (41) below is the Environmental and Social Risks & Management and Monitoring Plan (ESMMP) which is part of the ESMP for the case of direct treated wastewater effluent reuse as in the case of Wadi Mousa WWTP project (1.1) and the rainwater harvesting through the construction of earthen dams project (1.5).

- Table (42) is for the case of mixed water quality (TWW mixed ith fresh water supplies) such as in the case of Jordan Valley where the effluent from WWTPs is mixed with fresh water supplies downstream of king Talal Reservoir for the case of (Northern Jordan Valley (Irbid, Dougara and Shallalah), North Shouneh and Tal Mantah WWTPs)

Environmental and Social Management Plans including (the institutional, operational and financial arrangements for the environmental and social safeguarding activities).

Wadi Mousa WW Reuse Project (1.1) and the rainwater harvesting through the construction of earthen dams project (1.5).

TABLE 41: ENVIRONMENTAL AND SOCIAL (RISKS, IMPACTS, RATING) MITIGATION & MANAGEMENT AND MONITORING PLAN (ESMMP) FOR WADI MOUSA REUSE PROJECT AND THE RAINWATER HARVESTING THROUGH THE CONSTRUCTION OF EARTHEN DAMS PROJECT

Potential risk/impact and its rating	Mitigation Measures	Technical and Financial Responsibility	By when / frequency
Potential Risk/Adverse Impacts during WWT & Reuse Operation			
Contamination of Groundwater from accidental spills, overflows and seepages (medium potential)	Install groundwater monitoring wells Install seepage/leakage detection piezometers	Project team and contractor, in cooperation with WAJ	As early as possible (for wells) Piezometers /prior to operation
	Collect adequate groundwater quality baseline data	WAJ &MoE in cooperation with Project Team	As early as possible
	Carry out regular inspections and routine tests Monitoring water quality using the nearby monitoring wells	WWTP operator	Regularly during operations, frequency TBD during development of O&M manual by project team
Contamination from TWW discharges to the Wadi (medium potential)	Incorporate various built-in design mitigations Maximize on-site re-use	Project team	During Maintenance & operations
	Encourage sale of TWW to nearby farmers	Project team and WWTP operator	
	Ensure strict compliance with JS893/2006 wadi discharge standards	WWTP operator and monitoring agencies	Monitoring as per JS893/2002
Contamination from reuse of TWW in irrigation (medium potential)	Begin the water reuse activity only after the WWTP has been deemed to perform satisfactorily and preliminary test results show compliance with JS893/2006. Design and put in place appropriate irrigation (and Nitrates in groundwater) management systems and scheduling along with soil and TWW quality monitoring.	Project team	During Maintenance & operations
	Adjust irrigation scheduling, management as needed based on soil and TWW monitoring results and with changes in cropping patterns Monitoring soil salinity levels to determine leaching requirements.	WWTP operator, reuse contractor(s) in cooperation with MoA/NCARE	Annually
Contamination from sludge reuse and disposal (medium potential)	Treat sludge to first or second level in accordance with JS 1145/1996: (1) 1st level: dry wet sludge on sludge drying beds followed by storage in piles (2) 2nd level: treat sludge by composting (temperature of at least 55°C for 15 days) Carry out sampling and analysis in accordance with 1145/1996 Plan and obtain approval for reuse In case of sludge disposal, identify nearest suitable disposal	Project team and WWTP operator, monitoring by relevant authorities	Develop treatment / reuse/disposal plan during operation Continuously as required thereafter

	Soil Contamination (medium potential)	site/landfill Continue the soil monitoring program.	Water Authority of Jordan/ Water Reuse and Environment Unit	Over time, use of reclaimed wastewater for irrigation can lead to solid contamination in the farming area of the project.
	Odors (low potential)	Incorporate various built-in design mitigations Plant windbreaks around site perimeter (about 2km) to minimize wind/odors Install covers on anaerobic basins and denitrification reactors (as part of plant maintenance)	Project team	During maintenance activities
	Dust and noise pollution (low potential)	Ensure sound plant operation overall Provide protective masks for worker in the event of sudden odor surges providing safety gears and equipment such as hard hats, safety glasses, steel boots, and hearing protection. Schedule work tasks so that exposure durations for workers are within the acceptable limits.	WWTP operator, monitored by WAJ WWTP operator, monitored by Ministry of Labor /Occupational Safety & Health Institute	During operation
	During construction of the proposed dam, most of the existing vegetation within the construction site will probably be removed and uprooted (medium potential)	A biologist should conduct an initial ecological survey to locate any threatened or rare species A buffer zone should be declared to avoid imposing stress on those plants.	Project team & Ministry of Environment	Prior to construction activities of Earthen Dams
	Constructing Rainwater harvesting dams can be ecologically disruptive, causing water stress in the river downstream, and changing the biodiversity of the region (low to medium potential).	The rainwater to be harvested is collected from springs and streams from the mountains surrounding the valley after rainfall incidents. The captured water will be collected prior to it being evaporated or flowing to the Dead Sea which has extremely salty water. So no harm will be impacting ecological systems where the rainwater harvesting and impoundments will take place, plus an EIA has been conducted for the project by a specialized engineering firm and an environmental and social management and monitoring plan has been prepared and its summary of results is in Table 43 of the ESMP	Ministry of Agriculture and Ministry of Environment and the Royal Society for the Conservation of Nature	Continuous monitoring at all stages of the flora and Fauna
	Inequality of socio-economic impacts in ww effluent availability	Give priority to farmers nearest to the WWTP for purchase of TWW and supporting them to carry out safe reuse	Project team and WWTP&R operator monitored by JVA	During institutional agreements Followed up annually by WWTP operator

	(low potential)	Tanker charges should be openly discussed and revisited on a regular basis to ensure fair tanker charging systems	WWTP operator, Municipality/village councils and tanker drivers	Annually
	Health & safety issues (low potential)	Follow safe practices and standard operating procedures, including basic providing and requiring protective clothing Provide basic safety training to all workers and managers Fence off the entire WWTP site, and rainwater harvesting earthen dams; provide protective railings and appropriate signs were needed For ww reuse: Properly implement the water reuse activity according to Jordanian regulations on safe reuse and in accordance with JS893/2006 Provide regular medical checkups for all employees Use anti-coagulants to control black rats and house mice Provide on-site capability to treat affected individuals (first-aid, anti-venom, medical kits) Investigate nearest hospital/clinic for treatment of snake and scorpion bites	Project team and WWTP operator and ww reuse farmers	During operation and maintenance
		Ensure advance warning of all workers of upcoming maintenance works and ensure proper maintenance signage is put up.	WWTP operator	Prior to maintenance activities at the WWTP or rainwater harvesting site
		Provide tanker access from different directions, minimizing the need for all tankers to pass through any single residential area. Routes need to be designated and committed to appropriate use by the tanker drivers. Impose Speed restrictions	Project team, municipality, tanker drivers and traffic police	Prior to completion of construction Monitoring throughout operations
	Disease vectors (low potential)	Hire local workers to the extent possible and inspect worker health prior to plant and earthen dams operation. Apply approved biological insecticide (e.g., BT *Bacillus thuringiensis*) to control mosquitoes through ministry of health and municipality Apply molluscides to control snail intermediates (carriers of schistosomiasis) in ponds and lagoons. Coordinate with the MoH and municipality.	WWTP operator in cooperation with MoH and the Malaria and Schistosomiasis Dept. at Ministry of Health	Prior to WWTP operation Frequencies to be determined by relevant authorities for disease control
	Large influxes of refugees from Syria and Iraq increasing the demand for TWW & affecting the farmers water share (low potential).Furthermore, major risks to the Syrian refugees are:	Macro level solutions for the national governance of water resources and institutional design of integral decision making in the refugee planning field. The refugees are not land owners but labor force they contribute to the TWW and would benefit from the resilience plan resulting from the adaptation measure to CC proposed under the programme.	Responsible aid and humanitarian agencies, the Prime ministry, , MOPIC, MWI/WAJ & MoE, and MOA	Quarterly reports are issued by the sectoral committees under the NRP

	-Limited access to natural resources such as grazing and foraging of range shrubs and forest trees. -The project might attract people to come and work in the area which ultimately will result in increasing cost of living (mainly rental costs), thereby affecting Syrian refugees' standard of living -Some Syrian refugees, who get their income from illegal practices, such as collecting wild plants and cultivated government's land will be affected	A cross-sectoral and integrated approach for resource use and refugee planning would be needed to comprehensively address the water shortage issues. Policies should prioritize water demand management and water conservation practices. Stakeholder cooperation is needed to implement a majority of these policies. It is important for all aid agencies working on infrastructure to mandate environmental impact assessments during the pre-planning phase for refugees. Jordan has a National Resilience Plan to address all aspects of refugees impact on the national natural and institutional as well as infrastructure resources noting that Syrian refugees live in designated refugee camps and are provided with living means by UNHCR and UNICEF others living in host communities are considered as part of the labour force if they hold work permits and are subject to the 15 AF principles that are in line with the national laws and regulations. Also Jordan has a National Resilience Plan that addresses refugee issues and impacts on the natural and infrastructure and how to mitigate any negative impacts and ways to support the refugees in host communities..		
	Compensation for land owners who's lands will be taken to build the small earthen dams (low potential)	It is recommended to inform locals of the proposed project before construction works starts. In case resettlement is found to be necessary, nomadic families must be assisted to find another area with accessibility to water and grazing lands. Lands where the earthen dams will be built on are owned by the WUAs themselves so there will be minimum disputes and acquisitons	Project team	Prior to construction
	Finding Historical sites during excavation works " of construction earthen Dams" (low potential)	directly report any findings of archaeological nature during construction activities to the DOA " Department of Antiquities"	DOA & Moenv	Prior to construction or any time thereafter
	Traffic: the number of vehicles is expected to increase during Operation & construction activities	Scheduling trips to proposed work site to avoid any major disruptions in traffic flow resulting from the movement of large vehicles and transporting construction material. · Construction materials/wastewater should be securely packed/stored on trucks to prevent them from falling off/ spillage and causing harm.	MOT	During construction and operation

	(medium potential)	· The contractor should prepare and abide by a traffic management plan. · Transportation of workers should be done in vehicles equipped with seats and Barriers for their safety. It is not permitted to transport individuals in dump trucks.		
	Volumetric flow imbalance and sub-optimal operating capacity (low potential)	Incorporate various built-in design mitigations Develop emergency response procedures	Project team	During operation
		Public awareness raising to help regulate pumping (provide more balanced discharges)	WWTP operator and/or other local civil society	Continuously during operations
		Carry out routine maintenance and ensure immediate access to spare parts	WWTP operator, monitored by WAJ	Regularly during operations, frequencies TBD during development of O&M manual by project team
		Implement emergency response and contingency plans	WWTP operator	During operation
	Flooding (low potential)	Incorporate various built-in design mitigations Develop emergency response procedures	Project team	During detailed design (Earthen Dams) Revisited and refined if needed after initial operation
		Carry out routine inspection Implement emergency response and contingency plans	WWTP operator	Inspections after every summer
	Total power failure (low potential)	Investigate emergency power needs and incorporate into design as needed Develop emergency response procedures	Project team	During detailed design Revisited and refined if needed after initial operation
	Potential Positive Impacts			
	Conserving Limited Natural Water Resources (High +ve potential)	-	The need for support from the related governmental agencies such as the MWI, MoA and MoEnv.	During operation
	Desertification Control and Reduction of Soil Erosion (High +ve potential)	-	The need for support from the related governmental agencies such as the MWI, MoA and MoEnv.	During operation
	Job Opportunities and Income Generation (High +ve potential)	Give priority for hiring labor from the local community	MOPIC, PTDRA	During operation

For the proposed **Jordan Valley treated waste water reuse projects** where the wastewater effluent is mixed with fresh surface water supplies for irrigation purposes, ESIAs were conducted for each WWTP which had a scheme for a wastewater reuse pilot.

For the Northern Jordan Valley, and prior to allowing mixing wastewater effluent with fresh water for reuse in irrigation, the Water Authority of Ministry of Water and Irrigation prepared a ESIA study funded by the KFW for the reuse of treated wastewater in irrigated agriculture in the northern part of Jordan Valley in October 2004 and executed by GIETECH Germany, AHT International –Germany and Consulting Engineering Centre in Jordan where the JV agronomy, soil, crop demands, irrigation systems and drainage systems, environmental and social risks and impacts were assessed and alternatives developed with view to sludge management and an Environmental Monitoring and Management Plan (EMMP) for the EIA was conducted. The study was later updated by the same group in 2010 to meet new design, discharged effluent quality, reuse plan according to JS 893/2006 and to be in harmony with the new investments in enhanced WWTPs for supplying treated effluent for reuse.

The USAID funded a Build Operate and Transfer (BOT) project worth $ 175 million to upgrade the As Samara WWTP feeding the King Talal Reservoir (KTR) which enhanced the quality of the wastewater feeding the JV after being mixed with fresh river water and springs feeding King Abdullah Canal

An overview showing the public health, environmental and social risks and other potential risks and their rating-impacts/assessment, monitoring and management plan for the reuse of treated wastewater for Irrigated areas downstream of King Talal Reservoir (KTR), developed by JVA on Nov 2011 and supported by GIZ) in JV is provided in the Matrix below.

Table (42) below is the Environmental and Social Risks and Management and Monitoring Plan ESMMP for the JV treated WW Reuse Projects carried out for the associated mixed ww reuse irrigation activities. The EMMP identifies risks, mitigation measures, responsibility and the frequency of the actions required under the monitoring frequency and mitigation measures.

TABLE 42: ENVIRONMENTAL AND SOCIAL RISKS AND MANAGEMENT AND MONITORING PLAN ESMMP FOR THE JV TREATED WW REUSE PROJECTS CARRIED OUT FOR THE ASSOCIATED MIXED WW REUSE IRRIGATION ACTIVITIES

Risk Assessment and Management Downstream in Jordan Valley														
Affected Target	Risk identification and characterization						Basis	Existing Control Measures	Reassessment of risk post-control	Reference	Existing Monitoring Programmes		Risk Management Plan	
	Hazard Source	Hazard Type	Frequency	Consequence	Score	Risk Rating					Programme	Actor	Programme	Responsible Entity/Actor
Before farm														
Water in the Wadi (valley) and in the Canal	People:							Fences in some locations along the Canal, partially enforced regulations	The risk still exists because of the partial existence of the fence along the Canal, also there is no protection zone along the Wadi wherever there is a groundwater well used for drinking purposes. Still there is no real enforcement of the safety regulations by the responsible institution		Irrigation water monitoring programme (Telal Al-Thahab, Abu-Zeighan Outlet, Mu'adi and Thahret Al-Ramel)	JVA		
	Throwing waste, diapers and dead animal bodies into the Wadi and the Canal	Biological	3	3	9	Medium	Potential Increase of pathogens grown in the Canal and the Wadi						Locate fences where appropriate along the Canal. Put warning signs that prohibit throwing waste	JVA, MoEnv
	Swimming and washing in the Wadi and the Canal	Biological	3	3	9	Medium	Deterioration of water quality						Put signs prohibit the swimming and the use of this water for domestic purposes. Strengthen the role of the Env. Police and intensify their deployment	JVA, Env. Police

	Illegal dumping of sewage	Biological	2	4	8	Medium	Deterioration of water quality						Enforcement of enacted regulations that govern the use of this water as well as a punishments for violators. strengthen the role of Env. Police and intensify their deployment	MoH, MoI, MoM, MoEnv, Env. Police
	Disposal of picnic waste (plastic, bones, food leftover)	Biological	2	3	6	Medium	Deterioration of water quality						Conduct intensive awareness programmes for public on the pros and cons of using this water	MoEnv, JVA, Env. Police
	Pesticides leftover cans waste (e.g. Cans of car lubricants) - farmers install pumps next to the Wadi and the Canal (risk of oil and petrol spillage)	Chemical	3	3	9	Medium	Potential introduction of toxic chemicals in the Canal and the Wadi				Environmental inspection, enforcing environmental laws, and recording violations	Env. Police	Intensify the extension services programmes on the proper way of disposing the solid waste at farm level	MoA, NCARE
	Grazing nearby the Wadi and the Canal (Animals droppings)	Biological	3	3	9	Medium	Increase the pathogens grown in the Canal and the Wadi						Put warning signs that prohibit grazing animals nearby the Canal	JVA, MoEnv
	Mining	Chemical & Physical	2	4	8	Medium	Potential introduction of toxic chemicals in the Canal and the Wadi	Partially enforcement of regulations	Medium				Enforcement of existing regulations and punishments as well as conducting intensive supervision programs	NRA, MoEnv, Env. Police
	Sediments and algae	Physical & Biological	4	3	12	High	Deterioration of water quality	Screening system upstream at Telal Al-Thahab	Medium				Rehabilitation of the screening system to lower the risk as much as possible	JVA
Nearby Communities														

People, picnickers	RW:							Fences in some locations, partially enforced regulations, Signs, weakness of awareness	The risk still exists because of the partial existence of the fence along the Canal, also there is no protection zone along the Wadi. Still there is no real enforcement of the safety regulations by the responsible institution		Environmental inspection, enforcing environmental laws, and recording violations	Env. Police	Locate fences where appropriate along the Canal. Put signs prohibit the swimming in the Canal. Conduct awareness programmes for public. Strengthen the role of the Env. Police and intensify their deployment	JVA, MoEnv, Env. Police
	Swimming in the Canal or in the Wadi, ignorance to source of water	Biological	3	3	9	Medium	Possibility of drowning and potential illness from pathogens in the Canal							
	Use of RW for households purposes	Biological	2	3	6	Medium	Potential illness from pathogens in the RW							
Ditch Riders and JVA staff	RW-born pathogens:												Raise the awareness of JVA Staff on the proper hygienic practices during their daily work. Provide ditch riders with safety clothes	JVA
	Direct contact with RW during maintenance	Biological	3	3	9	Medium	Potential illness from pathogens in the RW							
On farm Level														
Farmers/ Workers	Irrigation with RW:	weak awareness, accessible health centers, insufficient extension services							Risk still exists because of the insufficient extension services and the weak awareness				Conduct intensive awareness programmes on the personal hygiene issues	MoA, NCARE, Farmers
	Direct contact with RW through maintenance of irrigation system	Biological & chemical	4	3	12	High	Potential illness from pathogens in the RW							
	Washing & bathing	Biological & chemical	3	3	9	Medium	Potential illness from pathogens in the RW							
Collection Ponds	Farm workers:	weak awareness, insufficient extension services							The risk still exists high because of the weak awareness				Conduct intensive awareness programmes on the personal hygiene issues	MoA, NCARE, Farmers

	Behavioral patterns: swimming, washing	Biological	3	3	9	Medium	Deterioration of water quality							
	Manure:	Ban on the use of fresh manure							Low	Jordan Ministry of Environment	Programme for promoting the use of compost in cultivation	MoEnv	Intensify the implementation of this programme and set a punishment system govern the use of fresh manure	MoEnv, MoA, NCARE, Farmers
	Soaking fresh manure in ponds	Biological	3	4	12	High	Deterioration of water quality (increase of pathogens)							
	Animals droppings	weak awareness, no fences							The risk is still Medium because of the weak awareness and no fences				Conduct intensive awareness programmes on the importance of putting fences around the ponds	MoA, NCARE, Farmers
	Accessibility to pond by cattle and animals	Biological	2	4	8	Medium	Deterioration of water quality (increase of pathogens)							
Fish raising/ Consumers	Heavy metals	Chemical	2	4	8	Medium	Mortality of fish. Potential illness of people who consume contaminated fish		Medium				Prohibit the use of TWW for fish raising. Formulate an official standard for fish raising. Establish monitoring programmes for fish raising farms	MoA
	Pesticides	Chemical	2	4	8	Medium								
	NO3	Chemical	2	4	8	Medium								
	Pathogens in RW	Biological	2	4	8	Medium								
Risk Assessment and Management Downstream KTR														
On farm Level														
Drip irrigation system	RW:													
	Precipitation of TDS, Ca, P, HCO3 and others	Chemical	5	3	15	High	Clogging	Acid injection	by regular maintenance, the risk of clogging is low				Intensify extension services programmes for farmers that address clogging problems	NCARE, MoA, Farmers
	RW							filtration systems, maintenance at farm level, and the existence of the screening system upstream at Telal Al-thahab	Medium				Rehabilitation of the screening system to lower the risk as much as possible. Use of filtration system	JVA, Farmers

	TSS, Sediments and algae	Physical	5	3	15	High	Clogging							
Soil	RW:							weak implementation of GAP	the risk of increasing soil salinity still exists because of the insufficient extension services		Non-obligatory Soil Monitoring Programme	JVA	Strengthening the existing extension activities to address soil quality deterioration	NCARE, MoA, Farmers
	High salts in irrigation water, inadequate leaching, bad drainage	Chemical	4	4	16	Very High	Increase soil salinity, deterioration of chemical and physical soil properties							
	Heavy metals in irrigation water	Chemical	2	2	4	Low	Accumulation of heavy metals on soil				Researches on soil salinity	NCARE		
Ground-water wells used for drinking	RW:							ground water protection zones	Low				Ground water protection zones must cover all the ground water wells used for drinking purposes in order to keep the risk as low as possible. Conduct routine monitoring programme for GW. Conduct awareness programme for public	WAJ, MoEnv, MoH, MoI
	Heavy metals	Chemical	2	3	6	Medium	Potential percolation of heavy metals							
	Pathogens in RW	biological	3	4	12	High	Potential percolation of pathogens							
	NO3	Chemical	3	4	12	High	Potential percolation of NO3							
Animals	Drinking of RW	Biological & Chemical	3	2	6	Medium	Potential of animals' mortality		Medium				Use fresh water for watering the animals whenever its possible	MoA

	grazing on contaminated surface irrigated fresh crops	Biological	3	2	6	Medium	Potential of animals' mortality	weak awareness	Medium				Put warning signs prohibit grazing animals on surface irrigated crops. Strengthening the role of Env. Police	MoEnv., MoA, NCARE
Crops at farm level														
High crops	Irrigation with RW	Biological	2	3	6	Medium	Fruits contaminated by pathogens	Drip irrigation, mulch	Low	WHO Guidelines 2006: **4** Pathogen log reduction	Fresh Vegetables Monitoring Programme (low, leaf, root crops). Places (JV and AWSM)	JFDA	Intensify extension services programmes for farmers to ensure proper implementation of control measures (drip irrigation and mulch) and discourage the use of surface irrigation	MoA, NCARE, Farmers
Low crops	Irrigation with RW	Biological	4	3	12	High	Fruits contaminated by pathogens	Drip irrigation, mulch	Low	WHO Guidelines 2006: **2** Pathogen log reduction				
Leaf crops	Pathogens in irrigation water	Biological	4	3	12	High	Fruits contaminated by pathogens	Drip irrigation	Low	WHO Guidelines 2006: **2** Pathogen log reduction				
	Heavy metals in irrigation water	Chemical	1	3	3	Low	Accumulation of heavy metals in leaves		Low					
	NO3 in irrigation water	Chemical	1	3	3	Low	Accumulation of NO3 in leaves		Low					
Root crops	Irrigation with RW	Biological	4	3	12	High	Fruits contaminated by pathogens	Drip irrigation,	Medium	WHO Guidelines 2006: **2** Pathogen log reduction				

Root crops & Leaf crops	Spreading manure on surface (farmers behavior)	Biological	4	4	16	Very High	Re-contamination source of pathogens on crops	Ban of using the fresh manure in cultivation	Low	Jordan Ministry of Environment	Programme for promoting the use of compost	MoEnv	Intensify the implementation of this programme and set a standard that govern the use of fresh manure	MoEnv
Harvesting, Handling and Marketing														
Different types of crops	Farm laborers and vendors													
	Lack of hygiene conscious	Biological	4	3	12	High	Re-contamination source of pathogens	small percentage of farmers have an access to hygienic facilities	Risk is still high to very high due to the weak awareness				Conduct intensive awareness programmes on the personal hygiene and on the product safety	MoA, NCARE
	Washing and moistening harvested crops with reclaimed water	Biological	4	4	16	Very High	Re-contamination source of pathogens	small percentage of farmers use fresh water (wells and springs, wadis) to moisten the harvested crops						
Consumers														
Cooked Crops/ Consumers	RW, Farm laborers and vendors													
	Contaminated crops	Biological	4	3	12	High	Accumulation of Pathogens on crops. Potential illness for consumers from contaminated crops	Cooking	Risk is mitigated	WHO Guidelines 2006: **5-6** Pathogen log reduction				
Fresh eaten														
Vegetables/ Consumers	RW, Farm laborers and vendors,						Washing , peeling	Low		WHO Guidelines 2006: **1-3** Pathogen log reduction			Conduct continuous awareness programmes on the good hygiene practices in dealing with fresh eaten crops at household level	JFDA

	Contaminated crops	Biological	4	3	12	High	Accumulation of Pathogens on crops. Potential illness for consumers from contaminated crops							
Leaf crops/ Consumers	RW, Farm laborers and vendors,						Washing with mild disinfectant	Low		Guidelines 2006: **2** Pathogen log				
	Contaminated crops	Biological	4	4	16	Very High	Accumulation of Pathogens on crops. Potential illness for consumers from contaminated crops		WHO Guidelines 2006: **1-3** Pathogen log reduction					
Root crops/ Consumers	RW, Manure, Farm laborers and vendors						Washing , peeling	Low						
	Contaminated crops	Biological	4	4	16	Very High	Accumulation of Pathogens on crops. Potential illness for consumers from contaminated crops							

TABLE 43: ENVIRONMENTAL AND SOCIAL RISKS AND MANAGEMENT AND MONITORING PLAN (ESMMP) FOR THE JVA EARTHEN DAM CONSTRUCTION

Characteristics of Anticipated Risks and their Impacts

Issue	Risk	Significance	Nature	Magnitude	Reversibility	Likelihood without Mitigation	Likelihood with Mitigation	Duration	Extent/ location
Water Supply and Demand	Construction activities may pose some stress on municipal water Sources	Moderate	Negative	Moderate	Reversible	Likely	Not likely	Temporary	Within Southern Ghor District
Employment and Development	Increasing employment opportunities.	High	Positive	High	--------	Not likely	Very likely	Temporary	Within Karak Governorate
Land Use and Land Acquisition	Limited acquisition and resettlement.	Moderate	Negative	Moderate	Irreversible	Unlikely	Unlikely	Long-term	Within the dam vicinity
Archeological Resources	Stop some grazing activities in the wadi vicinity.	Low	Negative	Low	Irreversible	Likely	Unlikely	Long-term	Within the dam vicinity
	Possibility of damaging archaeological sites.	High	Negative	High	Irreversible	Likely	Unlikely	Temporary	Within the construction site
Traffic	Increase in the number of vehicles traveling to and from the construction site.	Moderate	Negative	Moderate	Reversible	Likely	Unlikely	Temporary	Roads leading to Ghour Al-Mazra'a from Amman and from Karak
Occupational Safety and Health	Possible injuries related to handling heavy machineries.	High	Negative	High	Irreversible	Very likely	Unlikely	Temporary	Within the Construction site
	Spread of infectious diseases caused by hiring foreign workers without assuring their health clearance.	High	Negative	High	Reversible	Very likely	Unlikely	Long-term	Within Southern Ghor area
Sanitation	Lack of sanitary facilities onsite will cause health hazards	Moderate	Negative	Moderate	Reversible	Very likely	Unlikely	Temporary	Within the Construction site
Air Quality	Increased levels of dust.	Low	Negative	Low	Reversible	Very likely	Likely	Temporary	Within the Construction site
Noise	Increased noise levels	Low	Negative	Low	Reversible	Very likely	Likely	Temporary	Within the construction site
Groundwater	Seepage of hazardous material	High	Negative	High	Irreversible	Likely	Unlikely	Temporary	Dead Sea Basin
Surface Water	Debris will be carried with base flow downstream.	Moderate	Negative	Moderate	Reversible	Likely	Unlikely	Temporary	Dead Sea
Soils	Loss of soil structure. Reduced soil stability	Moderate	Negative	Moderate	Irreversible	Likely	Unlikely	Temporary	Within the construction site
	Contamination of soil with machinery oil.	Moderate	Negative	Moderate	Irreversible	Likely	Unlikely	Temporary	Within the construction site
Wildlife and Vegetation	Existing vegetation will be uprooted. Destruction of wildlife habitats.	Moderate	Negative	Moderate	Irreversible	Very likely	Likely	Temporary	Within the construction site

Water Supply and Demand	Help meet the increasing irrigation demands	High	Positive	Moderate	--------	Likely	Very Likely	Long-term	Within Southern Ghor area
	More water will be available for other area	High	Positive	Moderate	--------	Likely	Very Likely	Long-term	Ghor
Land Use	Encourage touristic investments in the lands overlooking the dam lake. Increase of land prices. Increase of residential areas.	High	Positive	High	--------	Likely	Likely	Long-term	Ghor
Traffic	Increase in the number of promenaders will increase traffic on the street leading to the reservoir lake.	Moderate	Negative	Moderate	Reversible	Likely	Unlikely	Long-term	Within Southern Ghor area
Vector Breeding	Attract aquatic insects such as mosquitoes, which are known vectors of malaria	High	Negative	High	Reversible	Likely	Unlikely	Long-term	Within Southern Ghor area
Public Safety and Health	Drowning in the dam lake	High	Negative	High	Irreversible	Likely	Unlikely	Long-term	Within the dam vicinity
	Water contamination caused by dumping of pollutants	High	Negative	High	Irreversible	Likely	Unlikely	Long-term	National level
	Earthen Dam structure stability and safety concerns	High	Negative	High	Irreversible	Likely	Unlikely	Long-term	Within Southern Ghor area
Air Quality	Carbon dioxide and methane emissions generated from the dam.	Low	Negative	Low	Irreversible	Likely	Likely	Long-term	World Climate
Climate	Dampen the daily temperature differences and add humidification	Low	Positive	Low	--------	Likely	Likely	Long-term	Within the dam icinity
Groundwater	High infiltration in the right abutment.	Moderate	Positive	Low	--------	Likely	Likely	Long-term	Dead Sea Basin
Surface Water	Eutrophication can reduce water quality.	Moderate	Negative	Moderate	Reversible	Likely	Unlikely	Long-term	Dead Sea Basin
Soil and Sedimentation	Sedimentation accumulation will decrease the life time of the dam	Moderate	Negative	Moderate	Irreversible	Likely	Likely	Long-term	Within the dam vicinity
Wildlife and Vegetation	Attract birds and other animals near the reservoir lake	Moderate	Positive	Moderate	- Reversible -------	Likely	Likely	Long-term	Within the dam vicinity
	Rise of water table on reservoir banks will enhance the vegetation cover in the area surrounding the dam lake.	Moderate	Positive	Moderate	Reversible	Likely	Likely	Long-term	Within the dam vicinity

Before constructing an earthen small dam, the environmental and social impacts must be evaluaed. Small earthen dams do not have a major impact, except if many small dams are constructed in the same catchment, in which ease their combined effect could be significant. The impact can be either negative and positive. If the negative impacts exceed the positive impacts, the dam should not be constructed. The list below can be used as a checklist.

Positive impacts of earthen dams and ponds	**Negative impacts of earthen dams and ponds**
1. Irrigating fields and tree nurseries for generating income and re-planting forests. 2. Watering livestock near villages saves time and reduces erosion caused by catle. 3. Providing domestic water from a hand-dug well generateds income and can lead to health improvements. 4. Raising ducks, geese and fish farming for food and income. 5. Making bricks and construction works for income generation. 6. Reducing water-borne diseases by providing improved waer supply for domestic use. 7. Saving peoples time by reduced walking distances to fetch water. 8. Reduced impact of floods by storing initial floodwaters thus lessening erosion. 9. Raising the water table downstream of ponds and dams which benefit well levels for hand-dug wells and trees. 10. Increasing the value of land near an earch dam because of all the above benefits. 11. Reducing poverty levels through the income generating activities.	1. Loss of some land taken up by the dam reservior and its spillway(s). 2. Risk of increased cases of malaria (this can be reduced by fish such as *Tilapia Nilotica*). 3. Risk of increased cases of bilharzia, cholera, dysentery and typhoid (this can be reduced if the reservoir is fenced and the water is drawn from hand-dug wells or draw-off pipes situated downstream of dam walls, if drinking water is boiled and if people do not bath in, and wash clothes in the resevoirs). 4. Increased soil erosion along roads due to people and animals coming for water at the earthen dam. 5. Risk of earthen dam wall collapse if poorly designed or constructed incorrectly, thereby releasing a violent flash-food damaging everything in its path. 6. Siltation of earthen dam reservoirs will shorten the lifetime of dams unless proper soil conservation is implemented in the catchment areas. 7. Risk of people and animals drowning if they try to bathe in or swim across a dam reservoir. 8. Impact on downstream users who may be deprived of water or subject to pllution.

Considerations before building small earthen dams

Before constructing a small earthen dam, or any type of communal water source, it is vital to confirm that the project find itviable. To determine thi,s it is helpful to ask a few key questions at the outset, such as:

- Will the water be clean enough, and if not, can the quality be improved?
- How much water is needed?
- How much water will the new source provide?
- What will the project cost and is this affordable?

Water quality and health

- The rainwater runoff which fills small water reservoirs usually flows over the ground that is sometimes contaminated. Catchment areas are sometimes covered with animal droppings, human excreta and other debris that can pollute the water.
- While this water is suitable for watering livestock, or for small scale irrigation, and construction work, it is not safe for drinking. If the purpose of a small dam is to get clean water for domestic purposes, then the waer shoould be drawn from a hand-dug well sunk in a seepage line downstream of the dam wall.
- Drinking untreated water from open water sources is not recommended, unless it has first been boiled, or sterilized by the sun's ultraviolet rays in a transparent bottle for 6 hours of sunshine. This technique is calld SODIS (=SOlar DISinfection of water).
- Drinking water that has not been treated by either boiling or SODIS may lead to waterborne diseases such as dysentery, diarrhoea or typhoid. If waterborne diseases, such as Schistosomiasis (Bilharzia) carried by water snails is present in the area, people should be discouraged from entering the water.

Also with respect to **Conservation of Biodiversity and Protection of Natural Habitats**, ensure the following:

- Avoiding any unnecessary excavation processes and off-road activities especially at fragile and sensitive habitats and utilize the existing roads instead of making new ones whenever applicable.
- Avoiding any accumulation of excavation piles during rainy season.
- Removal of green cover.
- Avoiding accumulation of excavated material through synchronizing excavation and filling processes.
- Avoiding accumulation of excavation materials and other solid wastes.
- Planting or seeding of crops and exotic species.
- After work completion, all work areas should be smoothed and graded in a manner to confirm the natural appearance of the surrounding landscape.

Earthen Dam(s) - Environmental Management Plan

TABLE 44-A: PROPOSED RISK MITIGATION MEASURES DURING CONSTRUCTION AND THEIR RELATED COMPLIANCE WITH AF ESP PRINCIPLES

	AF Principle	Environmental Issue	Possible Risk	Proposed Mitigation Measures	Responsibilities	
					Implementing	Monitoring
1	Pollution Prevention and Resource Efficiency	Water Supply and Demand	Construction activities may pose some stress on municipal water sources	Contractor should efficiently handle water sources and rationalize water use	Contractor	Supervision Consultant (JVA)
2	Core Labour Rights	Employment and Development	Increasing employment opportunities	Giving priority to local workers	Contractor	Supervision Consultant (JVA)
3	Involuntary Resettlement.	Land Acquisition	Limited acquisition and resettlement	If land acquisition is inevitable, proper compensation must be done.	JVA	Ghor Mazra'a Stop some grazing activities in the wadi Municipality
			Stop some grazing activities in the wadi Municipality vicinity.	assist affected locals in finding another area with accessibility to water and grazing lands		
4	Physical and Cultural Heritage	Archeological Resources	Possibility of damaging archaeological sites	If any suspected archaeological findings were discovered during construction, DOA is to be informed immediately	Contractor	Supervision Consultant (JVA) / DOA
5	Public Health.	Traffic	Increase in the number of vehicles traveling to and from the construction site	Scheduling trips to the dam site. Securely pack construction materials. Prepare and abide by traffic management plan. Transportation of workers should be in vehicles equipped with proper seats not dump trucks.	Contractor	Supervision Consultant (JVA)
6	Public Health.	Occupational Safety and Health	Possible injuries related to handling heavy machineries.	Provide onsite medical services to workers. Prepare and train all staff on a health and safety plan. Provide workers with protection equipment. Hold regular safety staff meetings and trainings.	Contractor	Supervision Consultant (JVA)
	Public Health.		Spread of infectious diseases caused by hiring foreign workers.	Assure health clearance for all workers in the project.		
7	Public Health.	Sanitation	Lack of sanitary facilities onsite will cause health hazards	Provision of on-site sanitary facilities for construction workers in accordance with second chapter of the Code of Safety during Construction	Contractor	Supervision Consultant (JVA)
8	Public Health.	Air Quality	Increased levels of dust.	Apply dust abatement measures, such as: Covering material when transporting. Moistening the excavation area and material to be transported	Contractor	Supervision Consultant (JVA)

9	Public Health.	Noise	Increased noise levels.	Abide by Jordanian instructions for noise levels and timing.	Contractor	Supervision Consultant (JVA)
10	Pollution Prevention and Resource Efficiency	Groundwater	Seepage of hazardous material.	Regular monitoring.	Contractor	Supervision Consultant (JVA)
11	Pollution Prevention and Resource Efficiency	11 Surface Water	Debris will be carried with base flow downstream	Proper and regular disposal of generated solid waste should be undertaken.	Contractor	Supervision Consultant (JVA)
12	Lands and Soil Conservation.	Soil	Contamination of soil with machinery oil.	Removal of contaminated surface soil after construction. Prepare and abide by a Spill Prevention & Management Plan.	Contractor	Supervision Consultant (JVA)
13	Conservation of Biological Diversity, and Protection of Natural Habitats	Wildlife and Vegetation	Destruction of wildlife habitats. Birds avoid potential breeding biotopes and thus their reproduction is prevented. Success of breeding is decreased by permanent disturbances during breeding time. Nests are destroyed.	Fencing to reduce accidents related to animal exposure to construction hazards. Contractor should avoid working during sensitive periods as the breeding season or when migratory birds or wild animals are present near the work site.	Contractor	Supervision Consultant (JVA)

Proposed Risk Mitigation Measures during Operation

		Environmental Issue	Possible Impact	Proposed Mitigation Measures	Responsibilities	
					Implementing	Monitoring
1	Pollution Prevention and Resource Efficiency	Water Demand	Double the production of wells and increase available water.	Proper allocation of water should be done	Operator	JVA
2	Lands and Soil Conservation	Land Use	Encourage touristic investments in the lands overlooking the dam lake. Increase of land prices. Increase of residential areas.	Consider the preliminary land use chart prepared by JVA.	Investors	JVA
3	Public Health	Traffic	Increase in the number of promenaders will pose some pressure on the meandering one lane street leading to the reservoir lake.	Future rehabilitation of the road leading to the reservoir is recommended	Ghor Mazra'a Municipality	Operator / JVA

4	Public Health	Vector Breeding	Attract aquatic insects such as mosquitoes, which are known vectors of malaria.	Regular application of pesticides is recommended	Ghor Mazra'a Municipality / Operator	JVA
5	Public Health	Public Safety and Health	Drowning in the dam lake.	Fencing to avoid trespassing into the dam lake	Operator	JVA
			Water contamination caused by dumping of pollutants.			
			Dam structure stability and safety concerns	Maintain a good monitoring system to ensure safety of the infrastructure and avoid failure. Acquire and dedicate land around the reservoir to avoid any damages of properties and lives		
6	Public Health	Air Quality	Carbon dioxide and methane emissions generated from the dam.	Clear of any biomass from the foundation during construction.	Contractor	Supervision Consultant (JVA)
7	Pollution Prevention and Resource Efficiency and CC	Groundwater	The high infiltration in the right abutment.	Water quality should be regularly monitored at both the inlet and dam lake	Operator	JVA
8	Pollution Prevention and Resource Efficiency and CC	Surface Water	Eutrophication can reduce water quality.	Algal growth control. Harvesting of overgrown algae by algae collection boats.	Operator	Ministry of Health / JVA
9	Pollution Prevention and Resource Efficiency	Soil and Sedimentation	Sedimentation accumulation will decrease the life time of the dam.	Manage and remove sedimentation by flushing out of the dam.	Operator	JVA
10	Conservation of Biological Diversity and Protection of Natural Habitats	Wildlife and Vegetation	Attract birds and other animals near the reservoir lake.	Fencing can reduce chances of animals drowning in the dam lake Enforce hunting guideline.	Operator	JVA / RSCN

Source: MOPIC- JVA EIA Study for Earthen Dam Construction in the Southern JV conducted by the environmental consulting firm ENGICON.

N.B: The table merges two tables that were detailed in the EIA study: the environmental management plan and the assessment of overall impacts. The environmental management plan table looked at impacts during construction and operation along with their mitigation and the responsible entities. Whereas the assessment of overall impacts table summarized the basis for impact assessment through categorizing the impacts according to their significance, reversibility, likelihood, duration and extent; the ecological importance of Jordan Rift Valley and the diversity of its ecosystems called for launching The Integrated Ecosystem Management for the Jordan Rift Valley Project (IEM- JO) in 2007. It introduces biodiversity conservation and community participation measures into the existing land use.

TABLE 44-B : OVERALL FRAMEWORK FOR ADDRESSING RISKS, AND THEIR LINK TO THE 15 ESP PRINCIPLES OUTLINING RESPONSIBILITIES FOR MONITORING & IMPLEMENTATION FOR THE WHOLE PROGRAMME.

Sub Project	Potential Risks	Link to the 15 ESP Principles	Responsibilities for monitoring & implementation of mitigation measures*
Wastewater reuse	Contamination of Groundwater from accidental spills, overflows and seepages (such as in the case of ww reuse activities, and dairy plant operation, and on farm agriculture operation)	Pollution Prevention and Resource Efficiency	WAJ &MoE in cooperation with Project Team
Wastewater reuse	Contamination from TWW discharges to the Wadi	Compliance with the Law & Protection of Natural Habitats & Pollution Prevention	WAJ, JVA, MoE & WWTP operator
Wastewater reuse	Contamination from reuse of TWW in irrigation		WWTP operator, reuse contractor(s) in cooperation with MoA/NCARE
Wastewater reuse	Contamination from sludge reuse and disposal		Project team and WWTP operator, monitoring by relevant authorities
Wastewater reuse, permaculture	Soil Contamination(such as in the case of ww reuse activities, and dairy plant operation, and on farm agriculture operation		Water Authority of Jordan/ Water Reuse and Environment Unit
Wastewater reuse	Throwing waste, diapers and dead animal bodies into the Wadi and the Canal	Pollution Prevention and Resource Efficiency	Jordan Valley Authority & Ministry of Environment.
Wastewater reuse	Swimming and washing in the Wadi and the Canal		Jordan Valley Authority & Environmental Police
Wastewater reuse	Illegal dumping of sewage		Ministry of Health & Environmental Police
Wastewater reuse	Disposal of picnic waste (plastics, bones, food leftovers etc.)		Jordan Valley Authority, Ministry of Environment & Environmental Police
On farm activities	Pesticides leftover cans waste, car lubricants) - farmers installing pumps next to the Wadi and the Canal (risk of oil and petrol spillage)	Pollution Prevention and Resource Efficiency	Ministry of Agriculture, National Center for Agricultural & Research Extension (NCARE) & Environmental Police.
On farm activities	Grazing nearby the Wadi and the Canal (Animals droppings)		Jordan Valley Authority & Ministry of Environment
Earthen dam construction	Residues of mining		Ministry of Energy and Mineral Resources/ Natural Resources Authority (NRA), Ministry of Environment & Environmental Police
Wastewater reuse	Sediments and algae in the water canal and King Talal Reservoir (KTR)		Jordan Valley Authority

Wastewater reuse	Illegal access for swimming in the Canal or in the Wadi, ignorance to source of water	Public Health	Jordan Valley Authority, Ministry of Environment & Environmental Police
Wastewater reuse	Use of RW for households purposes		Jordan Valley Authority, Ministry of Environment & Environmental Police
Wastewater reuse	Direct Contact with RW during maintenance		Jordan Valley Authority
Wastewater reuse	Changed behavioral patterns: (swimming in, washing with reclaimed water)	Public Health	Ministry of Agriculture, Ministry of Agriculture, National Center for Agricultural & Research Extension (NCARE) and farmers
On farm activities	Use of undigested animal manure:	Pollution Prevention and Resource Efficiency	Ministry of Agriculture, Ministry of Environment, Ministry of Agriculture, National Center for Agricultural & Research Extension (NCARE) and farmers
Wastewater reuse	Soaking fresh manure in ponds	Pollution Prevention and Resource Efficiency	Ministry of Agriculture, Ministry of Environment, Ministry of Agriculture, National Center for Agricultural & Research Extension (NCARE) and farmers
Wastewater reuse	Accessibility to pond by cattle and animals	Pollution Prevention and Resource Efficiency	Ministry of Agriculture, National Center for Agricultural & Research Extension (NCARE) and farmers
Wastewater reuse	Heavy metals build up	Public Health & Compliance with the Law	Ministry of Agriculture, Ministry of Water and Irrigation/WAJ and Ministry of Health/Environmental Health Directorate
On farm activities	Pesticides use		
Wastewater reuse	NO3 impacting GW quality		
Wastewater reuse	Pathogens buildup in RW		
Wastewater reuse	Precipitation of TDS, Ca, P, HCO3 and others	Compliance with the Law & Pollution Prevention and Resource Efficiency	Jordan Valley Authority, Ministry of Agriculture, Ministry of Agriculture, National Center for Agricultural & Research Extension (NCARE) and farmers
Wastewater reuse	TSS, Sediments & Algea impacting negatively on soil and water quality		
Wastewater reuse	High salinity content in irrigation water, inadequate leaching bad drainage & Heavy metals in irrigation water	Compliance with the Law & Lands and Soil Conservation	Ministry of Agriculture, Ministry of Agriculture, National Center for Agricultural & Research Extension (NCARE) and farmers
Wastewater reuse	Heavy metals in ground water wells	Compliance with the Law & Pollution Prevention and Resource Efficiency	Water Authority of Jordan, Ministry of Environment, Ministry of Health & MOI
Wastewater reuse	Pathogens in RW/ /in Ground water wells		
Wastewater reuse	NO3//in Ground water wells		
Wastewater reuse	Drinking of RW by animals	Compliance with the law & Protection of Natural Habitat	Ministry of Agriculture, Ministry of Environment & NCARE
Wastewater reuse and on farm activities	grazing on crops irrigated recently with reclaimed water by animals		
Wastewater reuse	Irrigation with RW for crops that are not allowed by JS 893/2006	Compliance with the law & Conservation of Biological Diversity	Ministry of Agriculture Ministry of Agriculture, National Center for Agricultural & Research Extension (NCARE) and farmers
Wastewater reuse	Pathogens in irrigation water		
Wastewater reuse	Heavy metals in irrigation water		

Wastewater reuse	NO3 in Irrigation water		
Wastewater reuse	Spreading manure on surface (farmers behavior		
Wastewater reuse	Lack of hygiene conscious by farm workers		
Wastewater reuse	Washing and moistening harvested crops with reclaimed water (not allowing safe period to pass before harvesting)		
Earthen dam(s) construction	Odors, Dust and noise pollution as a result of on farm work and machinery and access of vehicles during earthen dams construction		WWTP operator, monitored by Ministry of Labor /Occupational Safety & Health Institute
wastewater reuse	Inequality of socio-economic impacts in ww effluent availability	Access and Equity	Project team and WWTP and utility operator monitored by JVA
			WWTP operator, Municipality/village councils and tank drivers
	Earthen small Dam(s) construction: Small dams are normally less than 15 meters in height. This category includes, for example, farm ponds, local silt retention dams, and low embankment tanks.		
Earthen dam(s) construction	During construction of the proposed earthen rainwater harvesting dam, most of the existing vegetation within the construction site will probably be removed and uprooted	Protection of Natural Habitats & Conservation of Biological Diversity	Ministry of Environment and M. of Agriculture(
Earthen dam(s) construction	Constructing Rainwater harvesting dam(s) can be ecologically disruptive, causing water stress in the river downstream, and changing the biodiversity of the region.	Protection of Natural Habitats & Conservation of Biological Diversity	Ministry of Agriculture, Ministry of Agriculture, National Center for Agricultural & Research Extension (NCARE) and farmers
Earthen dam(s) construction	Failure to comply with good design, supervision of construction and operation practices (ie failure to comply with((a) For small dams, generic dam safety measures designed by qualified engineers are usually adequate. (b) Require that the dam be designed and its construction supervised by experienced and competent professionals. Also require that the implementing entity adopt and implement certain dam safety measures for the design, bid tendering, construction, operation, and maintenance of the dam and associated works.)	Compliance with the Law	Ministry of Public Works and Housing, Ministry of Water and Irrigation/JVA
Earthen dam(s) construction and ww reuse	Large influxes of refugees from Syria and Iraq increasing the demand for TWW & affecting the farmers water share	Marginalized and Vulnerable Groups & Access and Equity	Responsible aid agencies (UNHCR, UNICEF),Ministry of Labor, WAJ & MoEnv
Earthen dam(s) construction and ww reuse	Health & safety issues due to changed social structure resulting from increased labor opportunities especially amongst refugee workers	Public Health & Core Labor Rights	Project team and WWTP operator and ww reuse farmers
Earthen dam(s) construction and ww reuse	Disease vectors	Public Health	WWTP operator in cooperation with MoH and the Malaria and Schistosomiasis Dept. at Ministry of Health
Earthen dam(s) construction	Inadequate Compensation for land owners who's lands may be taken to build the small earthen dams	Involuntary Resettlement	Project team, Ministry of Labor

Earthen dam(s) construction	Finding Historical sites during excavation works " of construction earthen Dams"	Physical and Cultural Heritage	Department of Antiquities (DOA) & MoEnv
Earthen dam(s) construction	The number of vehicles is expected to increase during Operation & construction activities of earthen dams	Pollution Prevention and Resource Efficiency	Ministry of Transportation (MOT)
Earthen dam(s) construction	Flooding	Climate Change & Protection of Natural Habitats	JVA, Project team & WWTP operator
Earthen dam(s) construction and ww reuse	Total power failure	Pollution Prevention and Resource Efficiency	Project team
Earthen dam(s) construction	Conserving Limited Natural Water Resources	Protection of Natural Habitats & Pollution Prevention and Resource Efficiency	The need for support from the related governmental agencies such as the MWI, MoA and MoEnv.
Earthen dam(s) construction and ww reuse	Soil quality changes as result of irrigation with reclaimed water and desertification (Soil Erosion)	Lands and Soil Conservation	The need for support from the related governmental agencies such as the MWI, MoA and MoEnv.
Earthen dam(s) construction and ww reuse	Unequal Job Opportunities and Income Generation for women, and refugee workers with work permits	Access and Equity, Core labor rights	MOPIC, PTDRA, Ministry of labor, and international aid agencies and NGOs
Earthen dam(s) construction and ww reuse	Illegal Child labor	Core labor right, Compliance with the Law	Ministry of Labor and Minsitry of Social Affairs

Table 45: ESMP Cost Estimate and Schedule:

The cost associated with implementing the ESMP is accommodated by GOJ/MOPIC budget,

Activity	Quantity	Unit Rate in US$	Total in US$
1. Secondment of M of Environment Specialist to join the MOPIC PMU operations team	1 (in kind GOJ)	1,400/month	67,200[1]
2. Recruit Specialize Local Environment Consulting Firm to supervise and report on compliance with the ESMP.	1	10,000/year	40,000[1]
3. Social Specialist assigned from the Social Productivity Directorate to join the MOPIC/PMU operations team	1 (in Kind GOJ)	1,400/month	67,200[1]
4. Capacity Building and Training for PMU and municipal operations staff and contractors (workshops).	2	10,000	20,000
5. Costs associated with mitigation measures to be added to physical contracts	multiple	5% of any signed contract value	TBD[2]
6. Miscellaneous.		5,000/year	25,000
Total (GOJ funded)			**219,400**

NOTE: [1]This cost is based on a full-time local consultant assignment of 4 years .

It should be noted that this programme is an environmental project aimed at adapting to CC. The recommended measures are required only to enhance environmental conditions. Hence, the development of the ESMP is able to take into consideration maximum utilization of available and budgeted manpower and financial resources in designing and implementing the mitigation and monitoring measures

Public Disclosure and Consultation

MOPIC as implementing entity has identified stakeholders and involved them at early stages of project design in feedback needed for planning project activities supported by the Fund. The resultant ESIAs and their relevant screening and management plans were made available for public feedback in a timely, effective, inclusive, and were held free of coercion and in an appropriate way for communities that are directly affected by the proposed project. The secretariat will publicly disclose the final environmental and social assessment through the Fund's website as soon as it is received. The implementing entity is responsible for disclosing the final environmental and social assessment to project-affected people and other stakeholders. Project/programme performance reports including the status on implementation of environmental and social measures shall be publicly disclosed. Any significant proposed changes in the project/programme during implementation shall be made available for effective and timely public consultation with directly affected communities.

According to the scope of work of the environmental & social management plan "ESMP" for the project, a scoping study was implemented by the consultant study team. The scoping study, which represents an important phase of the ESMP for the project, aimed at identifying the stakeholders concerns about the project activities in relation to the major environmental and social aspects. The consultant ensured adequate coverage in the consultation process of all stakeholders that may be affected or may interact with the project including regulatory authorities, non-governmental organizations (NGOs), local communities for both (Men & Women) and indigenous beduins. Additionally, the arrangements for the scoping study were undertaken in close coordination with the Jordan Valley Authority & Ministry of Environment (MoEnv), who is responsible for executing the ESMP process.

Empowerment of local communities

During the community engagement and participatory planning processes that are described throughout the project, local communities will be empowered to detect, report and where possible mitigate environmental and social risks, as set out in the AF ESP and the project's Environmental and Social Management Plan (ESMP). Processes to build local community capacity to do this will be integrated in the technical capacity building plan activities (Component 2) that are envisaged during the early stages of each project component, and will be essential in ensuring that local communities understand the CC adaptation intentions of the project and can contribute to the design of subcomponent activates accordingly, know their rights and are aware of the recourse and redress mechanism in the event they have a certain grievance they may want to raise or any risk-related issues that causes their concerns

Public Disclosure Sessions, Methodology, Issues and Concerns Identified through Scoping Sessions, for Public and Regulatory Consultations.

A full description of the project/program components & activities was presented to all concerned stakeholders. At the public consultation and disclosure for scoping sessions the following activities took place:

- Opening session: The proposed project was outlined by JVA representative & the ESIA team leader: and Directors of Water User Association (WUAs) from Jordan Valley Authority (JVA) and PTDRA.
- A presentation about the project/program sites, activities, advantages, and their relation to climate change adaptation.

- The representatives of the local communities including women and beduins had the opportunity to speak about their interests and concerns, and were given the opportunity to give recommendations. Refer to section (D) on Public Consultation and Disclosure of this ESMP to view the issues of concern presented by participants.

The work group sessions resulted in identifying a number of issues and concerns for different phases of the project. All of the issues and concerns filled by the groups during the consultation sessions were collected and documented by the study team. Some new issues were raised by the participants. Following the consultation session, the study team reported the relevant environmental and social issues of importance.

All issues identified during the consultation sessions were analyzed and studied by the consultant study team. Potential interactions of these issues were specified and evaluated with respect to the AF ESP Principles. The level of significance for each issue was evaluated as follows:

- The level of impact was ranked as: Negative and Positive.
- The likelihood of occurrence was ranked as: (low), (medium) and (high).
- List of all issues and concerns identified by participants during operation & decommissioning phases and their evaluation are shown in the Table (43), and (44 and 45) above respectively. All the concerns mentioned below will be further assessed, evaluated, mitigated as well as taken into consideration in the monitoring plans and presents the potential interactions between project activities and Environmental & Social Principles.

FIGURE 27: COMMUNITY STAKEHOLDER CONSULTATION SESSION ON DECEMBER 4, 2014

FIGURE 28: CONSULTATION OF RELEVANT STAKEHOLDERS FROM REGULATORY AUTHORITIES, NON-GOVERNMENTAL ORGANIZATIONS (NGOS), CBOS AND LOCAL COMMUNITIES, AND FARMERS ETC. ON DECEMBER 4, 2014.

The names of the participants in the sessions held on December 4, 2014 for scoping on ESMP and project disclosure are shown in Table (46) below noting that a separate session was held on Dec 29, 2014 for women CBOs farmers as they do not sit in mixed gender meetings nor accept to be photographed due to social and religious reasons. The original Arabic list of attendees' names of the consultation sessions is attached and their translated names, gender and signatures are at the bottom of this table.

TABLE 45: ESMP SCOPING SESSION LIST OF PARTICIPANTS.

Name	Gender	Organization/ Occupation
1. Nawaf Riyadah	male	WUA, Head of Association pump33
2. Zaki Rababa'	male	WUA, Head of Association pump41
3. Mahmoud Al Bakar	male	Head of Observers Committee , Basin 3&4
4. Hassan Riyadah	male	WUA, Treasurer
5. Youssef Riyadah	Male	WUA, Pump33
6. Sulaiman Abu Saleem	Male	WUA, pump 55
7. Mehjem Al Subaih	male	WUA, pump 55
8. Hussain Al Omari	male	WUA, Basin 2
9. Waleed Ibrahim	Male	WUA, Basin 5
10. Hassan Al Saeed	Male	WUA, Basin 5
11. Osama Ahmad	Male	WUA, pump 41
12. Khaled Sanad	Male	Farmer
13. Atef Al Khashan	male	Farmer Pump 28
14. Ali Yaseen	Male	Farmer Pump 33
15. Ziyah Abrah	male	Farmer Pump 16
16. Mathayel Al Hawyan	Female	Head of Women Association
17. Mohammad Al Beshtawii	male	WUA
18. Nawaf Mohammad	male	WUA, Basin 3 &4
19. Eng. Ali Al Omari	male	JVA
20. Alaa Abu Ali	Male	GIZ
21. Eng. Salman Ibrahim	male	WUA, pump 14
22. Amer Nasrawi	male	WUA, pump 12

Name	Gender	Organization/ Occupation
23. Abdullah Saed	male	WUA, pump 14
24. Eng. Fadi Mohammad	male	JVA
25. Ahmad Bashawneh	Male	JVA
26. Mohamad Asaad	Male	JVA
27. Ahmad Hassan	Male	JVA
28. Ahmad Ali	Male	WUA, Pump 14
29. Suhaib Abu Jaber	Male	-
30. Eng. Anwar Ahmad	Male	JVA
31. Mohammad Al Gzawii	Male	WUA, pump28
32. Aref Abdullah	Male	WUA, pump33
33. Ali Hamoudeh	Male	Farmer
34. Salteyah Al Diyat	Female	Farmer
35. Sarah Abdullah	Female	Farmer
36. Wafeqa Al Diyat	Female	Farmer
37. Lurees Youssef	Female	Farmer
38. Badeeaa Al Diyat	Female	Farmer
39. Dr. Amal Hijazi	Female	Environmental & Social Expert
40. Eng. Nuwar El Husseini	Female	Food security specialist
41. Sannaa Qutiashat	Female	Jordan Valley water forum secretariat

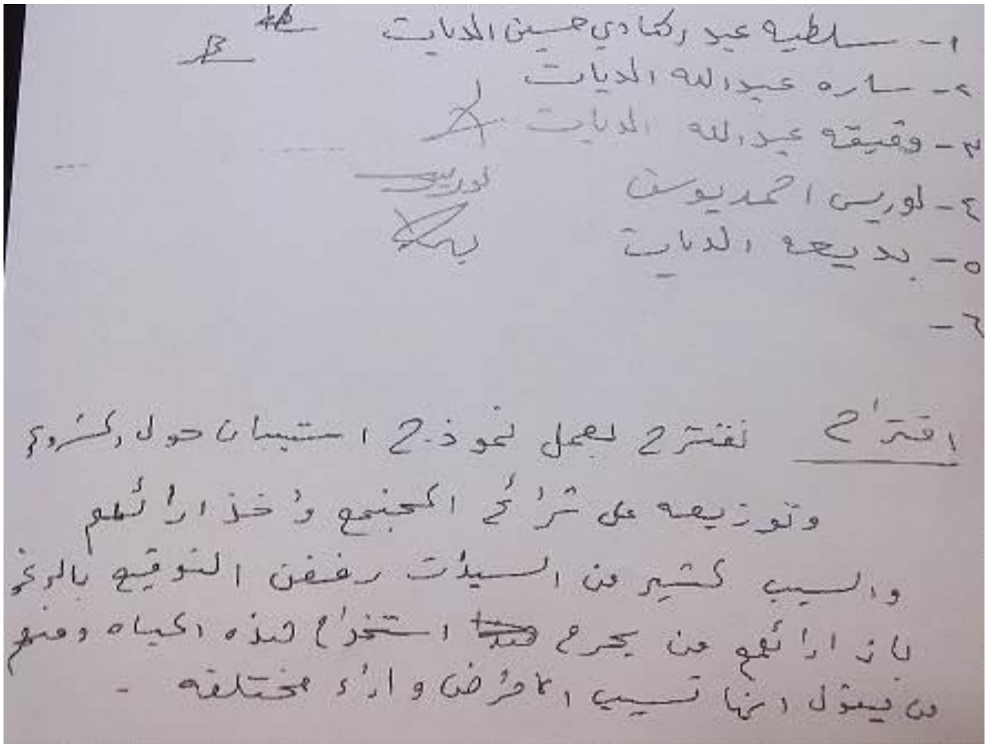
Public Consultation Meeting for ESMP attendees list held in Northern Jordan Valley-Al Masharea on Dec 4, 2014

اليوم : الخميس ... (١١/١٢/٢٠١٤)

المكان : معهد التدريب المهني – المشارع

الرقم	الإسم	الجمعية	الوظيفة	التوقيع
21	خالد جمال الصنور			
22	م. سلامه ابراهيم سالم ابو الغوار	١٤	مسؤول [illegible]	
23	عامر صالح ~~[illegible]~~ محمد نزاري	١٤	[illegible]	
24	~~احمد [illegible]~~	~~١٤~~	~~[illegible]~~	
25	عبد الله محمد رحاقدران	١٤	[illegible]	
26	أ. نادي محمد ابو [illegible]	سلطة وادي الاردن	رئيس قسم الري	
27	احمد حسين خلف ابشانوة	سلطة وادي الاردن	مسؤول المطالبات	
28	~~[illegible]~~ محمد سلامه اسعد	سلطة وادي الاردن	مسؤول مرحلة	
29	احمد علي حسن العقيلي	سلطة وادي الاردن	مسؤول مرحلة	
30	احمد ذيب علي	١٤	محاسب	
31	~~[illegible]~~	١٤	~~[illegible]~~	
32	مهيب احمد سعيد ابو جابر			
33	م. انور احمد العيسات	سلطة وادي الاردن	مدير المياه	
34	محمد يعقوب محمد الغزاوي	صفحة 28	مسؤول المياه	
35	عاسف عبد الله قياقا	صفحة ٢٢	سكرتير	
36	علي شوقا محمد	مزارع	[illegible]	
37				
38				
39				
40				

Consultation with Females (female CBO and female Farmers)



١- سلطيه عبد الهادي حسين الدبابات
٢- ساره عبد الله الدبابات
٣- وفيقه عبد الله الدبابات
٤- لوريس احمد يوسف
٥- بديعه الدبابات
٦-

اقتراح نقترح لعمل نموذج استبيان حول المشروع وتوزيعه على شرائح المجتمع وأخذ آرائهم والسبب كثير من السيدات رفضن التوقيع بالورق بان آرائهم من يحرم استخدام هذه المياه ومنهم من يقول انها تسبب الأمراض وآراء مختلفة -

Gender	NAME الإسم	ORGANIZATION الهيئة	POSITION الوظيفة	TEL الهاتف	MAIL البريد الإلكتروني
Males	Haidar Malhas	ISSP	Institutional development specialist	0796062016	hmalhas@isspjordan.org
	Nayef Seder	ISSP	SG Advisor	0797653873	nseder@gmail.com
	Qais Owais	JVA	S.G.Ass. for JV	0795649822	Qais_Owais@Yah...
Females	Kholoud Bashtawi	JVA	Head of Control Centre division	0798514017	khdoud_b@yahoo.com
	[illegible]	JVA	JVA	0777423171	Samaa-[illegible]
Males	Nael Qurabani	AFD	project officer	07784471[illegible]	quraanin@afd.fr
	Khalil Absi	JVA	Director	0799[illegible]	

Gender
Males
Females
Males

Grievance & Redress Procedures

MOPIC PMU will need to have a process that is clear and transparent process for receiving grievance and redress, with a clear process of how they will receive and handle complaints. The process should include a clear way of informing the public where to send their concerns (how they advertise this-ie. website, newspaper, application form, banners, etc.), how long it will take the PMU to respond (in a timely manner) and how they plan on responding to complaints (ie. face-to face, meetings, etc.).

During project inception workshops and the component launch workshops, stakeholders will be informed that any concerns relating to the design or management of the project, including social and environmental risks, should be raised with the Executing Entities (EE). Where these are not adequately addressed, these may be elevated to the project PSC and if necessary the NIE Steering Committee. The MOPIC as implementing entity has identified a grievance and redress mechanism that provides people affected by projects that are supported by the Fund with an accessible, transparent, fair and effective process for receiving and addressing their complaints about environmental or social harms caused by any such project. This mechanism will be project-specific and guided by a pre-existing national one under the Diwan Al Mazalem (or Bureau of Injustice).

The EEs will report any unintended social and environmental risks that are detected through the project monitoring, evaluation and reporting processes to the NIE via the PSC, together with a proposed risk management plan that shows how these risks will be mitigated. In response to this, the NIE and PSC may propose the redirection of project funds to risk management

activities, or the withholding of the next tranche of payment until satisfactory risk management actions are determined and agreed.

For the purpose of compliance with the AF, annual project/ performance reports and the mid-term and terminal evaluation reports will be modified to track any required environmental and social risk management plans. Implementing entities shall screen compliance with this policy on a project-by-project basis.

Roles and Responsibilities:

- EE, Executing Entities and partners – risk screening.
- PSC – Risk screening oversight.
- NIE – Capacity building, risk screening scrutiny and verification

Complaints regarding projects or their related activities can be filed with the secretariat at the following address:

Adaptation Fund Board secretariat
Mail stop: MSN P-4-400
1818 H Street NW
Washington DC
20433 USA
Tel: 001-202-478-7347
afbsec@adaptation-fund.org

The secretariat will respond promptly to all such complaints. Where appropriate, the secretariat will refer complainants to a grievance mechanism identified by the implementing entity as the primary place for addressing complaints.

Monitoring, Reporting & Evaluation

MOPIC as implementing entity will hold the ultimate responsibility for ensuring that monitoring, reporting and evaluation of projects in order to address all environmental and social risks identified in the ESIAs during project assessment, design, and implementation and in compliance with the AF ESP guidance document. Monitoring will be done to ensure that actions are taken in a timely manner and to determine if actions are appropriately mitigating the risk/impact or if they need to be modified in order to achieve the intended outcome. These reports shall include a section on the status of implementation of any environmental and social management plan, including those measures required to avoid, minimize, or mitigate environmental and social risks. The reports shall also include, if necessary, a description of any corrective actions that are deemed necessary. The mid-term and terminal evaluation reports shall also include an evaluation of the project performance with respect to environmental and social risks.

Reporting: Executing entities will be required to submit detailed quarterly reports that include risk forecasting to the NIE that are built up from anticipated project activities. All Component and sub-Component Leaders will be expected to do the same for the EE.

In an effort to strengthen risk screening, and to ensure that no unintended negative impacts are caused or not mitigated, all Component and sub-projects Leaders' will be trained and required

to submit a basic environmental and social risk table with their forecasts. These tables will need to be submitted to the MOPIC PMU as part of the forecast approval process.

In the lead up to project inception, the NIE will revisit and modify the ESIA's ESMP Risk Management Plan Schedules for this purpose. All risks will be included, but the table will be elaborated upon to create a set of clear and easy to understand activities that will need to be cross checked. This risk screening process will ensure compliance with the principles of the AF ESP and National legislation. Project activities that pose social or environmental risks that are not easily mitigated will not be approved during the detailed quarterly forecasting process.

Mid-term, Annual and Terminal evaluations: The PMU's quarterly and annual project performance reports shall include a section on the status of implementation of any environmental and social management plan, including those measures required to avoid, minimize, or mitigate environmental and social risks. The reports shall also include, if necessary, a description of any corrective actions that are deemed necessary.

Mid-term, annual and terminal evaluations will include a focus on environmental and social risks, and ensure compliance with no-risk assessments in terms of the AF ESMP. Particular attention will be given to the monitoring of unanticipated environmental and social risks in the quarterly reporting process. The EE will be expected to scrutinize Executing Entity reports for such risks, and to provide the PSC and NIE with their appraisals for verification. The NIE will work closely alongside the EE to ensure that PMU staffs have the capacity to undertake the required screening, and to provide the necessary scrutiny.

Quarterly Forecast Reviews and Risk Assessments

All quarterly forecasts, including risk assessments, will be reviewed by the PMU with support of the Gender and Social (Monitoring and Evaluation Expert). These reviews will be tabled with recommendations to the PSC and NIE for approval.

A commitment by the MOPIC PMU as implementing entity to oversee and ensure that executing entities implement the management plan will be reflected in the monitoring and reporting plan for these projects.

Roles and Responsibilities:

- Consultants – risk evaluation.
- EE, Executing Entities and partners – risk management responses (in the unlikely event that these should arise).
- PSC – risk management oversight.
- NIE – risk management verification.
- Direct Financial costs (operational, monitoring and institutional costs) were identified under each project operational costs while indirect costs will be borne by the executing entities.