

## 4.1 The Interventions

A total of 127 interventions have been identified with a total investment value of 4.58 Billion USD until the year 2050. The full set of interventions is presented in Appendix A and grouped around the various strategic planning objectives. Interventions have been distinguished in terms of Israeli (ISR), Jordanian (JOR), Palestinian (PAL), or Regional (REG) interventions. The regional interventions are particularly important due to their potential to establish co-operation among the three core parties, and to strengthen the conditions for a permanent peace settlement between Israel and Palestine. However, specific Palestinian and Jordanian projects that have been identified in the national plans need to be executed in order to bring these countries on par with Israel in order for all three parties to benefit equally from the implementation of the Regional NGO Master Plan.

The Jordanian, Palestinian and Regional interventions have been identified and developed by the consultant in co-operation with the key Jordanian and Palestinian stakeholders in the valley. The Israeli interventions presented here have mostly been identified by the Lower Jordan Drainage Authority and the Jordan Valley Regional Council as part of their governmental planning cycles, and relate to pollution control, water management, ecology and tourism only. In addition, the Roadmap for Rehabilitation of the Jordan River (Eco Peace 2009) proposed a series of interventions as well with a total costs (including lost revenues) of 3.4 Billion NIS. These were the following:

1. Ceasing pumping from the Lower Yarmouk to the Sea of Galilee if the water level in the Sea of Galilee is above the Red Line. This will save pumping costs, and does not negatively influence the Sea of Galilee water levels
2. Transfer the brine of the Salt Water Carrier directly to the Dead Sea, using a 83 km long gravitational pipeline (see also intervention P05 ISR)
3. Transferring effluent from Kishon to AMWA and Harod, which requires a 15 km long pipeline
4. Further and faster decreasing pumping to the National
5. Water Carrier (NWC). The Master Plan assumes that by 2050 Israel will reduce pumping water from the Sea of Galilee out of the valley through the National Water Carrier to enable an annual outflow of 234 MCM/year into the Lower part of the Jordan River. In addition, it is assumed that Israel will maintain supplying its domestic and agricultural water needs within the Jordan Valley from the Sea of Galilee and local water resources
6. Changing 50 % of the fish ponds through closed systems or by other agricultural activities, such as field crops and alfalfa, which will provide a direct economic benefit for 35 MCM of water/year, and this will reduce the reduce salinity levels in the Jordan River (see also P03 ISR)
7. Discharge effluents from the Kishon to the Harod River to reduce salinity levels and desalinate 1.5 MCM/year of brackish water from the Salt Water Carrier for local water supply.

The proposed pollution control related interventions focus on eliminating all sources of environmental pollution in terms of wastewater and solid waste in the Jordan Valley by 2025. This includes full and adequate treatment and reuse of all wastewater flows in the valley and to fully integrated solid waste management. Proposals include waste collection, transportation; transfer; reuse and recycling of solid waste streams; sanitary landfilling and closing of existing non-sanitary dump sites.

The sustainable water management related interventions focus on establishing efficient domestic and agricultural water supply within a valley wide water balance. It also includes an Integrated Water Resources Management approach for the whole (Lower) Jordan River, based on international co-operation among Israel, Jordan and Palestine, supported with adequate water management tools (like WEAP) to ensure sustainable water supply and an increase of the base flow and rehabilitation of the ecological values of the Jordan River.

The agricultural related interventions focus on improving water use and irrigation efficiencies and the economic outputs per unit of agricultural water used. It is assumed that the total water demands for the agricultural sector in the Jordan Valley will remain stable and that adequate tariff policies on water used for irrigation will be implemented, including enforcement, to stimulate more efficient use of water through for instance green house drip irrigation.

The governance related interventions include setting up a Palestinian Basin Authority, strengthening the Jordan Valley Authority and establishing a trans-national Jordan River Basin Organization (Israel, Jordan, Palestine) that will address water management related issues from the valley perspective to the benefit of all stakeholders and inhabitants in the valley.

The ecological interventions focus on restoring the good ecological status of the Jordan Valley in general and the Jordan River particularly. This includes restoration of the flood plain and the ecological (flora, fauna) status of the river, based on environmental flows and good water quality; design and implementation of dedicated ecological restoration projects and eco-parks along the borders of the Jordan River; expansion of currently assigned nature reserves.

The proposed interventions in terms of tourism and cultural heritage focus on restoration and saving the intrinsic cultural heritage sites in the valley, as well as for boosting the tourism economy in the area, including parks, hotel facilities, museums and touristic routes through the valley, as well as tourism branding and promotion. The interventions aim at creating valley wide synergies and stronger economic development opportunities for the valley as a whole.

The proposed interventions in terms of urban and infrastructure development focus on developing sufficient urban housing and infrastructure facilities in the valley towards the year 2050, and meanwhile increase traffic safety and public transport capacities.

The interventions, including foreseen planning and related investment costs are presented below for each strategic objective (Tables 4.1 and 4.2).

#### 4.1.1 Pollution Control and Sanitation

The pollution control related interventions have been designed to eliminating all sources of environmental pollution in the Jordan Valley by 2025.

The purpose of the regional coordination intervention setting up a regional coordination structure, or Steering Committee, among key Jordanian, Israeli and Palestinian governmental stakeholders for the implementation of the proposed national and regional interventions in the Jordan Valley with regards to the Pollution Control. The objective is that this Steering Committee will eventually be embedded in

the structures of the overall River Basin Organization for the Jordan Valley (ref. intervention IC01 REG Jordan River Basin Organization).

The Israeli intervention on short-term pollution control of the fish ponds aims at changing operations of their wastewater discharge and releasing their wastewater during winter season into the Jordan River when water is high, or there are floods to reduce concentrations. It also includes construction of settling ponds before release into the river and expansion of two pilot projects under implementation. The Mine Fields Removal Project aims at removing all mine fields in the Israeli part of the study area by 2016 or early 2017.

The Israeli project on sustainable fish farming in the Jordan Valley aims at developing fully sustainable closed systems without negative environmental impacts and minimized water use; and to remove fish farms from the region that cannot meet these criteria, either by changing them into bird reservoirs, or other type of less-polluting agriculture. This project consists of continued research on sustainable fish farming, including bio-pesticides; biological filtering and reusing of fish farm discharge water; including use of forced oxidation to maximize production; selection of higher revenue fish types like sea bass. Research has showed that this may result in only 10 % of the water consumption compared to today; and no discharge of polluted water at all. Next, the aim is to transfer the research results to real scale model fish farms and change co-operative fish farms into these sustainable concepts.

The proposed Betaniya tertiary wastewater treatment project aims at expanding the current secondary treatment of Betaniya, and bringing the effluent to the downstream new Afikim reservoir (not part of this intervention), which will also receive desalinated water from the Salt Water Carrier, and next to reuse this water for agricultural purposes.

The proposed Betaniya Desalination Plant and Afikim Reservoir Project aims at constructing a desalination unit for much of the water from the Saline Water Carrier (SWC), to mix this water with effluent from the Betaniya WWTP into the Afikim Reservoir, and to reuse this mixed water (3.5 MCM/year) for agricultural purposes. The desalinated water will be used for drinking water purposes. In addition, the project aims at using 6 MCM/year of brine (4000 ppm) for use in Fish Ponds near Bezeq, or alternatively, discharging this brine through a pipeline into Dead Sea (needing an additional 100 M NIS investment).

The proposed Jordanian Solid Waste Management intervention is in line with the National Solid Waste Management Plan that is currently (2014) prepared by the Ministry of Environment and new legislation currently being prepared for the municipalities. The project includes an integrated planning section dedicated to the Jordan Valley, cross boarder waste transfer; transfer of the landfill in North







**Table 4.2** Pollution control related interventions

P01	REG	Jordan Valley Regional Coordination on Pollution Control
P01	ISR	Fish Ponds Short Term Pollution Control Improvement Project
P02	ISR	Mine Fields Removal Project
P03	ISR	Sustainable Fish Farming in the Jordan Valley
P04	ISR	Betanya Tertiary Wastewater Treatment
P05	ISR	Betanya Desalination Plan and Afikim Reservoir Project
P01	JOR	Solid Waste Management
P02	JOR	Environmental Management and Public Awareness Program
P03	JOR	Agricultural Pollution Control Project
P04	JOR	Separate Waste Collection and Reuse Pilots
P01	PAL	Solid and Hazardous Waste Management Plan
P02	PAL	Environmental Management Project
P03	PAL	Wastewater Collection and Treatment
P04	PAL	Fish farm Pollution Control Project
P05	PAL	Land and Water Quality Protection Project
P06	PAL	Remediation of Military Bases and Mine Fields

Shuneh into a transfer station, focusing on composting organic waste for composting, including household organic waste, agricultural waste of solid waste generated by olive mills and PPPs. However, the National SWM strategy will be elaborated on the levels of governorates, which overlaps parts of the area of the Jordan Valley. This proposed interventions under this Master Plan focused explicitly on the Jordan Valley, without waste management plans for other regions, such as the Syrian refugee camps currently located close to the border. Additional elements to be addressed are way of financing; increasing public and governmental awareness and participation; private sector involvement; source separation, and following environmental and social procedures for the preparation of landfills.

The proposed Jordanian integrated environmental monitoring, enforcement and public awareness program for the Jordan Valley includes monitoring of wastewater and solid waste major pollution sources, fish farms; ambient surface and groundwater quality; soil quality and air quality. The purpose of this program is to enabling JVA and related authorities to establish the environmental baseline of the Jordan Valley; to increase public awareness on environmental protection and water demands; and to monitor the impacts of pollution control measures, such as solid waste management and wastewater management interventions. The project will also include development of dedicated impact assessment tools for JVA, such as Strategic Environmental Assessments to be used to test new policies and strategies related to the Jordan Valley.

The Jordanian agricultural pollution control project aims to assist farmers and their organizations in applying sustainable agronomic practices, including minimized use of pesticides and fertilizers; regulation and distribution and types of pesticides on regional or national levels, and promotion of environmentally sustainable substances; stimulation of the reuse of organic agricultural waste as compost; improve the management of agricultural waste; improvement of the environmental performance of fish farms.

The Jordanian separate waste collection and reuse pilots aim to stimulate the reuse of resources/waste streams and limit the amount of waste to be land filled, in line with the National SWM Strategy that is currently being prepared. This includes research to investigate the possibilities and bottlenecks for separate collection and reuse of certain waste streams.

The Palestinian SWM project aims at full collection and sanitary treatment of all solid waste streams and maximized reuse and recycling of waste streams, including waste to energy. And at the same time stimulate the reuse of resources/waste streams and limit the amount of waste to be land filled. The intervention includes construction of a central sanitary landfill for the area.

The Palestinian proposed integrated environmental management plan aim to Improvement of urban and environmental planning capacities and enhance environmental data collection, improvement of enforcement. It proposes to make one organization responsible for environmental issues in the Jordan Valley, to empower this organization and improve the public environmental awareness in the Valley.

The Palestinian wastewater collection and treatment project focuses on full scale, adequate and safe collection of waste water for all the communities in the study area by constructing wastewater collection networks, to treat the generated wastewater from the different communities and lay the ground for safe reuse of wastewater for agricultural purposes from the constructed wastewater treatment plant. This includes expansion of the sewer system in Jericho covering the whole city and connecting the system to the recently completed WWTP, and covering the remainder of the communities with adequate networks and treatment facilities. The objective of this intervention is to reach a situation where all generated wastewater in Palestine is collection, treated and reused for agricultural purposes, or where better functioning sanitation systems using substantially smaller amounts of water are introduced, such as vacuum removal of toilet effluents, or electric incinerating toilets. As mentioned earlier, localized solutions are preferred, avoiding the use of extensive sewer systems throughout the Jordan Valley.

The Palestinian fish farm pollution control project focused on the current pilot fish farm and potential future fish farms in the Jordan Valley. The current four pilot fish

farms in Jericho are not well lined against leakage. This project will assess the technical state of the fish farms and prepare for adequate lining and groundwater protection. The project will also focus on options for reusing the wastewater of the fish farms and on developing environmental standards for the management of current and future fish farms.

The Land and Water quality management project aims at studying the vulnerability of the Jordan Valley against groundwater, soil and surface water contamination, to prepare vulnerability maps for the study area and to assign and restrict rank land use according to this vulnerability assessment.

Remediation of Military Bases and Mine fields will be required once Palestine has been established as an independent state. The aim of this intervention is to clean all mine fields and remediate the by then former Israeli military bases within the Palestinian areas. This will include soil, waste and groundwater pollution assessment, remediation planning and implementation.

#### 4.1.2 Sustainable Water Management and River Rehabilitation

The interventions related to sustainable water management focus on overcoming the water scarcity related problems in the Jordan Valley, meeting the current and future domestic and agricultural water demands, preserving the water resources for future generations and for the environment, and establishing a clean Jordan river system that sustains a healthy ecosystem and the valley economy (see also Annex 2—Environmental Flows) (Table 4.3).

The total projected human water demands in the valley will have increased from about 694 MCM/year in 2010 to about 849 MCM/year in the year 2050. However, the suggestions interventions in this valley plan will allow for full supply of these demands in 2050. Details are provided in Sect. 5.3 “Water Demands and Supply Balance in 2050”.

The Regional Jordan Valley Domestic and Tourism Water Demands Management Project aims at setting up a system for instituting, regulating and monitoring of water demands and water use efficiencies for the Domestic and Tourism Sectors in the Jordan Valley. This will require an assessment of current domestic and tourism water supply infrastructure, practices and policies in the valley and provision of information for better and more efficient water use in the domestic and tourism sectors.

The purpose of the regional coordination intervention is setting up a regional coordination structure, or Steering Committee, among key Jordanian, Israeli and Palestinian governmental stakeholders for the implementation of the proposed national and regional interventions in the Jordan Valley with regards to the Water Management. The

**Table 4.3** Water management related interventions

W01	REG	Jordan Valley Water Demands Management Project
W02	REG	Jordan Valley Regional Coordination on Water Management
W01	ISR	Yarmouk River Dredging and Cliff Protection Project
W02	ISR	Western Drainage Basins Flood Management
W03	ISR	Northern Sewerage Expansion Project
W04	ISR	Springs Rehabilitation Project
W01	JOR	Improved Lower Jordan River Basin Management Project
W02	JOR	Wastewater Collection, Treatment and reuse Project
W03	JOR	Emergency Wastewater Management Project
W04	JOR	Waste Water Reuse Pilot Projects
W01	PAL	Wells Rehabilitation and Drilling of new well in the Jordan Valley
W02	PAL	Rehabilitation and Protection of Springs
W03	PAL	Rehabilitation and Construction of Domestic Water Networks
W04	PAL	Desalination of Brackish Wells
W05	PAL	Rehabilitation of Al Auja Springs
W06	PAL	Development of Water Traffic Structure
W07	PAL	Utilization of Al-Fashkha Spring
W08	PAL	Development of a Water Conveyance System
W09	PAL	Utilization of Jordan River
W10	PAL	Artificial Recharge Scheme
W11	PAL	Construction of Water networks
W12	PAL	Hydro-Geological Assessment of the study Areas

objective is that this Steering Committee will eventually be embedded in the structures of the overall River Basin Organization for the Jordan Valley (ref. intervention IC01 REG Jordan River Basin Organization).

The proposed Yarmouk River Dredging and Cliff Protection Project in Israel aims at improving drainage and flow of water through the Yarmouk River in Israel/Jordan section; to prevent collapsing of banks and cliffs into the river flow and to prevent flooding in the Yarmouk Flood Plain in co-operation with Jordan. The proposed Western Drainage Basins Flood Management Project in Israel aims at improving drainage of the four Israeli sub-basins of the Jordan Valley and preventing soil erosion from these basins into the Jordan River.

The proposed northern sewerage expansion project aims at connect all Israeli communities from Moshav Menahamia to Harod Stream in the Israeli section of Jordan Valley to the Beit Shean waste water treatment plant (WWTP), and to reuse the treated water for olive tree irrigation. The Israeli Springs Rehabilitation Project in the Jordan Valley aims at

improving water flow and environmental quality of five springs in the Israeli Jordan Valley, increasing the related eco-tourism at these springs; and increasing the springs' discharge into the Jordan River with 3–4 MCM/year.

The Jordanian interventions W01–W04 shall be considered as one package, starting with the emergency and pilot projects W03 and W04, followed by W01 and W02. These projects aim at reaching a situation where generated wastewater is collection, treated and reused for agricultural purposes, or introduce better sanitation systems using substantially smaller amounts of water, such as vacuum removal of toilet effluents, or electric incinerating toilets. As mentioned earlier, localized solutions are preferred, avoiding the use of extensive sewer systems throughout the Jordan Valley.

These projects shall furthermore be linked to existing infrastructure and national wastewater (reuse) policies, and be performed in an economically and ecologically sound manner under the proximity principle.

The aim of the Jordan Valley Water Demands Management Project is set up a system for instituting, regulating and monitoring of water demands and water use efficiencies for the Domestic and Tourism Sectors in the Jordan Valley. The Jordanian improved Jordan Valley Management project aims to improve the basin water management in terms of operational and information management of the Jordan Valley, and to prepare for full collection, treatment and reuse of locally generated wastewater in the valley. This includes investment planning and a pilot wastewater collection and reuse scheme, to demonstrate to the inhabitants in the valley the advantages of reusing treated wastewater for agricultural purposes.

The proposed Jordanian wastewater collection, treatment and reuse project focuses on realizing adequate and safe collection of wastewater from all the communities in the study area by constructing wastewater collection networks for 540,000 people in 2025 and 607,000 people in 2050; and to treat the generated wastewater from the different communities, including full scale reuse of treated wastewater in the Jordan Valley: 25 MCM/year in 2025 and 33 MCM in 2050. Specific attention shall be given to treatment of wastewater originating from olive mills, which contain high BOD concentration and cannot be treated by regular domestic wastewater treatment plants.

Currently most wastewater in the Jordan Valley is collected in cesspits, which are partly in bad condition or irregularly emptied. This poses immediate threats for the public health and the environment. The aim of the Jordanian Emergency Wastewater Management Project is to make an assessment of the scope and extend of the current problems; to plan for a valley wide cesspits rehabilitation program; to increase capacities for emptying cesspits; to purchase additional tanker trucks for wastewater collection; to plan for

related organization and operational aspects; and to implement these short term emergency measures.

In order to prepare for full scale wastewater reuse, a Jordanian pilot project in the Jordan Valley is proposed, to serve as an example for the wider water and agricultural sector and as core for further expansion of local wastewater reuse throughout the valley. The pilot project shall be linked to collection and treatment of wastewater from existing cesspits in the Jordan Valley.

The Palestinian Well rehabilitation project aims at increasing the water resources availability and enhancing water efficiency from 30 wells in the Jordan Valley, and drilling of new well in order to increase water supply for different purposes from these 30 wells. In addition it is proposed to increase water resource efficiency and reduce losses through leakage and evaporation from the springs and the main channels.

The Palestinian project for rehabilitation and construction of domestic water networks focuses on 30 km of water networks of different diameters. It includes installation of filling points, distribution of 1.5 m<sup>3</sup> plastic tanks and mobile water tankers with a variety of capacities, and rehabilitation of rainwater harvesting cisterns in marginalized communities.

The interventions related to desalination of Palestinian brackish wells aims at installation of small desalination units at 10 brackish water wells in the area, and rehabilitation of the related water network leading from these wells. The proposed rehabilitation of the Al Auja Spring includes rehabilitation of the main source of the spring and lining the 1 km stream from the source to prevent seepage of water into the subsurface.

The intervention related to the Palestinian water tariff structure focusing on developing a unified tariff structure for both domestic and agricultural water uses that will be used for the different water supply provides, and includes related framework for inspection, enforcement and incentives. This activity shall be developed in close coordination with the Palestinian Water Regulatory Council.

The aim of the proposed Al-Feshka Spring project is to establish a conveyor for 10 MCM of water from Al Fashkha spring through a 15 km long 36" diameter pipe and the construction of a 5,000 m<sup>3</sup> reservoir to cultivate about 10 thousand dunums of agricultural land at the southern entrance of Jericho City.

The West Ghor water conveyance system aims to develop a temporary solution for conveying water from north to south through the West Bank area in the Jordan Valley to strategic water distribution. Under this Master Plan this intervention will be required until the three countries have developed a regional and peaceful basin water management framework, in which eventually the Jordan River will be used as the main strategic water conveyor through the Jordan



Valley, and will at that stage replace under the vision of this Master Plan both this West Ghor water conveyer as well as the east Ghor/Kind Abdullah Canal. This final solution will require pumping stations on the River and the development of the necessary conveyance system to link to river to the main water demands in Palestine and Jordan. This temporary West Ghor water conveyer encompasses a water pipeline (20 in. diameter) about 60 km pipeline that goes from North to south through the Palestinian Jordan Valley.

The artificial recharge scheme is proposed to replenish the groundwater aquifers with access water during the rainy season, which will enhance and increase the safe yield of the aquifer in addition to improving water quality and reduce desalinization rates and finally to mitigate any future impact from climate change. In addition, the construction of water networks is proposed to facilitate the future urban extension areas in Palestine.

Finally, it is proposed to develop a hydro geological study for groundwater in the Palestinian part of the Jordan Valley to better understand the behavior and development options of the aquifer system.

### 4.1.3 Sustainable Agriculture

The interventions related to the sustainable agriculture focus on improving water use and irrigation efficiencies and economic outputs in the Jordan Valley, meanwhile limiting the agricultural water use in Israel and Jordan to the 2010 levels.

Increasing the agricultural value which is the focus of interventions which implies people making more money and water use is most efficient. This requires access to land and tenure security, access to water, and access to markets. The private sector is to play an important role in promoting these improved investments in agriculture, while the role of the government is to provide an enabling policy environment, including effectively monitor and force regulations with respect to water use and pollution prevention and support family farms that are focusing on the LEISA agriculture (Table 4.4).

In Jordan, the focus is on irrigation efficiency and economic output per unit of the crop per drop per water and on reuse of treated waste water. In the Palestinian, further development of irrigation is suggested allowed for four thousand hectares and six thousand hectares currently irrigated by settlers will be transferred over to Palestinians.

Furthermore commitment from all three countries will be required to successfully implement the proposed agricultural investments. The objective is that eventually there will be an integration and coordination of the three countries whereby each country uses its comparative advantage in terms of agricultural products.

**Table 4.4** Sustainable agriculture related interventions

A01	JOR	Jordan Valley Greenhouses Expansion Project
A02	JOR	Jordan Valley Extension Services Improvement Project
A03	JOR	Jordan Valley Drip Irrigation Improvement Project
A04	JOR	Jordan Valley Post Harvesting Support Project
A05	JOR	Jordan Valley Irrigation Efficiency Improvement Project
A06	JOR	Jordan Valley Authority Support Project
A01	PAL	Shifting in Cropping Patterns
A02	PAL	Rehabilitation and Upgrading of Water Systems
A03	PAL	Water Right Policies and Regulation
A04	PAL	Operate and expand the Agro-Industrial Park
A05	PAL	construction of Agricultural Roads
A06	PAL	enhancement of Palm Production'
A07	PAL	Development and Support livestock Sector
A08	PAL	Support to Women Organizations and Bedouin Communities
A09	PAL	Land Rehabilitation
A10	PAL	Strengthening of Extension Services
A11	PAL	Promotions of Farmers Cooperative
A12	PAL	Jordan valley Credit Program
A13	PAL	LEISA Research Certification
A14	PAL	Establish an Agro-Industrial Zone in the Northern JV
A15	PAL	Hand over of Settlements Agricultural Lands

Improving the agricultural water use efficiencies is an important goal under this strategic objective. This will require setting up a system for organizing, regulating and monitoring the water efficiencies in agriculture, based on the WEDO/EcoPeace Foot Print approach and international best practices. This requires assessment and analysis of current extension services and related flaws, based on field visits and interviews; provision of improved extension services to better manage and monitor water use and distribution; setting up a training center in the Jordan Valley—special focus on agricultural water efficiencies and water-related themes; and provision of services to optimize agriculture field water efficient crops.

The purpose of this regional co-ordination intervention setting up a regional coordination structure, or Steering Committee, among key Jordanian, Israeli and Palestinian governmental stakeholders for the implementation of the proposed national and regional interventions in the Jordan Valley with regards to the Agriculture. The objective is that this Steering Committee will eventually be embedded in the structures of the overall River Basin Organization for the Jordan Valley (ref. intervention IC01 REG Jordan River Basin Organization).

Further it will be required to expand the number of greenhouses in the LJR to increase agricultural production and revenues, particular in Jordanian agricultural areas PS 41 and PS 55, and to expand the use of drip irrigation in the northern part of the Jordan Valley and to increase the operations and efficiencies of drip irrigation of the southern part of the Jordan Valley.

In addition, this plan proposes to increase the quality of extension services to all Palestinian and Jordanian farmers in the JORDAN VALLEY, and linking these services to the existing 26 WUAs in the Jordanian part of the valley. Palestinian WUAs or farmer organizations have not yet been established. It is proposed to facilitate groups of Palestinian family farms to invest jointly in user self-provision of irrigation, processing and/or marketing services for high value export crops.

This also requires that credits will become available to the farmer, which requires setting up a credit program focusing on semi-subsistence family farms, to overcome financial bottlenecks they face in adapting GAP and LEISA agricultural practices, and investing in drip irrigation and green houses. This also requires research activities, such as for obtain LEIA certifications.

In order to raise the economic outputs of the agricultural sector, it will be required to improve the post-harvesting and marketing potentials of the farmers in the Jordan Valley. This requires organizing farmers within the Jordan Valley in product organizations; providing them with relevant local and international market information; related product quality requirements, prices and logistic requirements; assisting the farmers with development of good business models and information of product processing and agro-industry, marketing approaches and access to export markets. Finally it is proposed to assisting the farmers with implementing joint pilot export initiatives for certain products.

Currently some large Jordanian farmers outsource their irrigation operations to specialized (private) operating organizations. These specialized firms apply computerized operating system linked to weather stations and dedicated operating software. It is proposed to expand these services to other farmers in the Jordan Valley as well.

This plan furthermore proposes to strengthen the capabilities of the Jordan Valley Authority in its role as authority and regulator of agricultural water supply in the Jordan Valley. This includes strengthening their water data collection and management and water sector planning capacities; improving the SCADA system and the operations of water storage and distribution networks in the Jordan Valley, and strengthening the role of JVA towards supervising the WUAs in the Jordan Valley.

For the Palestinian farmers it will be required to reduce their per dunum agricultural water demands through the adaptation of cropping pattern, and at the same time to

increase their water availability by enhancing water efficiency from wells and pond in the Jordan Valley. This will also require that policies, regulations and enforcement are developed to better organize agricultural water rights. Furthermore it is proposed to establish 100 dunums of male Palm trees farms and provide them with reproduction seeds, in addition to the construction of 1000 ton capacity packaging and storage centre.

Since 2014 an agro-industrial park is under construction near the city of Jericho. This will contribute to strengthening the agricultural economic outputs considerably. The benefits of the agro-industrial park are to be maximized and expanded where possible, including development of a similar agro-industrial zone in Northern Part of the LJV. It is proposed to support and strengthen the Palestinian livestock sector through providing buildings, tools, milking machines, by improving health safety through the introduction of new yoghurt processing units and related measures. It is furthermore proposed to strengthen the Palestinian women organization programs, enhancing the economic conditions for women, including in the Bedouin communities.

The Palestinian agricultural sector is relatively small in size. It is therefore proposed to increase the irrigable Palestinian land by 40,000 dunums, enhancing the agricultural production and increasing the food security in Palestine. Better and more agricultural roads need to be constructed to increase the accessibility to the different Palestinian agricultural areas, and upon independency of the Palestinian state the 60,000 dunums currently being irrigated by the Israeli settlers in the study area are to be handed over to the Palestinian.

#### 4.1.4 Jordan Valley Governance

Better coordination will be required to improve management of the valley's joint land and water resources, including water quality.

This Master Plan proposes establishing a trans-national Jordan River Basin Organization and creating a Palestinian Jordan Valley Authority in the Palestinian part of the Jordan Valley.

In preparation for a final peace agreement in the Jordan Valley, it is proposed to assess the feasibility and institutional set-up of a transboundary river basin organization (RBO) in line with the UN Watercourses Convention. The RBO's key objective is to ensure coordinated water resources and quality management between riparian countries Jordan, Israel and Palestine on a shared Jordan River Basin, while addressing the legitimate social and economic needs of each of the riparian states, and to enable joint development and management of water resources infrastructure between the riparians. The Organization may act as

a coordinating body for the riparian countries of the LJR, fostering co-operation over water resources through a coordinated, transparent and democratic process, and might ultimately include the collaboration with Syria and Lebanon as well in the context of the whole Jordan River Basin. The objective is that the sector related Steering Committees will eventually be embedded in the structures of this overall River Basin Organization for the Jordan Valley.

The organization may be supported by a technical support team, responsible for managing and exchange of trans-boundary water quantity and quality information, and development of a shared water databank among the three countries. The organization could also focus on joint management of trans-boundary infrastructure, tourism development, nature protection and urban expansion related issues. As reference earlier programs under EXACT—Water Data Banks Program can be looked at.

In addition, it is suggested to establish a single Palestinian entity that is responsible for development planning and regulation of the Palestinian part of the Jordan Valley, similar to the JVA on the Jordanian side. This authority shall also address political, economic and environmental sustainability management issues.

#### 4.1.5 Ecological Rehabilitation

The Lower part of the Jordan River used to flow freely for thousands of years from the Sea of Galilee to the Dead Sea creating a lush wetland ecosystem, rich in biodiversity. The proposed interventions focus on restoring the good ecological status of the Jordan Valley. This will benefit the environment, and will improve the level of eco-services to the people in the valley. The eco-services that the rehabilitation river system will provide, typically include: access to the river for recreation and tourism reasons; water conveyance and supply and minerals (from Dead Sea) (Table 4.5).

The ecological restoration interventions proposed below depend however on the condition that first the pollution sources are to be removed from the valley, as discussed before. The aim of the Jordan River Environmental Flows Project is to restore and rehabilitate the Lower part of the Jordan River by increasing the water flow level in the river to an environmental efficient level that will aid in supporting not only the river riparian ecosystem services and biodiversity, but also the biodiversity of the valley in general. This project will depend on the gradual improvement of water quality, water supply and environmental flow into the river, and will include design and implementation of dedicated ecological restoration projects. The realization of this intervention is the corner stone for the success of most of the rest of interventions within this category.

**Table 4.5** Ecological restoration related interventions

E01	REG	Jordan River Environmental Flows Project
E02	REG	Jordan River Ecological Restoration Project—Regional
E03	REG	Jordan River Fisk Stock Restoration Project
E04	REG	Nature Protection Areas and Management Plan
E05	REG	International Accreditation of the Lower Jordan River Valley
E06	REG	Jordan Valley Regional Coordination on Ecology
E01	ISR	Jordan River Ecological Restoration Project—Israel
E01	JOR	Ecological Corridors Around Valleys and Dams
E02	JOR	Wetlands and Aquatic Fauna Restoration Project
E03	JOR	Ecological Monitoring and Management Project
E04	JOR	Jordanian Eco-parks and Projected Areas Project
E01	PAL	Nature Protection Areas and Management Plan

The aim of the Ecological Restoration Project for the Lower part of the Jordan River is to restore the green character of the river again—supporting not only the riparian ecosystem services and biodiversity, but also the biodiversity of the region in general. This project will depend on the gradual improvement of water quality, water supply and environmental flow into the river, and will include design and implementation of dedicated ecological restoration projects and eco-parks along its borders, as well as detailed surface water quality and ecological protection and monitoring projects. One of these projects may relate to assigning “nitrate” vulnerability zones along the river, to prevent emissions of nitrate from farmer practices into the river system.

An important project shall contain various components including specific sections with valuable habitats along the river designated as “no-touch” zones; commitment to ecological rehabilitation for several years while constantly monitoring the changes; expand the river flood zone, including side wadis, rehabilitation of river banks; dredge the flow channel where needed, and protect buffer zones between the cultivated agricultural lands and the habitat along the stream.

This project requires enriching the diversity of natural vegetation with the expected improvement in water quality; treating and removal of invasive species and restoring diverse original (native) habitats to increase biological diversity in accordance with their suitability and the expected flow regime of the river. It furthermore requires preserving the stream meanders, including river bank protection and vegetation management.

Other requirements include landscaping and vegetation rehabilitation in river areas where fragmented, to enable continuous eco-zones, managing the environmental flow

regimes in accordance with water availability, including regulated floods for the encouragement of vegetation development in riparian buffer zone and river maintenance in the first period after planting to prevent the overrun by common reed.

It is expected that maintenance and water quality monitoring can be reduced to a minimum after the vegetation is established. This project will be required to create sequences of ecological corridors along the stream including the possibility for the migration of fish upstream to the Yarmouk, development of specific touristic and hiking routes along the river and setting up a tri-partial river management structure for implementation and monitoring. Finally, the project will preferably start with a pilot restoration project on each side, such as in Wadi Ziglab in Jordan.

The aim of the Jordan River Fish Stock Restoration Project is to restore and protect the natural fish stock of the river and to recreate the aquatic structure, meeting the future quantity and quality standards of the water flow in the river.

The aim of the proposed Nature Protection Planning project is to make a detailed assessment of the nature and ecological status through the Jordan Valley, including the nature areas designated earlier by the Israeli Military Authorities in the West Bank, and will lead to defining plans and policies for nature preservation and protection areas, including grazing lands and parks, under Palestinian, Jordanian and Israeli Law, and development of ecological protection plans beyond.

The aim of obtaining international accreditation for the Jordan Valley with international organizations such as UNESCO World Heritage, Ramsar and IUCN Protected Areas is to draw substantially more international attention to the Jordan Valley and to create related ecological protection and economic growth opportunities. However, such accreditation will likely depend on a final peace settlement between Israel and Palestine, and appropriate integrated management structures for the valley.

The purpose of the regional co-ordination intervention is setting up a regional coordination structure, or Steering Committee, among key Jordanian, Israeli and Palestinian governmental stakeholders for the implementation of the proposed national and regional interventions in the Jordan Valley with regards to the Ecology. The objective is that this Steering Committee will eventually be embedded in the structures of the overall River Basin Organization for the Jordan Valley (ref. intervention IC01 REG Jordan River Basin Organization).

The aim of the Jordan River Ecological Restoration Project in Israel is to restore the ecology of the Jordan River Section between Sea of Galilee to Naharayim (fully located

in Israel) and between Naharayim and Bezeq (together with Jordan) as described in the regional intervention E01 REG. This intervention aims not only at the riparian aqua ecosystem services and biodiversity, but also the biodiversity of the region in general.

The aim of the Jordanian Ecological Corridors project around Valleys and Dams is to restore the natural vegetation in areas surrounding dams in the eastern Jordan Valley. This includes also restoration activities in areas surrounding the valleys that flow into the Lower part of the Jordan River. This intervention is designed to support riparian areas ecosystem services and biodiversity, which will have far reaching positive impacts on the biodiversity of the region in general. In addition, work on this intervention will include the improvement of side valleys channel systems and discharge channels; and the reintroduction to these areas the natural plants and forest species as part of a systematic ecological restoration of the eastern Jordan Valley.

The aim of the Jordanian Wetlands and Aquatic Fauna Restoration Project is to recreate the wetland and aquatic structure of the valleys flowing into the Lower Jordan and Yarmouk rivers. This intervention is intended to create a balanced ecological system in which wildlife and aquatic fauna is re-introduced in all relevant elements of the Jordan Valley. In particular, this intervention targets a select number of endemic dragonflies, reptiles, endangered and rare species of relevance to the Jordan Valley. Indirectly, this intervention will have a positive impact on the aquatic life and ecosystem services of the Lower part of the Jordan River as well.

The aim of the Jordanian Ecological Monitoring and Management Project is to protect and regularly monitor the reservoirs of the Arab, Ziglab, Shueib and Kafrein dams from pollution; to create a water management plan for the dams in order to stabilize the populations of natural fish, Bat, Fresh water turtle, Common Otter Egyptian fruit bat; and to declare areas around the Yarmouk and Jordan river as protected national rangeland or forest reserves: including Wadi Damya, Wadi Al Kharar, and King Hussein Bridge surrounding areas.

Finally, the Jordanian Eco parks and Protected Areas Project envisages protection of a number ecological parks and carefully selected special zones including a number of bird observation sites. These include designating the Bakoura area, unique for its natural and cultural values, as a National Park; designating the area of the Al Hujaija Tree as a National Natural Monument; designate the Karamah dam area as a National Park; setting a bird monitoring center at the Bakoura Park, Karamah dam area, and the Jordan River, and expanding the SHE ecological park in the westerly direction until reaching the Jordan River.

### 4.1.6 Sustainable Tourism and Cultural Heritage Development

Sustainable tourism and cultural heritage development are key strategic objectives for saving the intrinsic cultural heritage and local culture values in the valley, as well as for boosting the economy and create jobs. This will require investments in regional and national projects of various kinds by both the public and private sector. Particularly the investments related to hotels, accommodations and touristic attractions will have to be taken up by the private sector (Table 4.6).

The related challenges, as identified by the Palestinian National Strategic Master Plan, include better enforcement and updating existing laws, by laws and regulations; developing urban plans with a clear tourism development vision; more archaeological research; better natural and cultural heritage management, tourism product and infrastructure development and management and strengthening fund management capacities.

In addition it will be essential that the three core parties will develop a regional tourism development policy framework to facilitate and support private investments and take away related obstacles. For instance, the administrative procedures for obtaining visa for various nationalities will have to be simplified, the reputation of the valley as a safe and pleasant destination will have to be established, and the infrastructure, transportation means and accessibility of the valley will have to be improved.

The proposed regional projects include development of a regional Southern tourism center at the meeting point of the Jordan River with the Dead Sea, aiming at providing information and guidance to tourists and visitors to the Jordan Valley. The center shall be linked to the main tourism related websites for Jordan, Israel and Palestine, and shall be linked to the main tourism support centers. It also includes improving the tourism facilities at the Baptism site along the River Jordan, particularly with regard to establishing a good restaurant, a rest house, a bookshop and souvenirs shop on the Jordanian site, and a river walk, and integrating the Jordanian and Palestinian site into one concept.

Furthermore it is proposed to combine two eco-parks on both side of the river: Al Bakoura and Naharayim/Gesher into one Jordan River Peace Park'. Here already a small island was created at the junction of the Jordan and Yarmouk Rivers, and the Jeser Al Majama/Gesher site, known as the historical crossing point of the Jordan River Valley. This intervention aims at creating a single cross border tourism bubble with kayaking down the river, a bird park, visitors centers, use of the old railway line, accommodation centers, souvenir shops, and nature and river walks and paths.

**Table 4.6** Sustainable tourism and cultural heritage related interventions

C01	REG	Jordan River Mouth Tourism Information Center
C02	REG	Jordan River Baptism Site Improvement Project
C03	REG	Jordan River Peace Park Improvement Project
C04	REG	Jordan River Regional Routes
C05	REG	Cultural and Historic Museum for the Lower Jordan Valley
C06	REG	Jordan Valley Regional Coordination on CH and Tourism
C01	ISR	Tsemach to Naharayim Tourism Development Project
C02	ISR	Gesher to Bezeq Stream Tourism Development Project
C01	JOR	Pella Tabaqat Fahl Site Improvement Project
C02	JOR	Abu Ubaydah Tomb Improvement Project
C03	JOR	Cultural and Historic Museum for the Lower Jordan Valley
C04	JOR	Archaeological Landmarks Development Project
C01	PAL	Cultural Heritage Protection and Management Plan
C02	PAL	Tourism Branding and Promotion
C03	PAL	Museum of Natural and Cultural History of the Rift valley
C04	PAL	Rehabilitation of the Catchment of Ancient Jericho
C05	PAL	Rehabilitation of salt industry sites, Rusheideyeh
C06	PAL	Rehabilitation of Ancient Jericho
C07	PAL	Rehabilitation of Hisham's Palace
C08	PAL	Rehabilitation of Tel Abu El Alayek
C09	PAL	Rehabilitation of Khirbet El biyadat or Tel Ouja
C10	PAL	Rehabilitation of Khirbet El Makhrouq
C11	PAL	Rehabilitation of Tel El Hamma
C12	PAL	Archaeological Landmark Features
C13	PAL	Spa, Thalasso therapy and Balneo therapy Center
C14	PAL	Jesus Village
C15	PAL	Hiking trail Development
C16	PAL	Sport and Adventure Center
C17	PAL	Travelers Centers
C18	PAL	Hotel Rooms 4 Stars (Resort)
C19	PAL	The Mud Brick Youth Village
C20	PAL	Youth and Guest houses

Finally it is proposed to establish a coordinated authentic network of museums in the three countries on a regional level, each one complementing the other, and to provide information on the natural, historic and cultural history of the valley from different perspectives, including specific information on the pre-historic importance of sites throughout the valley and key natural and cultural heritage

objects and artifacts. This network will support growth of the tourism sector in the valley.

The purpose of the regional co-ordination intervention is setting up a regional coordination structure, or Steering Committee, among key Jordanian, Israeli and Palestinian governmental stakeholders for the implementation of the proposed national and regional interventions in the Jordan Valley with regards to the CH and Tourism. The objective is that this Steering Committee will eventually be embedded in the structures of the overall River Basin Organization for the Jordan Valley (ref. intervention IC01 REG Jordan River Basin Organization).

The Israeli tourism development interventions aim at developing the region between Tsemach and Naharayim and between Gesher to Bezeq. This includes rehabilitation of Tsemach Old Police Station into visitor information center; restoring the Zero Canal and its flow, to enable rafting and related water tourism; to create combined agriculture—tourism facilities into specific rural tourism concepts and to develop water sports facilities between Naharayim to Old Gesher.

It also includes further development of existing museums, like the Gordon, Pre-historic and agriculture museums; further development of hiking and bicycling tourism routes with various information themes along the river section between Tsemach and Naharayim; rehabilitation of various small sized archaeological sites and tels, and improvement of their tourism facilities and development of a third baptism religious site at Old Gesher as part of the Jordan River Peace Park.

The Israeli tourism development project also includes restoration of the old British Tegart police station at Gesher into a hotel and welcome facility, to develop water sports facilities between Naharayim and Old Gesher; to build a promenade along the river near Yardena and to further develop the Beit Shean tourism center in the Ottoman Khan area and linking this center to the surrounding tels and the future river tourism along Harod and the Jordan River. It includes rehabilitation of old Flour Mills, construction of a Café and lookout over Jordan River near the Sheikh Hussein Bridge and expansion of Gane Khulda camping site along Harod (500 m from Jordan River) in addition to the current Mongolian tent facilities.

Finally, the Israeli tourism development project includes conversion of current Rupin Kibbutz Fish Pond near Bezeq Stream and Jordan River into a Bird Park; development of a Tourism Information Center within the joint Jordanian–Israeli Gateway Economic Park (3 km north of Bezeq), and linking this to existing facilities and museums; development of hiking and bicycling tourism routes with various information themes along the river section between Gesher and Bezeq, and rehabilitation of various small sized

archaeological sites and tels, and improvement of their tourism facilities.

The Jordanian interventions include developing and improving the tourism facilities at Bakoura National Park, Pella and at Abu Ubaydah, particularly with regard to establishing motels, good restaurants, rest houses, bookshops and souvenirs shops, and link the sites to the 20 Decapolis cities. Furthermore it is proposed to develop a Jordanian Cultural and Historic Museum linked to the proposed valley wide network, including information on the natural, historic and cultural history of the valley; specific information on the pre-historic importance of Deir Alla and presentations of key natural and cultural heritage objects and artifacts. Finally it is proposed to develop a series of important archaeological Tel landmarks in the Jordan Valley. This shall include visiting facilities, provision of touristic and historic back ground information. It is proposed to linking the various sites by touring tracks for pedestrians and bicyclers, linking sites like Tell El Hammar; Tell Es Saidiyeh; Tell Es Sakhneh; Tell Kreinah; Tell North Shuna and Tell Umm Hammad.

The proposed Palestinian interventions include developing a cultural heritage protection and management plan focused on authentic tourism attractions that represent the value of the JV, including site development plans and a Cultural and Natural Heritage Preservation Center (CNHPC). Next it is proposed to promote and brand the Palestinian tourism sector internationally, to stimulate private enterprise growth and investments. Furthermore it is proposed to develop a Palestinian Natural and Cultural Museum linked to the valley wide network, including information on the natural, historic and cultural history of the valley; specific information on the pre-historic sites in the region and presentations of key natural and cultural heritage objects and artifacts.

In addition it is proposed to perform eight particular Palestinian cultural heritage rehabilitation projects, including Ancient Jericho and its surroundings; the salt industry sites at Rusheideyeh; the Hisham's Palace in Jericho Municipality; Tel Abu El Alayek; Khirbet El Biyadat; Khirbet El Makhrouq and Tel El Hamma, as well as a series of valuable Water Mills, Water Sugar Mills, Water Aqueducts, Water Reservoirs and Watch Towers in the region. Furthermore it is proposed to develop a Jesus Village near Jericho and rehabilitate the Spa Thalassotherapy and Balneotherapy Centers into attractive religious and tourism destinations.

Furthermore it is proposed to develop attractive Palestinian hiking trails for tourists and for local people, particularly between Hezme and Jericho; Kofor Malek and Auja; Nablus and Jiftlik; Tubas Tayseer and Ein el Beida, and to develop a travel center and a Sports and Adventure Center for local, regional and international tourist, including

camping facilities and recreation facilities for family based tourism.

In anticipation of the growing number of tourists, it will be required to expand the volume of hotels with an additional 1550 rooms in the region as well. In addition it is proposed to develop traditional mud brick compounds to provide for an authentic stay in a traditional JV village environment, and youth and guest houses to facilitate for low-budget travelers in the region.

#### 4.1.7 Sustainable Urban, Energy and Infrastructure Development

The interventions related to sustainable urban, energy and infrastructure aim at developing sufficient and affordable urban housing and roads, energy and telecom infrastructure and public facilities in the valley until 2050 (Table 4.7).

The regional energy development projects aims at creating renewable energy generation schemes in the Jordan Valley, leading towards a 50 % renewable non-fossil energy

share throughout the valley by 2050. The regional intervention aims at promoting the use of renewable energy sources, such as biogas; waste-to-energy; small scale solar energy and wind energy potentials in the valley, as well as promoting sustainable energy co-operation in the region. Particularly this intervention aims at boosting the potentials in terms of solar energy, and linking this to vocational education and research facilities in the Jordan Valley.

Furthermore it is proposed to rehabilitate and open the Adam Bridge and Abdullah Bridge for agricultural goods and commercial traffic, as an additional outlet for imports and exports to or through Jordan; and to create more efficient border crossing regulations and procedures for all nationalities at the existing Allenby/King Hussein Crossing and Sheikh Hussein Crossing.

The purpose of the regional co-ordination intervention is setting up a regional coordination structure, or Steering Committee, among key Jordanian, Israeli and Palestinian governmental stakeholders for the implementation of the proposed national and regional interventions in the Jordan Valley with regards to the Urban and Infra Dev. The objective is that this Steering Committee will eventually be embedded in the structures of the overall River Basin Organization for the Jordan Valley (ref. intervention IC01 REG Jordan River Basin Organization).

The current route 65 in Jordan is the main north south road through the Jordan Valley, and crosses all major villages in the valley. However, traffic along the road is dense and relative dangerous, and intersected by many minor roads and used by pedestrians, slow traffic and heavy traffic alike. It is proposed to support the plans of the Ministry of Transportation, who is responsible for Infrastructure, to rehabilitate this road for local traffic purposes only, including safe pedestrian sideways, signs and lighting, and safe crossings, bypasses, green corridors, related parks, and meanwhile constructing a new parallel North-South highway for heavy traffic that bypasses the urban centers.

The focus of the Israeli Center of Excellence at Kinneret College, located at the college southern campus, is on Water and Environment Innovation and Technology open for Israeli, Jordanian, Palestinian and international researchers and students. It aims at developing related research facilities, laboratories and study programs.

The Eden Regional Agricultural Research and Training Center in Israel aims at developing a regional center focused on crop management, improved water management and increase production quantities and qualities. This center is currently based on know-how developed in Israel and serves the Israeli farmers in the Jordan Valley; its activities are also attended today by Jordanian and Palestinian farmers. The aim is to expand this center for the benefit of all farmers in the Jordan Valley, including Israeli, Jordanian and Palestinian farmers.

**Table 4.7** Urban and infrastructure related interventions

U01	REG	Non-fossil, Renewable Energy Development Project
U02	REG	Adam/Damia Bridge Rehabilitation Project
U03	REG	King Abdullah Bridge Rehabilitation Project
U04	REG	Efficient Border Bridges Crossings
U05	REG	Jordan Valley Regional Coordination on Urban and Infra Dev.
U01	ISR	Center of Excellence at Kinneret College
U02	ISR	Eden Regional Agricultural Research and Training Center
U01	JOR	Infrastructure Development Project
U02	JOR	Urban and Infrastructure development Master Plan
U03	JOR	Higher Education and Vocational Development Project
U04	JOR	Non-fossil, Renewable Energy Development Project
U01	PAL	Urban and Infrastructure development Master Plan
U02	PAL	Educational and Vocational Needs Assessment
U03	PAL	School building Program
U04	PAL	Higher Education and vocational Training Program
U05	PAL	Health Care services Development Project
U06	PAL	Electricity and Telecommunications Development Project
U07	PAL	Develop Renewable Energy Resources
U08	PAL	Import and Export Logistics Center
U09	PAL	Utilization of Dead Sea Minerals for Economic Production

The aim of the suggested Jordanian and Palestinian urban and infrastructure master plans is to develop detailed urban, infrastructure and physical land use plans for the LJV, taking into account the foreseen population and economic projections of the Jordan Valley, and considering to foreseen growth of the population to over 600,000 people in Jordan and 500,000 people in Palestine. This requires about numerous housing or apartment units in 2050, including related infrastructure, transport, water, sanitation, electricity and IT related utilities, public services, schools and recreational areas and facilities.

These Jordanian and Palestinian schools and higher education and vocational development projects aims at establishing primary, secondary and university level education facilities in the Jordan Valley to accommodate (future) residents and to utilize hands on education and training to meet the developmental needs and the growing population, including agricultural and environmental research. Addition projects in Palestine are development of healthcare services, including centers and ambulances, and a dedicated import and export center.

The aim of the Palestinian Dead Sea Minerals Development project into create a research and development centre and production facilities for the extraction of Dead Sea Minerals and Salts, which would be utilized for production of cosmetics and other production inputs, as well as for Palestinian export of raw materials for production by other countries.

## 4.2 Priority Setting

### 4.2.1 Introduction

The implementation sequence and timing of the interventions presented above depends on various factors. First, those interventions that require full co-operation among the three riparian countries can only be implemented upon establishment of Palestine as an independent state, which for the sake of this NGO Master Plan was set as 2020.

Secondly, some interventions have a logical sequence, where the initiation of one intervention depends on the results of others. For instance, rehabilitation of the ecosystems in the Lower part of the Jordan River depends first on a successful removal of inflow of polluting substances into the river.

Thirdly, the sequence of the interventions depends on the sense of urgency felt by the key stakeholders considering the limited financial resources and absorption capacities of implementing organizations. In this context, the project organized a series of stakeholder meetings, where the long list of interventions were presented, discussed and prioritized in accordance with a pre-set list of evaluation criteria.

SIWI developed the criteria for prioritizing the interventions based on a quantifiable, cross-cutting approach that scores interventions according to how they contribute to WEDO/EcoPeace's vision for the Jordan Valley, including:

- *Prosperity* Interventions should create opportunities to lift residents off poverty and contribute to the region's economic development;
- *Peace* Interventions should have a peace-dividend, contributing to the wider integration of the river basin and create space for constructive cooperation between the three riparians;
- *Sustainability* Each intervention should aim to maintain a positive impact on the environment and avoid degradation of existing resources, maintain a positive impact on society and become self-sufficient financially within a specified period of time.

The stakeholders were asked to evaluate the interventions against the following considerations. To the extent that the interventions:

- Increase water availability, including drinking water and sanitation?
- Generate positive socio-economic impacts including peace prospects?
- Eliminate vector borne diseases and other health impacts?
- Improve habitats and ecosystems?
- Improve water quality?
- Are technical sound (e.g. ease of implementation, redundancy and robustness of the solution, flexibility to changing conditions, durability)?
- Are compatibility to existing plans and policies?
- Require costly investments?
- Receive political support?

### 4.2.2 Short Term Versus Long Term Interventions

As presented above, the interventions were prioritized and grouped into: (1) Short term interventions and (2) Long term interventions. Short term interventions are defined to possible be implemented before 2020, the suggested year of the establishment of an independent Palestinian State. Long term interventions depend on the outcome of others, or on the prior establishment of the Palestinian State. They can be implemented after 2020.

All proposed pollution control related interventions received high priorities, and can be implemented in the shortest possible notice. These interventions will have direct



positive impacts in terms of environment, ecology and public health, and will pave the way for other interventions, such as restoration of the ecology in the valley and maximized reuse of treated wastewater. Next, the sequence and timing of the interventions related to pollution control depend on the financial resources and absorption capacities of implementing organizations. An exception is the suggested intervention related to remediation of mine fields and Israeli military bases, which depends on reaching a peace agreement between Israel and Palestine and should therefore be considered a Long Term intervention.

The proposed water management and river rehabilitation interventions include both short term and long term interventions. The short terms interventions include all projects related to wastewater treatment and reuse and rehabilitation of springs and wells. The long term interventions depend on regional co-operation or Palestinian access to area C, such as the development of the Jordan River as the natural conveyance systems, drilling new wells in area C and projects directly related to joint ecological and economic water management of the Jordan River.

The proposed agricultural interventions also received high priorities, since they have direct positive impacts in terms of water use efficiencies and increasing agricultural economic outputs. Most of the Jordanian interventions can be implemented in the shortest possible notice, with the exception of wastewater reuse actions, which depend on the realization of full collection and treatment of generated wastewater in the valley. The Palestinian agricultural interventions largely assume Palestinian control over area C, and are therefore mostly to be considered as Long Term Interventions. Some exceptions are policies and capacity strengthening interventions, such as supporting communities and organizations, promotion of farmer associations and strengthening the extension services in the valley.

The proposed basin governance interventions are by definition long term, since they depend on either full accessibility of the Palestinian Authority over the areas C, or on the establishment of Palestine as an equitable riparian partner. The proposed ecological rehabilitation interventions are long term as well, since they depend on either on a successful removal of inflow of polluting substances into the river, or on full accessibility of the Palestinian Authority over Area C.

Some of the interventions on sustainable tourism and cultural heritage can be implemented in the short term, while others have a longer perspective. All Jordanian site specific interventions can be implemented in short term, and so can the proposed Palestinian site specific interventions in areas A. All projects with a regional component, such as establishment of a network of cultural and natural museums or regional tourism information centers, or project located in area C are considered to be long term interventions.

The proposed investments in Urban and Infrastructure Development assume a supportive economic development, which goes hand in hand with the realization of the above mentioned types of interventions. Also considering the fact that they are costly and require donor, public and private financing, and these interventions are all considered to be long term, although preparatory work might advance before 2020.

### 4.3 Disbursement and Finance

As presented in Table 3.5, the totally required investments are 4.58 Billion USD until the year 2050, excluding operation costs. The annually required disbursement schedule is shown in Fig. 4.1.

As shown above, the annual investment requirements gradually increase until the year 2025 and then gradually decline until the end of the planning period in 2050. During the short term period until 2020 the investment are still relatively modest, and mainly focus on pollution control, water management, agriculture and the tourism sector. The bulk in the investment will be required in the Long Term from 2020 onwards and include urban and transportation development investments. The annual investments will reach its maximum in 2025, when about 260 MUSD of investments will be required, of which 76 % relates to urban development and infrastructure investments (Fig. 4.2).

The disbursement requirements for the national Jordanian, Israeli, Palestinian and regional interventions are presented below.

This Regional NGO Master Plan for the Jordan Valley does not provide a detailed financing model for the required investments. The philosophy of this Master Plan predicts that the investments proposed here will gradually increase the economy of the region in a sustainable manner that will benefit the people, including related tax revenues, private savings, and eventually investment power; as well as the environment and the ecological status of the Lower part of

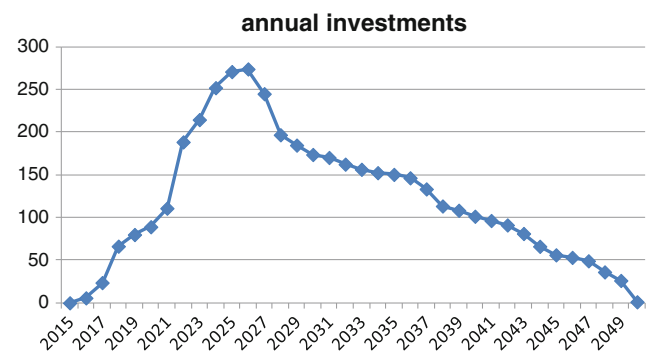
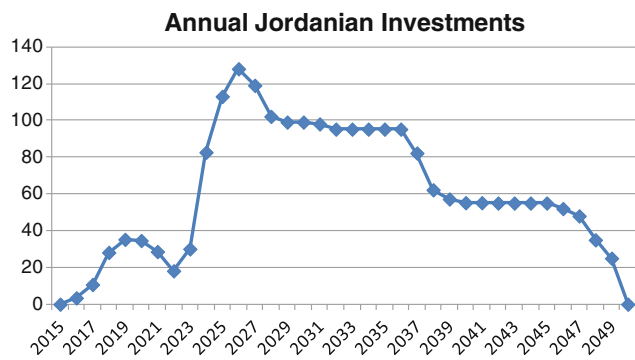
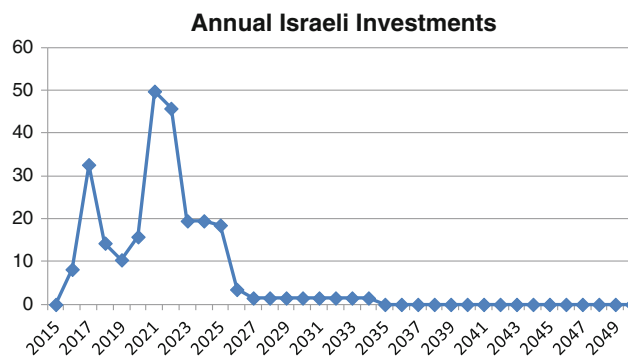


Fig. 4.1 Total disbursement requirements in MUSD per year



**Fig. 4.2** Jordanian disbursement requirements in MUSD per year



**Fig. 4.3** Israeli disbursement requirements in MUSD per year

the Jordan River itself. This will particularly be the case if regional co-operation among the three riparian countries will flourish in a peaceful and safe living environment, which will also lead to higher number of international tourists visiting the region.

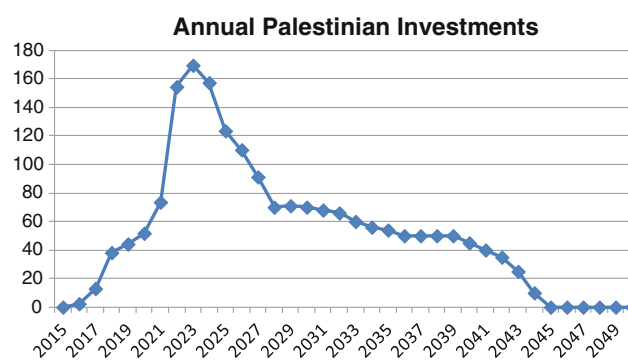
The Israeli financing requirements are to be provided by a combination of public and private Israeli investments. The type of financing required for Jordan and Palestine relates to the type of interventions, and will strongly depend, particularly during the initial 5–10 years of this Master Plan, on international donor funds. During this phase promotion and dissemination of this Master Plan and related investment plans will remain important to gain support from the international donor community. Particularly the NGO sector, including WEDO/EcoPeace may play a key role during this period.

It is expected that gradually the local and national Jordanian and Palestinian governments will gain finance strength as a result of economic growth and higher tax revenues, leading to a higher public sector participation in the required investments. The proposed Israeli national interventions will likely to be financed from the allocated governmental budgets and related private partnerships.

The private sectors in Jordan and Palestine will likely become increasingly important as well in contributing to the required investments, particularly for those projects that lead to healthy revenues against acceptable internal rates of return (IRR) (Figs. 4.3 and 4.4).

Examples may be the proposed water reuse projects; agricultural improvement projects, urban development projects and tourism—cultural heritage related investments. Also the farmers will be able to pay more “realistic” water prices once the basin economy grows and agricultural outputs improve. Combination may also be possible, such as Public–Private Partnership in which the government and the private sector join forces in those cases where this leads to win-win situations for both.

In this Master Plan it is assumed that the required investments in the Jordan Valley, particularly in Jordan and

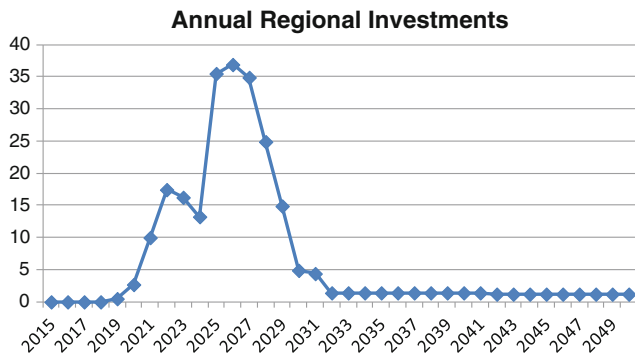


**Fig. 4.4** Palestinian disbursement requirements in MUSD per year

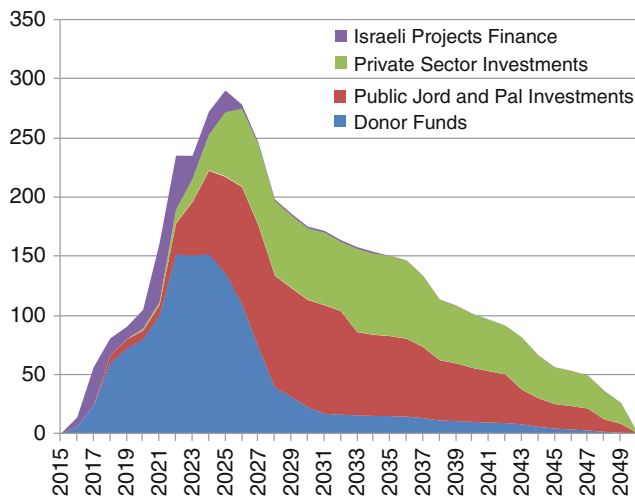
Palestine will depend on international donor funds at least until 2030, reaching its peak by 2023 with about 150 MUSD donor investment requirements for that year. It is assumed that gradually national public investments and later on private investment will catch up due to increasing economic opportunities in the valley. This leads to the following investment scheme for the total package of interventions that have been proposed and listed in Table 3.5, separated for donor funds, public investments and private investments.

#### 4.4 Institutional and Governance Aspects

The aim of the proposed interventions in this Regional Master Plan for the Jordan Valley is to use it as an advocacy tool with national stakeholders, international financiers and various actors of the international community to increase political will for the adoption in full or in part of the proposed interventions. The interventions described in Annex 1 include a suggested institutional setting for each. Financing for the proposed interventions has yet to be secured, and will require additional preparation and design activities, including elaboration of the proposed institutional and governance aspects, also depending on the specific requirements of the



**Fig. 4.5** Regional disbursement requirements in MUSD per year



**Fig. 4.6** Funding model for the Jordan Valley in MUSD per year

financiers, either nationally or internationally. However, it is foreseen that the national authorities will play the major role in implementation of most of the interventions, since its main task is the development, protection and improvement

of the water and environment in the Jordan Valley (Figs. 4.5 and 4.6).

The Municipalities and the civil community have to play an important role in the further preparation and implementation of the suggested interventions, since they represent the local population living in the valley, and they play a key role in providing services to these inhabitants in terms of water, wastewater collection and solid waste management. The subsidiary principle is again here relevant. In addition, proper Environmental and Social Impact Assessments, including stakeholder participation and if needed Resettlement Action Plans shall be part of all infrastructure preparation works.

Finally WEDO/EcoPeace Middle East is foreseen to play a key role in most of the interventions as one of the major NGO’s active in the Jordan Valley, particularly with regard to organizing grass root environmental protection activities, and engaging and organizing the local stakeholders in the further preparation and implementation of the proposed interventions. Furthermore, WEDO/EcoPeace as a unique organization at the forefront of the environmental peace-making movement is therefore very well equipped to help promote trans-boundary co-operation and dissemination components of the proposed interventions.

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