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MINISTRY OF WATER & IRRIGATION

JORDAN VALLEY AUTHORITY

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Jordan Valley Preliminary Land Use Master Plan Project

Final Land Use Report

Volume 1 of 5

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Abstract

The primary objective of this report is to analyze the problems and opportunities of the Jordan Valley and to create a preliminary land use plan for the Jordan Valley Authority JVA (JVA). JVA's mandate will change in 2004 and it will be forced to rely on its own sources of operating income, involving the private sector through construction, operations, or management of resources and economic ventures. Therefore, the results of this study must guide JVA and the Parliament in approving those lands that will be retained by JVA to support its future operations and those lands that will be returned to the National Treasury or private sector for their use.

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Acronyms Or Abbreviations

AMIR	Achievement of Market Friendly Initiatives and Results Program
a.s.l	Above Sea Level
b.s.l	Below Sea Level
BMPs	Best Management Practices
CC	Consolidated Consultants Engineering & Environment
CDG	Community Development Group
CIDA	Canadian International Development Agency
CMI	Chesrown Metzger International
CSBE	Center for the Study of the Built Environment
DOA	Department of Antiquities
DOS	Department of Statistics
EA	Environmental Assessment
EIS	Environmental Impact Statement
EU	European Union
FOE	Friends of the Environment
FoEME	Friends of the Earth Middle East
FTA	Free Tourism Area
GIS	Geographic Information System
GTZ	German Aid Agency
IBA	Important Bird Area
IUCN	International Union for the Conservation of Nature
JEPAFV	Jordan Exporters and Producers Association for Fruits and Vegetables
JES	Jordan Environment Society
JIB	Jordan Investment Board
JSDCBD	Jordan Society for Desertification Control and Badia Development
JTB	Jordan Tourism Board
JVA	Jordan Valley Authority
JVA IAS	Jordan Valley Authority Irrigation Advisory Service Unit
KAC	King Abdullah Canal
KAFA'A	Knowledge and Action Fostering Advances in Agriculture
KTD	King Talal Dam
LRD	Department for Lands and Rural Development
MCM	Million Cubic Meters (water)
MJVSA	Middle Jordan Valley Study Area
MOA	Ministry of Agriculture
MOE	Ministry of Environment
MOP	Ministry of Planning
MOT	Ministry of Transport
MOTA	Ministry of Tourism and Antiquities

MPWH	Ministry of Public Works and Housing
MWI	Ministry of Water and Irrigation
NCARTT	National Center for Agricultural Research and Technology Transfer
NTSI	National Tourism Strategy Initiative
NEAP	National Environmental Action Plan
NEF	Near East Foundation
NGO	Non-governmental Organization
NJVSA	Northern Jordan Valley Study Area
QIZ	Qualified Industrial Zone
RSCN	Royal Society for the Conservation of Nature
RSDS	Red Sea to Dead Sea Canal or Pipeline Project
SJVSA	Southern Jordan Valley Study Area
SWOT	Strengths, Weaknesses, Opportunities and Threats
TFR	Total Fertility Rate
UFW	Unaccounted for Water
USAID	United States Agency for International Development
WAJ	Water Authority of Jordan
WCA	Water Conservation Association
WTO	World Tourism Organization

Executive Summary

The objective of this consultancy, with funding from the United States Agency for International Development (USAID) under the AMIR Program, was to analyze the problems and opportunities of the Jordan Valley, and to create a Preliminary Land Use Plan (the Study) for the Jordan Valley Authority (JVA). JVA's mandate will change later this summer (2004), and it will be forced to rely on its own sources of operating income, involving the private sector through construction, operations, or management of resources and economic ventures. Therefore, the results of the Study must guide JVA and the Parliament in approving those lands that will be retained by JVA to support its future operations and those lands that will be returned to the National Treasury or private sector for their use.

Recognizing the JVA's Strategic Plan which includes a primary goal of water resource management, the project vision was to create a sustainable future for the Jordan Valley and the Jordan Valley Authority, by understanding current conditions and future needs. The challenge was to balance economic growth and development for the 191,000 people who live in the Jordan Valley and other stakeholders' interests, against enhanced quality of life through protection of the natural environment and cultural heritage. Using Focus Group and JVA input, the Study includes recommendations for improved public services and infrastructure development that will benefit communities and tourism.

Ecologically, the land use plan protects the unusual ecological attributes of the Dead Sea and the Jordan Valley, and it recognizes that the Valley (also known as Ghor) as part of the Great Rift Valley is one of the world's most important ecological corridors, acting as a geological navigational system and land bridge for thousands of migratory birds who annually journey from Africa to Europe. While ensuring the Jordan Valley's ecological properties and seeking to protect its dwindling water supply, the proposed Plan also protects existing investments, including agricultural, potash and related industry, and tourism related development.

The Study Team began by dividing the JVA's mandate area into three study zones, which begin at the Yarmouk River in the north and end at the Qatar area of Wadi Araba in the south. The Northern Jordan Valley Study Area (NJVSA) boundaries are the Yarmouk River to the Baptism Site, and the zone is characterized by large-scale agriculture that contributes to Jordan's food basket and small scale industry and tourism. The Middle Jordan Valley Study Area (MJVSA) boundaries are the Dead Sea area, and the zone is characterized by unique natural geological beauty, the historic Dead Sea coastline and related tourism development including a national park, hotels, and Mujib Reserve operated by the Royal Society for the Conservation of Nature (RSCN), and mineral extraction industries including potash and Dead Sea salt.

The Southern Jordan Valley Study Area (SJVSA) is the Southern Ghors and Wadi Araba, an arid environment graced by the unique desert environment of Wadi Araba, including the living heritage of Beduoin tribes, that is forming the basis under RSCN for a nature based tourism industry. All three study zones are peppered by world class archaeological and religious sites, nature reserves and IBAs or important bird areas, and a few important vernacular villages.

reviewing existing reports and data and analyzing existing baseline conditions on Farm Unit Lands (privately held), areas outside the boundaries of Zoned or Municipal Lands, and Other Lands (either owned by the private sector or National Treasury). Baseline conditions included infrastructure and municipal development, and current land uses such as agricultural, industry, and tourism. Working side-by-side with the Jordan Valley Authority Steering Committee and field staff, the Study Team operated under a participatory planning methodology that involved numerous stakeholders in the private sector, NGOs, and government ministries, as well as community focus groups, to arrive at a Strengths, Weaknesses, Opportunities, Threats (SWOT) analysis.

At the same time, the Team was photographically surveying the Jordan Valley, resulting in documentation of existing conditions on thousands of photographs that are linked to the baseline maps by GPS coordinates. Following the survey, Study Team specialists technically analyzed the land, and held a land use planning charrette that utilized land use criteria to arrive at recommendations on a series of baseline maps or GIS overlays, including a land use map with proposed new land uses and tourism linkages. The Study Team also created a map that illustrates those lands that the Jordan Valley Authority should retain and utilize for future economic ventures and related operating income, and those lands that the JVA should return to the private sector or National Treasury.

The results of this study, in addition to the aforementioned baseline maps and land use plan map, are detailed in this report which includes design guidelines and other policy recommendations to enhance future management of and development in the Jordan Valley, and a framework for sustainable fish farming at the JVA's dam sites to promote local tourism and agricultural industry.

The technical summaries that follow address a variety of Jordan Valley issues that were analyzed by the Study Team, including community or socioeconomic needs, environmental and cultural resources, water supply and demand, agriculture with improved cropping patterns, other types of industry, tourism, and public infrastructure.

(a) Socioeconomic Resources and Issues and Resulting Recommended Land Uses

The Jordan Valley's population of 191,000 people is about 3.5% of Jordan's total population. There are more than 55 villages in the JV, which are grouped into 10 municipalities. All of them are illustrated on the baseline maps.

Traditional families are larger and the fertility rate is higher in the JV than in other parts of the country. Therefore, it is projected that the population could reach 314,000 by the year 2020, putting increased pressure on water supply, land, and government services. The Study Team recommends strategies to support public awareness and population control in the JV.

Stakeholders throughout the JV favored tourism and other forms of industrial development, as their populations are young and urbanizing. The growth rate will create a supply of people who will require training for alternative employment, such as in the services sector and in product (handicrafts) development, as the current employment base of agriculture, government, and NGOs will not be sufficient to create a sufficient job base. The people of Sweimeh are already concentrated in the Dead Sea tourism industry, and this probably forecasts a future trend, as the region stabilizes and tourism grows.

Other community needs as expressed by focus group members and other stakeholders include the following:

- expanded municipalities for residential and other types of development;
- improved agriculture through larger farm units, reduced irrigation loss and increased water recycling (treated and grey), better marketing and exporting of products, and new industry such as organic fertilizer plants, juice factories, and water conserving crops such as date palms;
- improved public facilities including more comfortable schools and play areas, public parkland and beaches, sports cities, improved sewage and solid waste facilities, expanded bus service and roads system, and regional health and training centers;
- expanded protected areas for conservation of reserves and IBAs and tourism development including campsites, visitors information and related facilities;
- public awareness programs to stop littering and damage to archaeological and religious sites and to promote water conservation, fish farming, tourism development; and
- slightly expanded and better utilized industrial zones.

(b) Environmental and Cultural Resources and Issues

The Jordan Valley's resources are threatened by population growth, uncontrolled industry, tourism with an overdeveloped northern Dead Sea shoreline, agriculture with its water intensive crops and related chemical fertilizers, and the mismanagement of liquid and solid waste. Policies should be put in place to better regulate industrial pollutants and to address agricultural cropping patterns to decrease chemical fertilizers and encourage organic fertilizers, while increasing the use of Xeric or less water consuming crops and grasses. Sewage plants should be built to decrease pollution of existing water supply, and solid waste dump sites should be better managed to decrease problems related to contamination, odor and insect infestation.

In order to protect and encourage growth of flora and fauna for purposes of conservation and nature based tourism development, land use recommendations include intergarted ecosystem amanegment and conserving of the following IBAs, as recommended by the international NGO Bird Life International, and nature reserves as recommended by RSCN. The list includes, from north to south:

- the Yarmouk River Reserve and IBA,
- the North Ghor or Jordan Valley IBA
- the Jordan River Reserve and Maghtas IBA (coordinated in an integrated plan with MOTA's Sweimeh National Park, to be re-named the Dead Sea National Park),
- the Mujib Nature Reserve (already established) and IBA,
- the Wadi Bin Hammad-Haditha IBA,
- the Fifa Reserve and IBA,
- the Dana Reserve (already established) and IBA,
- the Wadi Araba IBA,

Also recommended for protection from development are wadis, sinkholes along the Dead Sea shoreline, 19 wetlands of which 13 are considered important ecological sites, unique geological formations, and areas around dam sites. For example, the Land Use Plan proposes that the Zarqa River basin be cleansed of existing municipal and industrial pollutants and that sewage be treated in the future to enable it to remain pollution free, so that the basin can become part of an environmental corridor of parkland to serve community needs and create nature based hiking/biking trails and passive recreation (e.g., picnicking). The Zarqa River Trail would link to the Jordan River Trail, which would run in a linear fashion from north to south from the Karameh Dam to the Dead Sea National Park, and connect from east to west through interwoven "green fingers" of parkland. Dam sites would also be protected and enhanced through fish farming.

The Land Use Plan recommends that a broad swath of the Jordan Valley's cultural resources be protected, including the archaeology, vernacular villages, religious sites (including the pilgrimage route of the Venerable Companions of the Prophet and the Baptism site of Jesus), and living heritage, as the basis for increased nature based and cultural heritage tourism. Particularly, the living heritage of the communities and the Bedouin tribes is under-exposed, yet the Focus Groups indicated a strong interest in participating in tourism. Not only authentic cultural landscapes but also traditional arts and crafts, local music, dance, foods, etc. should be protected and promoted for development of local jobs and income through training and production. The Study Team, working with the Department of Antiquities, identified 55 significant archaeological sites of the many that dot the Jordan Valley, and the Land Use Plan recommends protection of each as a cultural heritage area with surrounding buffer zones and conservation policies.

The universal ecological issue in the Jordan Valley is the long-term well being of the Dead Sea, which is rapidly evaporating and not being replenished, as water on both the Jordanian and Israeli sides are being diverted for municipal, industrial, tourism, and agricultural uses.

The Land Use Plan recommends a management plan for the entire Dead Sea Basin in order to conserve and restore its unique ecosystems, and to foster integrated development. Development of the Dead Sea shoreline should not exceed its carrying capacity, and it is recommended that a thorough carrying capacity study with stakeholder involvement be completed by RSCN in the near future under a GEF study.

The Land Use Plan identifies, parcel by parcel, recommended land uses along the Dead Sea shoreline. It adheres to the Sigma Study recommendations in those cases where the JVA has already legally committed to hotel and other types of development, but it strives to give the Dead Sea a stronger "public edge" and conserved, un-built shoreline where possible. Across the Dead Sea Road from the shoreline, the Land Use Plan recommends conservation of the spectacular geological formations, and a Dead Sea Trail to run along the highway at the cliff base, where possible.

The establishment of a canal to bring water from the Red Sea to the Dead Sea is being discussed by the Jordanian Government, and the Study Team strongly recommends that the Environmental Impact Statement (EIS) for that canal alignment be implemented in the near future. The right-of-way for the preliminary alignment is illustrated on the maps.

(c) Water Supply and Demand

Jordan is one of the world's 10 most water poor countries, and the water supply is operating on borrowed time. Water supply is being produced by damming and pumping from wadis and springs, over pumping of aquifers, exploiting fossil water, and restricting municipal and agricultural use. Water demand exceeds supply by 140% and exceeds renewable supply by 175% at year 2000. The Land Use Plan recommends that structural fundamental issues be addressed, including management and economic evaluation of water (high return per cubic meter), watershed management, crop selection for less water intensive planting patterns, and water efficient technology and training.

The baseline survey illustrates infrastructure that requires protection under the Land Use Plan including dam sites (existing and proposed), weirs, wells, and canals. For the most part, water supply in the Jordan Valley is quite brackish or salty. The Study Team recommends that fresh water be used primarily for domestic purposes (drinking) rather than for irrigation or industry, with continued public awareness conservation strategies. (It will be necessary to use a limited amount of fresh water for agricultural prpose to limit soil salinity.) The Study Team strongly recommends development of non-conventional water supply including water recycling through sewage treatment plant wastewater re-use and grey water use be implemented on a grand scale to create additional water supply. However, even after supply is increased through non-traditional measures, it will not be enough. Therefore, water imports and intersea project or desalination of seawater will be required.

Water use by the tourism industry is projected to drastically increase in the next 15 years, and it is recommended that hotels and other service providers operate under strict water conservation and recycling policies.

The agricultural sector consumes 64% of Jordan's water resources, with a total irrigated area of 84,300 hectares, of which 30,300 hectares are in the Jordan Valley. Citrus farmers used 35% of the JV water supply, and banana farmers used 21% for a total of 56% of the water consumed in the Valley. It is critical that water be more efficiently used through changed cropping patterns and improved irrigation systems and technology.

(d) Agricultural Issues

The agriculture sector in Jordan directly contributes 4.5% to GDP, but it contributes 29% indirectly to the economy and employs 7% of the work force in two primary areas – the rainfed northern highlands and the Jordan Valley. Agricultural exports contribute to 12.1% of total exports, of which fruits and vegetables make up 61.4% of agricultural exports. The JV is very important to food production, particularly fruits and vegetables, and is only second to the

highlands in terms of agricultural output. Insufficient and ineffective marketing and an inability to meet international standards have created overproduction and lower profits, particularly for small to medium farmers. Therefore, the Study Team believes that in the short term a balance must be maintained between production of traditional domestic crops, with which JV farmers are familiar and have strong markets, and the introduction of less water intensive crops with new high value markets. Undeniably, in the long term, fruit trees such as citrus and bananas which consume the majority (56%) of the water should bepartially curbed and rotated into less water intensive cropping patterns for sustainability. Changing trade policies, such as eliminating protectionist tariffs on citrus and banana imports that reduce competition, can contribute to changed cropping patterns and water conservation in the future.

As mentioned, the JV has small and medium farmers, many of whom reside there, but the Valley is also owned by non-resident, large scale farmers, many of whom live in Amman. In some instances in response to small and medium farmers, the Land Use Plan recommends consolidation of farm units with expanded agricultural land to facilitate larger, more efficient farm operations with higher crop yields. The Study Team recommends that agricultural extension services be expanded and that staff be trained to provide improved professional advice to JV farmers on water conserving crops, adoption of most efficient irrigation methods and improvement of irrigation management at the farm level, and viable export markets. Farmers seem to be amenable to use of treated water to irrigate crops not for human consumption, such as animal fodder and landscape irrigation, as well as trees and forests.

Generally within the Study Areas, the most fertile land is found in the North around Karamah, Deir Alla, and Mashara. Saline and thus less productive land is found in the Middle Study Area near South Shouneh and Suweimah. The least fertile land is south of Fifa near Wadi Araba in the South Study Area, where the soil is quite sandy and water supply and infrastructure are quite limited.

Popular cropping patterns include tomatoes, cucumbers, potatoes, squash, onions, eggplants, peppers, melohkia, beans, citrus, and bananas. The Study Team identifies in the report specific crops for each Study Area. Examples include some traditional crops such as seedless grapes, olives, potatoes, broadbean, corn, wheat, spinach, eggplant, onions, cucumbers, squash, date palm, and some non-traditional crops such as avocadoes, asparagus, mangoes, sorghum, barley, safflower, traditional medicinal herbs, Xeric grasses (saltgrass, sudan, silver beard for use in landscaping), and aquaculture or fish farming.

Changes to cropping patterns require technical and political support. It is important to note that the Study Team believes that proper water usage along with proper crop selection (less water intensive and more salt tolerant crops) might actually increase the agricultural sector's contribution to the economy while decreasing water consumption, so the Land Use Plan should protect and facilitate continued agricultural production.

(e) Other Types of Industry

The industrial sector in Jordan is concentrated in the Aqaba region. In the Jordan Valley, industry is primarily characterized by small agro-processing plants, polystyrene factories, and quarries in the NJVSA; by the mineral extraction plants around the Dead Sea including the large revenue generators such as potash and salts and phosphate in the MJVSA; and by no industry in the SJVSA. The Jordan Arab Potash Company (JAPC) has two plants located at the southern edge of the Dead Sea. JAPC is the world's fifth largest potash producer, and it mines not only potash but also magnesium, bromine, and their derivatives. It employs more than 2000 people, most of whom reside in the JV.

JAPC and its affiliated companies is a critical industry to the performance of Jordan's economy. Unfortunately, although a solid revenue generator and major employer, it has significantly impacted the Dead Sea, and is a contributor to the reduced water level and expanded salt flats.

The industrial economy should be diversified throughout the Jordan Valley, and the Land Use Plan provides increased land for new types of sustainable industry in the NJVSA.

(f) Tourism

Tourism contributes 10% to Jordan's GDP. In the Jordan Valley, which boasts of incredible natural beauty, extraordinary geology, internationally known sites (Dead Sea), a growing diversity of tourism products and services, and good roads, the sector has tremendous growth potential. The segments of health based/spa tourism, nature, and cultural heritage (including religious) tourism were established a few years ago. Adding business tourism and agro-tourism to that list, the segments can be linked and expanded through improved marketing and facilities for both the local and international tourism markets.

Recently, the health /spa segment has been strengthened along the Dead Sea with the renovation of the Dead Sea Spa Hotel and the development of three other five star, international hotels. In the NJVSA, Zara is renovating an existing hotel built around a hot springs to provide accommodations in the north, which fills an important gap in the market. Under policy, the Land Use Plan proposes that Jordan Valley hotels adhere to "green hotel" standards that recommend or mandate water and energy conservation, as tourists on average use more resources than local people.

Nature based tourism has begun to thrive, particularly in the MJVSA and the SJVSA with the provision of RSCN's visitors center near the bridge at Wadi Mujib and campsite along the Dead Sea, both within the Mujib Nature Reserve. RSCN has also developed visitor facilities at Dana Nature Reserve and is building visitor facilities within the proposed Fifa Nature Reserve at Finan. The Land Use Plan proposes to adopt protected areas and recognize IBAs as linked green recreational areas for local recreation and nature based tourism. Activities might include hiking and biking on the proposed Jordan River Trail and Dead Sea Trail, bird watching, camping, rock climbing, non-motorized boating like sea kayaks and canoes in dam waters and on the Dead Sea, and desert safaris in the south. Under policy, the Plan recommends stronger inter-agency coordination between JVA and MOTA, MOE, RSCN, and MOA, as well as a stronger role in tourism decision-making by local communities. The Land Use Plan recommends a circular flow of income from tourism back to protected areas to enhance sustainability through strong management.

Business tourism at the Dead Sea is already being promoted through the establishment of a clustered hotels base and convention center. The Study Team recommends that this segment be strengthened through proposed land uses and associated activities, such as the Low Altitude Winter Training Center, the Mediterranean Culinary Institute, and the King Abdullah Middle East Center for the Conservation of Water, all of which would in turn support the hotels and convention center.

Agro-tourism, including fish farming, can promote the use of renewable resources such as solar power, and can bring tourists closer to local communities with direct payback through food production (e.g., solar powered agroprocessing facilities to transform local fruits and vegetables into tourism products), rural gite (farm building housing), and bed and breakfasts (lodging in family homes or in Bedouin tents).

MOTA and DOA are protecting and promoting a number of cultural heritage (religious and archaeological) sites within the Jordan Valley, including Umm Qais (just outside the JVA mandate boundary), Pella, the Baptism site, the Dead Sea Panorama, Zara, and Lot's Cave. Near Lot's Cave the Lowest Museum on Earth is being constructed. These sites are well located for tourism linkages from north to south in the JV, and they also link to sites outside the JV from west to east. If there is peace in the region, they can link to Jericho and Masada. In addition to the well known primary sites, working with DOA, the Study Team identified 55 secondary sites that are considered to be archaeologically significant and that require protection. Those sites are illustrated on the Land Use map. Particularly, the Zara

archaeological sites are well located along the Dead Sea on the cultural heritage circuit, and should be better presented and interpreted with limited adjacent parking and visitor facilities.

The Land Use Plan recommends areas for training facilities to strengthen local capability in handicrafts development and living heritage, as part of the development of the cultural heritage segment, and it recommends additional visitor activities such as small museums and a night souk.

The Land Use Plan illustrates a generic combined nature/cultural Great Rift Valley Tour that includes 24 stops, to illustrate that the Jordan Valley is rich in visitor attractions and that visitor length-of-stay could be greatly expanded. Examples of other tourism linkages includes the Pilgrims Path of the Companion of the Prophets (Islamic tour), On the Hajj Trail (regional tour), Journey in the Footsteps of Moses, John, and Jesus in the Land of Moab (religious tour), Conserving the Most Precious Resource – Water (ecology tour), Those Dam Tours are for the Birds (nature based tour linking the dam sites and regional protected areas) and many others.

Current arrivals to Jordan are at approximately 1.6 million visitors, and about 22,000 people, mostly Jordanians and male, work in the tourism sector. The average length-of-stay is 4.3 nights, a decrease from 4.6 days in more stable times. The number of classified hotels in 2003 was 310, plus 144 unclassified hotels, 3 camp sites, and 1 motel, for a total of 458. The number of rooms was close to 20,000, and the number of beds was slightly less than 38,000.

Along the Dead Sea, international donor studies have been trying to predict necessary supply based on demand projections. The PADECO/JICA study predicted a need for 2200 rooms by 2010, the Harza study predicted 8640, and the Sigma study predicted 10,800. JVA has approved a supply of approximately 3400 rooms, which includes 12 hotels on the Dead Sea shoreline and the RSCN Mujib Reserve campsite. This number already exceeds JICA's projections to the year 2010, and is probably sufficient to meet demand and provide hotels with healthy non-peak and peak period occupancy rates.

In order to meet Harza's prediction, the number of hotels would have to more than double. To meet the Sigma prediction, it would have to triple. At JVA's four story height requirement, either the entire shoreline would be built out with a relatively dense coverage of hotels, or some would have to be built in the rock outcroppings across the road from the Dead Sea. This type of build-out would have a low-rise Miami Beach appearance, and would project a very different image for the Dead Sea than the one that is experienced today.

According to the currently operating Dead Sea hotel managers who were interviewed for this study, the occupancy rates are 30% off peak and 70% peak with 1.5 million visitors. Even if Jordan's tourism in the Jordan Valley doubles to 3 million visitors, the 12 hotels with 3,383 rooms that JVA has already approved for the Dead Sea shoreline should be more than enough to meet demand. The Study Team predicts that after build-out of 12 hotels, tourism would have to increase from 1.5 million visitors to close to 8 million visitors to continue an occupancy rate of 30% non-peak and 70% peak. It is doubtful that Jordan will reach that figure.

The proposed Land Use Plan recognizes JVA's approvals and current investments, and recommends that the remaining undeveloped land along the shoreline allow greater access to the public. This "public edge" would include non-hotel visitor facilities, as well as a naturalized stretch of coastline in the Zara area, to link to the archaeological sites and to provide the Dead Sea with a long-term protected beach. The Study Team proposes that the actual carrying capacity of the Dead Sea be determined by RSCN during their upcoming GEF study.

Limited additional lodging might be needed in the NJVSA and the SJVSA, but it should take the form of campsites, rural gite, and bed and breakfasts, tied to the living heritage in order to meet the needs of culture and nature based tourists.

Targeted tourism segments can improve the standard of living for Jordan Valley's residents through training and "buy local/employ local" hotel policies, and through establishment of handicraft and agro/nature based product training centers and retail outlets. These types of activities are facilitated by strategically located land uses under the proposed Land Use Plan and its recommended policies.

(g) Public Infrastructure

In terms of public infrastructure, all health centers and schools are located in municipalities, so they are not illustrated separately on the baseline maps. There are no regional colleges, universities (other than university related agricultural training centers), or hospitals in the JV. Regional police and fire stations are illustrated, as are two sewerage waste water treatment plants (one existing and one proposed). The Dead Sea hotels operate their own package treatment plants. Three managed dump sites are also illustrated on the baseline maps. Electrical lines are disbursed throughout the Jordan Valley and are not illustrated on the baseline maps; however, the Study Team recommends that they be under-grounded along the Dead Sea shoreline to improve its natural appearance. Telecommunication lines require further study, but JVA might want to illustrate them on future maps, so that investors are aware of their locations.

There appears to be a strong need for improved schools in the municipalities, increased training centers, increased sewage treatment, and engineered land fills that are free of odor and insects.

From the Israeli/West Bank side of the Dead Sea, the Dead Sea Development Company's Ein Bokek sewage plant was not yet operational as of 2002. Therefore, Israel was, and probably still is, dumping 4,000 cubic meters of untreated sewage into the Dead Sea on a daily basis.

On the Jordanian side, there is the following sewage treatment facility in the JV Study Area::

- Tel el Mantah Sewage Treatment Plant (Jordan Valley Integrated Waste Management Project/CIDA funded) (only one that is operational) west of Al Arda as illustrated on the baseline map.

In addition, the following site is proposed:

- The North Shuneh Treatment Plant west of Abu Habeel.

The Dead Sea hotels operate their own package plants, and no sewerage network is planned for the SJVSA.

There are no engineered land fills in the Jordan Valley. Managed dump sites for solid waste disposal (which should be re-studied and perhaps relocated) include:

- Two dump sites in the NJVSA at N. Shuneh and Deir Alla;
- One dump site in the MJVSA servicing S. Shuneh and the Dead Sea hotels;
- One dump site in the SJVSA at Naqa' south of Safi.

The road system is extensive, and the primary tourism route is the Dead Sea Road which runs from north to south. The northern section of the road experiences a much higher volume of traffic than the southern section, and slow moving trucks and farm vehicles will compete in the future with increased tourism buses and cars. This section is poorly serviced, and there is an immediate need for maintenance and improvements, particularly paving, marking, and signing. The MPWH is currently evaluating whether the existing road should be improved to a four lane divided highway, which entails demolition of existing village farms and buildings,

or whether a new highway should be built adjacent to the existing one. There are numerous other routes running from east to west. It is important to note that a new highway will facilitate the movement of tourism traffic and decrease noise, pollution, and accidents within villages, but it will also separate tourists from local people. Thus, when this decision is made, the municipalities should analyze their land uses to properly link villages and tourism facilities, such as handicraft workshops, rural gite, bed and breakfasts, local museums, etc.

The Dead Sea Parkway is under construction, and this will link the tourism sites in and near Madaba, including Mukawir and Mt. Nebo, Ma'in Hot Springs, and the Dead Sea Panorama with the Dead Sea shoreline, including the Baptism site and Mujib Reserve.

The Karak road links visitors to Karak Castle, and the Ghor Fifa road links visitors to Tafila and Dana Nature Reserve. The Dalagha-Wadi Musa-Ma'an Road links visitors to the ancient King's Highway to Showbek and Petra, from which they can continue to Wadi Rum and Aqaba. Currently suggested improvements for all of the aforementioned roads, if implemented, are sufficient to accommodate projected traffic from increased tourism and population growth in the Jordan Valley. What is missing is adequate public transport, specifically an effective bus system and routing pattern that will improve the quality of life for Jordan Valley residents. This need was emphasized by the Focus Groups, particularly in regard to local women who must use the bus to access handicraft training centers and workshops. The proposed Land Use Plan recommends bus stops from north to south and proposes a Transit Station at Sweimeh, as a way to centrally organize the system and provide visitor information for local people and nature based tourists arriving from Amman and elsewhere.

(h) Economic Opportunities for JVA

The proposed Land Use Plan illustrates a number of land uses that will facilitate economic activities in which the JVA can be involved, to create operating income and revenue. These include the previously mentioned tourism overlay districts and non-motorized water sports and fish farms at the dam sites, particularly important at Karamah, Wadi Arab, and Shuieb. Under integrated development plans and public private ventures, aquaculture as part of the JV agricultural base could draw both local tourists, a very important market in times of regional instability, and international nature based tourists. The dam sites and their surrounding parkland will also provide picnic areas for local people.

Nature based tourism is particularly encouraged through a system of protected areas, including regional parkland, hiking and biking trails (the Jordan River Trail that runs from Karameh south to the Dead Sea and the Dead Sea Trail that runs across the road from the shoreline and provides visitors a geological experience), and nature reserves and IBAs for bird watching. The JVA could work with RSCN and MOTA to manage this system under a coordinated management plan that includes admission fees, with limited visitor information and camping facilities. This park management system should include the undeveloped beachfront along the Dead Sea and the Dead Sea hiking trail along the geological rock formations. Those areas that are particularly rocky are to be returned to the Treasury as open space, but they could continue to provide an important visual backdrop for tourism. A nature based tourism facility called the Great Rift Valley Badia Nature Center is also proposed for the SJVSA, which JVA might jointly operate with RSCN.

JVA could also develop one or two regional Sports Cities, with indoor swimming pools, courts, etc. within the JV, and locations have been identified on the map. These would provide much needed youth and adult recreation. Youth camps could be integrated into those areas to facilitate increased local tourism.

JVA could become involved with municipalities in promoting cultural heritage tourism as well, with proposed facilities such as vernacular "heritage villages," which are protected under the CH zone of the Land Use Plan. Such villages could include a small bed and breakfast or rural gite industry with associated cafes, coffee houses, local heritage museums,

and handicraft centers. JVA could also work with international tour operators and DOA to create specialized geological and archaeological programs, such as Can You Dig It (archaeological digs), that are linked to the heritage village services, wherein volunteers could live and eat with local families. Facilities could be designed to give local families privacy, while allowing interaction and economic opportunity. JVA could also work with MOTA and Al Qawf to create a Venerable Companions of the Prophet Trail that links to the heritage villages.

Dead Sea facilities that JVA could either build and manage or transfer to the private sector include not only hotels and the Sweimeh Transit Station, but also the "public edge" facilities that were previously mentioned, allowing visitor's greater public access to the sea. These are identified parcel by parcel in the report's land use section. Activities include the following:

- a Dead Sea Heritage Center with a World of Salt Museum that could include training facilities to promote standards of authenticity and cultural value, and might include design studios to promote the Land Use Plan's architectural design standards;
- a Mediterranean Culinary Institute that could work with local farmers to promote less water intensive crops through creative menus;
- a Night Souk to provide visitors with night-time fun to eliminate the problem that Petra faces;
- a Boat Pier with associated sea kayaking and non-motorized canoeing and boating, which might include a non-motorized Sea Taxi system to take visitors from the northern edge to the Wadi Mujib Campsite;
- an integrated Dead Sea (Suweimah) National Park with a Nature Guide Training Institute and Low Altitude Winter Training Center (for world class athletes);
- and a King Abdullah Middle East Center for the Conservation of Water or Hydrology with training and research facilities that would draw scientists from around the world. The Center could also be a major tourism draw, with its laboratories, library, meeting rooms, international donor training facilities, Xeric interpretive gardens, and Water Café and Shop. The King Abdullah Center could create an economically supportive relationship with surrounding activities including the Culinary Institute and the existing Convention Center.

Further down the coast, JVA could work with DOA and MOTA to operate a Zara Archaeological Park with limited visitor facilities including a fruit juice and water bar, shwarma and tabouleh stand, as there is almost no fast food for tourists along the Dead Sea, small gift shop as another outlet for local products, and bathroom facilities.

All of the above could provide jobs for JVA staff and operating revenue, as well as for Jordan Valley residents, and could become part of an extended visitor stay to the Jordan Valley. In turn, this would improve the hotel occupancy rates.

In the NJVSA, JVA might also become involved in new light industrial uses, such as olive oil or date processing, furniture production (i.e., handmade furniture that reflects the culture to be sold to the hotel industry), and spice production and packaging. The latter could include a Tea Factory, like Celestial Seasonings in Colorado, which has become one of the state's major tourism sites. Celestial simply re-packages tea, a staple in Jordan, and presents it in a very enticing manner through production, graphics, an Herb Garden Tour, a Mint Room, a Tea Sampling Bar, a gift shop, etc. Depending upon the presentation, these could all be part of an "industrial tourism" route. A "World of Arabic Coffee and Tea" might also be located near Wadi Mujib, and could promote not only Jordanian cuisine and habits, but also Xeric plants at a Xeric nursery.

Other activities include residential development and associated office and retail under the Mixed Use zone, as the increased tourism at the Dead Sea will require a large amount of residential land to accommodate housing for hotel employees and staff, as well as for local

teachers, doctors, and others. A limited amount of luxury housing for hotel managers and other high level staff is proposed along the shoreline, while employee housing is located within expanding municipalities or near their borders for shared infrastructure and services.

Because of the pleasant winter climate in the Jordan Valley, the Land Use Plan also proposes areas for Mixed Use that would accommodate retirement villages and assisted living complexes, a market that will undoubtedly grow in the future.

(i) Framework for Fish Farming

With global depletion of the natural fish catch, and rising demand, aquaculture is one of the world's fastest growing industries. In Jordan's Gulf of Aqaba, the fish catch has been rapidly declining from 125 tons in 1985 to 15 tons in 2000. In 2003, Jordan imported 1000 tons of sea fish and 16,000 tons of frozen fish. The Study Team interviewed the Jordanian fish farming industry and learned that they project tremendous growth potential in Jordan to 2000 tons annually, if fresh aquaculture fish was priced competitively with frozen fish, and public awareness increased. Because demand is lower than it should be, and Jordanians are still purchasing mainly frozen fish, the Jordan Valley Fish Farm, Jordan's largest producer, and other smaller operations are not operating at their full capacity. Current local fish farming operations primarily produce tilapia, which is appropriate for the saline waters of the Jordan Valley and is globally considered to be one of the most ecologically correct fish to eat.

This spring JVA published a Request for Proposal that encourages implementation of a fish farming pilot project using the brackish water of Karameh Dam. There are already three types of fish residing in the dam's waters: tilapia, carp, and catfish. The Study Team recommends that this pilot project be implemented as a model for fish farming at dam sites throughout the Jordan Valley. The fish hatchery should be able to produce live feed, and fingerlings could be sold to smaller fish farms. Near the pilot fish farm, the Land Use Plan recommends light industrial land to facilitate fish farming related facilities such as plants to produce aerators, feeders, and fish nets. Those products are relatively easy to produce, but are being imported into Jordan from Egypt. Such light industrial uses could increase the number of local jobs related to fish farming.

Brackish wastewater should be recycled to irrigate salt-resistant alfalfa fields or other animal feed crops for which there is high local demand. It might also be used to irrigate new salt-resistant, Xeric crops, that could be featured in the fish farm restaurants, as a way to educate the public about new food production. Fish waste can be processed into feed as a commercially viable by-product. Sustainable facilities should include organic agriculture and renewable energy systems, such as passive solar panels and wind turbines.

Through Jordanian universities and the Near East Foundation, which is already very active in aquaculture, training programs should be organized with international universities or organizations that are well established in the industry. Local farmers, particularly in the SJVSA where agriculture is quite limited, can be trained under international environmental standards to create fish farming at other dam sites or on their large irrigation ponds.

For tourism development, the Land Use Plan illustrates tourism overlays on the dam sites, and the pilot project should include commercial activities such as cafes or restaurants that utilize fish farm products and surrounding agricultural products creatively. For example, pilot Xeric agricultural projects could link to the pilot fish farm and serve artichokes, asparagus, and avocado recipes that make local people aware of their taste and opportunity for integration into traditional menus.

If environmental standards are maintained, dam sites might include swimming and non-motorized boating, such as canoeing or sea kayaking, and the pilot might host an annual Fish Farm Festival with fish feasts, educational exhibits, local handicrafts, and traditional oud and drum music. Through public/private joint ventures, JVA can be involved to create operating revenue.

(j) Policy

The Study Team recommends a number of policies under Section 7 of the report. The most important in terms of conservation is for JVA to work to increase water conservation, and to establish a management plan with RSCN for the Dead Sea Basin. Also important are working with local communities to establish training programs and public awareness, as detailed above.

The report includes a very detailed section on establishment of Architectural and Design Guidelines, divided into those that should be mandatory to protect the visual character of the Jordan Valley, particularly the Dead Sea area which already has some design guidelines under the Sigma Plan, and those that should be recommended or encouraged. The goal is to create a sympathetic relationship between the environment and architecture, with sensitive responses to context including water conservation, landscape colors, and traditional building materials and designs.

There are few historical structures in the Jordan Valley, but those vernacular villages with strong architectural character should be preserved and enhanced to promote the integrity of the cultural landscape and to allow adaptive reuse of existing assets to play a role in tourism development through the creation of local museums, gift shops, rural gite, bed and breakfasts, etc. Those villages are highlighted in the Land Use Plan.

(k) Recommended Action Items

As a way to verify the Preliminary Land Use Plan, the Study Team recommends that JVA move into a Phase 2, which would include coordination of and interaction with three task forces: local government or JV municipalities; agricultural including NGOs, farmer associations, and universities; and environmental and cultural including RSCN, MOE, DOA/MOTA, and numerous NGOs involved in protection and training/development.

During the meetings, the JVA would present the Preliminary Land Use Plans and get stakeholder feedback, to either verify the presented land uses or to revise certain aspects, prior to the Final Land Use Plan's presentation to the Council of Ministers. The Plan could then be approved as a holistic and sustainable baseline survey and land use strategy or vision for the Jordan Valley. The Study Team recommends that an annual review policy be implemented to allow JVA to update the Land Use Plan yearly with stakeholder input that addresses changing market or other conditions. At the same time, JVA should work with field staff to implement a monitoring and evaluation system to facilitate on-going improvements to the Land Use Plan.

The Study Team also recommends that JVA implement three to five pilot projects, at least one in each of three study zones, as public-private enterprises and sources of operating income for JVA. These are detailed above as Economic Opportunities for JVA. All of the pilots or other economic enterprises should include water conservation strategies, and improved agricultural practices where appropriate. Outside the sphere of direct economic opportunities, JVA should implement a pilot project with local municipalities that physically illustrates the result of appropriate zoning and building regulations, as a way to improve local quality of life and the visual appearance of villages along the tourism route through the Jordan Valley.

1.0 Introduction

The Jordan (Rift) Valley (Ghor) lies on the East Bank of the Jordan River. It is part of the Great Rift Valley, the extensive fault line that stretches 5,000 kilometers between Turkey and East Africa, one of the world's most important anthropological and scenic ecological corridors. The Rift Valley acts as a geological navigational system and land bridge for millions of birds that migrate between Africa and Europe, and stop in the Jordan Valley to feed and rest on their annual journeys. These Important Bird Areas or IBAs are identified in this report, as recommended by the Royal Society for the Conservation of Nature (RSCN) and Birdlife International.

The Valley also contains ecosystems of global importance including the Dead Sea, a 'biodiversity hotspot' with extraordinary geological formations, and the Jordan River, and other existing or proposed nature reserves. These ecosystems support many endangered and endemic species, including the Sand Cat, Leopard, Nubian Ibex, Syrian Wolf, Griffon Vulture, Imperial Eagle, Lesser Kestrel, Dead Sea Sparrow, and several endemic fish and insects. Their habitats are threatened by agricultural and urban encroachment, over-extraction of water, water and air pollution from agrochemicals and industrial emissions, inappropriately located proposed tourism development, lack of solid waste treatment, excessive grazing and woodcutting, and excessive hunting.

In addition to the global ecological issues, the Jordan Valley is the home to dozens of communities, and a population of approximately 191,000 people who make their living in farming, government jobs, industry (particularly mineral extraction), and tourism (services and limited handicraft development). Like the endangered species, human habitats are threatened by a limited and rapidly diminishing water supply and pollution from industrial and agricultural run-off and sewage waste.

This land use planning study analyzed the problems and the opportunities of the northern, middle, and southern parts of the Jordan Valley. The Northern Jordan Valley Study Area (NJVSA) is characterized by the largest numbers of people with agricultural communities that produce chemically dependent and water intensive fruits and vegetables, such as bananas, citrus, and tomatoes, which contribute to Jordan's acute water deficit. It is also characterized by limited small scale industry, important agriculture that contributes to Jordan's Mediterranean food basket, an interesting cultural heritage of Roman, Islamic, and other sites, a living heritage of basket and rug weavers, and a broad swath of environmentally sensitive land and IBAs along the Jordan and Yarmouk Rivers.

The Middle Jordan Valley Study Area (MJVSA) includes the Dead Sea, an internationally known site, with its rapidly decreasing water quantity and rapidly increasing shoreline. The area has a small population of indigenous human settlement, and is characterized by rare natural beauty, internationally competitive potash and salt extraction related industries along the southern shore of the Dead Sea, universally important cultural heritage sites including the Baptismal site of Jesus, sophisticated health/spa tourism development, and fascinating nature based tourism including Mujib Nature Reserve.

The Southern Jordan Valley Study Area (SJVSA) is an arid environment, home to many tribes, including nomadic Bedouin who are restricted to smaller and smaller areas, resulting in overgrazing of sensitive rangelands and illegal woodcutting. Although poor in agriculture, its deserts, geology, historical sites, and Beduoin communities form the basis for a nature based tourism industry with strong potential.

The Client for this land use study, the Jordan Valley Authority (JVA), was established originally as the Jordan Valley Commission in 1972, and currently operates under Law No. 19 of the Jordan Valley Development Law of 1988. JVA is responsible for social and economic development of the Jordan Valley, and protecting and developing its water resources

including irrigation and dam projects. Responsibility for the agricultural sector rests with the Ministry of Agriculture; however, the JVA is responsible for planning and developing the Valley's agricultural lands. JVA has successfully implemented many of its tasks. However, the Authority is facing new challenges with municipalities, agriculture, industry, and tourism competing for dwindling water resources and land.

The Jordan Valley Development Law No. 19 (1988) and the amending law No. 30 (2001) provided special provisions for land use planning. The original law included the development of towns and villages, housing, infrastructure, and tourism in the vast region of the Valley. The amended law limited jurisdiction for land use planning to areas outside the municipal boundaries. In order to execute their responsibilities, the JVA established the Department for Lands and Rural Development (LRD). However, LRD's activities primarily focused on illegal developments and land transaction and registration. JVA focused on water distribution and management. In the meantime, development pressures from water intensive agriculture and other forms of industry, including tourism development along and around the Dead Sea, increased without sufficient environmental review and physical infrastructure. The result was the beginning of unplanned and unsustainable land uses, which the JVA wished to prevent.

Under the Ministry of Water and Irrigation, JVA's jurisdiction extends from the Yarmouk River in the North to Qatar in the South (Wadi Araba); the eastern boundaries are contours 300 and 500 in the area north and south of the Dead Sea, respectively. JVA, although certainly the most significant player, shares responsibility for the Jordan Valley with the municipalities, the Ministry of Agriculture (MOA), the Royal Society for the Conservation of Nature (RSCN), and in the south with the Aqaba Special Economic Zone Authority (ASEZA).

It is important to understand that there are three types of land in the JV: Farm Unit Lands, Zoned or Municipal Lands, and Other Lands. Farm Unit Lands are privately held; Zoned Lands are under the control of municipalities; and Other Lands are either owned by the National Treasury or privately owned. JVA controls a significant amount of vacant or under-utilized land that is suitable for several different uses. Therefore, this land use plan analyzes all lands except those that fall within municipal boundaries.

JVA's Strategic Plan, which was recently completed, states: "The large number of sites with historic, religious, and archaeological significance means that tourism, in particular, has strong growth potential. Additionally, if this land were capitalized on properly, it can directly benefit the local communities through creating employment and fostering small, local business development. Such development though needs to be planned carefully, so that the sustainable use of the land is ensured, and that it is protected from pollution and other environmental hazards." The Strategic Plan also recommends selecting and developing one to three tourism sites, and paving the way for investors who would operate the sites through a lease or concession agreement (e.g., Build Operate Transfer or BOT).

In order to fulfill its mission, the JVA Strategic Plan lists four objectives under the goal of Water Resource Management, including increased availability through efficiency, increased use of marginal water for irrigation, use of water for other benefits such as fish habitat and recreational facilities. It recommends improved quality through decreased pollution, controlled pumping of wells to avoid groundwater aquifer salinization, and recharge of aquifers through surplus flood water and treated wastewater. It also recommends improved water supply, conservation, and distribution. New irrigation projects will no longer be supported by international donors, and all on-going and proposed dams are to supply old irrigation projects with reliable water supply. A great deal of fresh water for the Jordan Valley is and will be transferred to Amman to supply its municipal growth.

Under their revised law, JVA's mandate will change soon (summer of 2004) when the agency will be forced to rely on its own sources for income, and water will be sold at market rates. JVA's new mission is to "develop, manage, and protect water and land resources and their

supporting infrastructure in the Jordan Valley in an economically and environmentally sound manner in the Jordanian national interest," and to involve the private sector when appropriate. In other words, JVA must identify those lands that should be returned to the national Treasury, sold to the private sector including indigenous communities, or retained for lease or development to finance JVA's operational expenses. To create long term sustainability In terms of land use planning, some of the land should be preserved as protected areas (environmentally and culturally sensitive reserves, parkland, archaeological sites and associated buffer zones), other land should continue in its present use, while the remainder should be planned as area for municipal expansion, or new land uses such as tourism, agriculture, industry, mixed use (residential and supporting commercial), institutional/educational, or recreational area (such as a sports city).

The US Agency for International Development (USAID) through its programmatic focus is very supportive of policies to protect Jordan's fragile environment and to enhance its economy. USAID has supported and is funding many projects to address Jordan's chronic water problems and to use water more economically, and the Agency recognizes that although development of water infrastructure is important, it is insufficient to meet demand. Hence, conservation and reallocation of water supplies among the sectors is inevitable, as are associated changes to land uses in the Jordan Valley. Water supply to the agricultural sector and its current cropping patterns must decrease, and support for new types of jobs and alternative economic development must increase. (According to USAID, currently most farmers do not export, and the price of the water exceeds the selling price of their crops.)

1.1 Organization of the Land Use Report

The purpose of the Final Report is to provide the complete details of all work performed, analyses made, and justification of options and recommendations proposed. The Final Report is submitted in five separate volumes which comprise the Land Use Report and the four volumes on the reports by the specialist in the fields of architecture, sociology, transportation, economy, environment, archaeology, geology, and water and agricultural resources. These five volumes are as follows:

- **Volume 1 of 5:** Land Use Report, which is prepared in both Arabic and English languages.
- **Volume 2 of 5:** Planning Process and Architectural Design Guidelines.
- **Volume 3 of 5:** Social, Transportation, and Economic Assessment. This volume also presents a preliminary framework for establishment of fish farms in the study area.
- **Volume 4 of 5:** Environmental Assessment, Dead Sea Carrying Capacity and Archaeological Assessment.
- **Volume 5 of 5:** Geologic Assessment, Water Resources and Agricultural Resources.

2.0 Project Vision, Goals, and Objectives: Water Conservation and Environmental and Economic Sustainability

The project vision is to ensure growth that maintains or achieves a high quality of life while minimizing adverse impacts to the communities and the environment. The "visioning" process engaged planning, engineering, and design professionals to develop a sustainable land use plan, resulting in a sustainable economy through innovative land uses and related activities, improved transit, protected agricultural land and environmental resources, and protected existing economic assets.

Sustainable development preserves and enhances resources, while it supports economic development and helps to build private/public partnerships through shared values and goals. Community benefits include increased consensus on preferred land uses and development patterns, enhanced economic opportunities, and environmental qualities. The vision of a good land use plan is to protect the baseline resources and current assets, as detailed herein, while demonstrating smart planning principles, conserving water and energy, and managing resources wisely for appropriate future development.

The Study Team's goal is to assist the Jordan Valley Authority with its physical land use planning needs, including enhancement of their GIS data, to secure long-term protection and productivity of the Jordan Valley. This includes preserving the Dead Sea and other natural and cultural resources while building the tourism base, protecting the water supply while creating recommendations for agricultural cropping patterns and other policies that will result in improved water conservation and management, and protecting existing industrial and other investments while assuring that their long-term impact is positive. At the same time, recommended land uses shall facilitate economic activities that benefit JVA and local communities.

Study objectives include:

- a participatory planning methodology that involved numerous stakeholders;
- the development of a factually correct baseline assessment of the Jordan Valley through a series of A.0, GIS based overlay maps for each of the three study areas. Maps shall illustrate existing resources including sensitive environmental and cultural heritage areas, infrastructure, communities, industry, tourism facilities, institutions, and any other areas or buildings that have value and need to be protected. Additional information illustrates locations of municipalities/villages and existing ownership patterns, i.e., those lands that are owned by JVA or the government and those that are private;
- policy recommendations to facilitate better management of the Jordan Valley; and
- a fish farming pilot project to improve opportunities for economic development at existing dam sites.

The proposed land use map illustrates proposed land use recommendations, taking into account environmental and economic value, tourism linkages, and JVA's need to create operating income and private sector investment. As Jordan ranks among the top ten "water poor" countries in the world, the Study Team was guided by the necessity for water conservation and realistic market analysis for long-term economic development.

If under a future project the recommended land uses become zoned areas, very specific regulatory language including allowable building footprints or floor area ratios and building types and requirements should be detailed. For example, if mixed use area, or those areas in yellow on the maps, were zoned residential, accompanying text should state the type of housing, whether single family, townhouse, apartment, nursing homes, etc., according to density and level of impact on surrounding land uses.

3.0 Planning Methodology

Under the Ian MacHarg theory of planning, the best way to do physical land use planning is to examine and map existing or baseline conditions, in order to understand that which has environmental or economic value and therefore deserves to be protected in the future, and to illustrate resulting relationships and impacts between existing and proposed land uses. Therefore, the purpose of the overlay maps is to illustrate baseline or existing conditions, including environmental conditions (water resources, wetlands, mudflats, nature reserves, bird migratory routes, geology including scenic rock outcroppings), cultural heritage sites including archaeological sites and interesting vernacular villages, communities, industrial facilities, infrastructure and utilities (sewer, water, police, fire, electrical, telecom – there are no gas pipelines passing within the JVA mandate), transportation routes and service, and tourism facilities.

Extensive surveys were completed and existing field conditions were digitally photographed, to allow team members to better understand the actual conditions and to "visually discuss" existing land uses and relationships with JVA. With the utilization of GPS, photos were digitally attached to specific land areas throughout the Valley. A thorough literature review was also conducted, using existing data on socio-economic conditions including public health (water supply and quality, solid waste, recycling, toxic waste and regional medical facilities), safety (police and fire), and education (schools, training institutions, libraries). Environmental and cultural conditions were also studied and coordinated with RSCN and the Department of Antiquities including natural landscapes (protected areas, IBAs, wildlife habitat, wetlands, sink holes) and cultural areas (archaeological sites, vernacular villages, cultural landscapes). In addition, working or economic landscapes (mostly farming, grazing, and tourism), industries (primarily mineral extraction and agro related processing plants), and built infrastructure (transportation network and bus service, sewer and water, Red Sea to Dead Sea Canal, electrical and telecommunications) were analyzed.

Existing JVA layers of GIS data that were used included governates/villages/JVA directorates, potash zone, Baptism site, roads, Dead Sea, Jordan River, other wadis/rivers, wells and springs, development areas, farm units, irrigation networks, dams/existing and proposed, drainage networks, King Abdullah Canal (KAC), pump stations, diversion weirs and settling ponds, desalination plants, and investment zones. These GIS layers were greatly expanded. The land use maps use symbols to illustrate infrastructure and are color-coded to illustrate proposed land use zones. A chart of recommended activities within those zones is provided. The land use zones were first derived from planning rationale and functional relationships, and then were checked within the Study Team and with the JVA Steering Committee against field conditions and a series of land use criteria based on JVA's mission and local community needs.

The decision that must follow development of the land use plan is one of policy, i.e., which lands shall JVA keep under its jurisdiction for income generation, in some cases through public private ventures or partnerships.

3.1 Participatory Planning Strategy

In addition to the technical planning procedures and analysis, the methodology included participation by a wide variety of stakeholders. The May 1997 Manila Declaration on World Tourism called for "greater involvement of communities in the planning, implementation, monitoring and evaluation processes of tourism policies, programs, and projects" to empower people. "Pro-Poor Tourism," as it is called by the World Tourism Organization (WTO), focuses strategies on expanding employment and training, expanding opportunities, developing collective community income, mitigating environmental impacts, addressing competing use of natural resources, improving the social and cultural impacts of tourism, and improving access to services and infrastructure.

This participatory approach of involving stakeholders to arrive at land use recommendations was accomplished through focus group interviews and questionnaires. Stakeholders included municipalities and community representatives, JVA and other government ministry staff, USAID, donor funded project managers, NGOs, and investors and managers from companies that operate in the Jordan Valley. Stakeholders were extensively questioned regarding environmental issues and socioeconomic issues. The goal was to arrive at an understanding of local strengths, weaknesses, opportunities, and threats (SWOT), in order for land use recommendations to address community needs and to build upon the existing base of activities, services, interests, and skills.

The Study Team recommends that this participatory approach be expanded through the establishment of task forces, in order to arrive at a final shared vision for development of the Jordan Valley. Task forces could verify the proposed land uses from a community and NGO/associations' perspective, as well as promote institutional linkages and networking, community awareness and training, and land use planning goals.

3.2 Technical Scope of Work

Specifically, the Study Team completed the following tasks:

Phase 1 -

- agreed on the following three study areas and JVA mandate boundaries:
  Northern Jordan Valley Study Area (NJVSA):
  Yarmouk River to the Baptism Site
  (including portions of the Governates of Irbid, Ajloun, Jarash, and Al Balqa),
  Middle Jordan Valley Study Area (MJVSA):
  the Dead Sea area
  (including portions of the Governates of Madaba and Al Karak);
  Southern Jordan Valley Study Area (SJVSA):
  the Southern Ghors and Wadi Araba
  (including portions of the Governates of Al Tafileh, Ma'an, and Al Aqaba);
- collected, disseminated, and read existing data and studies as background information;
- worked with JVA to cross reference existing Geographic Information System (GIS) layers of data;
- made numerous field visits to better understand the land use conditions and communities, and to complete a photo survey of the Jordan Valley;
- conducted three Focus Groups, one in each of the Study Areas, and collected questionnaires from Focus Group stakeholders;
- interviewed a wide variety of other stakeholders, including governmental, NGOs, and industry;
- participated in a land use planning team charrette or workshop;
- mapped and analyzed the existing baseline conditions or land uses, including public infrastructure, water supply, environmental and cultural heritage, agricultural cropping patterns and soils, communities, industries, and tourism;
- created a list of criteria by which to judge the land use plan;
- presented Phase 1 baseline findings to the JVA and USAID for discussion.

Phase 2 -

- analyzed the baseline information;
- created preliminary baseline drawings;
- developed design guidelines;

- prepared a bibliography of baseline information;
- completed preliminary text for the draft report.

Phase 3 -

- analyzed functional relationships and prepared land use maps,
- worked with JVA to analyze the preliminary land uses against land use criteria;
- created tourism linkages to create greater demand for existing and proposed supply;
- recommended a framework for an environmentally sustainable fish farming pilot project that will create additional economic opportunities;
- revised the text and prepared a draft final report with drawings;
- presented the draft final information to JVA and USAID for input;
- revised the final drawings and text in follow-up to the clients' comments;
- prepared the final report layout and printed copies with overlay maps of baseline conditions and land use recommendations on GIS;
- submitted both to JVA and USAID.

4.0 Baseline Assessment of Existing Conditions

"People who – like the wild iris, the purple heron, the tamarisk tree, the wetlands, and the two little rivers of Wadi Mujib – are struggling for survival." RSCN

4.1 People and Communities – Participation and Socioeconomic Characteristics

The baseline assessment targeted the living communities who inhabit the Jordan Valley, including the municipalities, villages, farms, and Bedouin. In order to understand their characteristics, such as size, tribes, jobs, existing services and service needs, and heritage, the Study Team analyzed existing socioeconomic data and reports, created questionnaires, and held three focus groups. The result was an understanding of community strengths, weaknesses, opportunities, and threats, or a SWOT analysis **(Annexes 1 and 2)**, and recommendations for sustainable land uses through income generating activities. Training needs for future economic development were briefly assessed.

Three focus groups were held in March of 2004, one in each study area. The Study Team sent invitations to municipalities, NGOs, ministries, private industry, and other stakeholders living or working in the Jordan Valley. Numerous team members participated in each focus group, serving as facilitators and observers. Facilitators explained to community members that the purpose of the focus groups was to identify existing land uses and community issues and concerns, and to provide recommendations for community improvements that will lead to appropriate land uses and increased economic opportunities. Each focus group was divided into three sub-groups: environmental/tourism/economy, social/infrastructure, and water/ agricultural. In addition, questionnaires were distributed to and collected from participants.

4.1.1 Population Growth and Communities

According to census reports, the population of Jordan has grown quite dramatically, from an estimated 470,000 people in the early 1950s, to 900,000 in 1961, to 2,150,000 in 1979, to 4.14 million in 1994. The Department of Statistics estimated the total population in 2002 to be 5.3 million, the last year for which statistics were completed.

The present rate of growth of 2.8% is sufficient to double the total population to around 10 million by the year 2030 if growth continues at the present rate. However, the rate is expected to slow gradually in the coming years.

According to the World Fertility Survey, the Total Fertility Rate (TFR), which is the average number of children a woman is expected to have during her reproductive years, fell in Jordan from 7.4 children/woman in 1976 to 3.7 children/woman in 2002 ("Fertility and Family Health Survey, Jordan Department of Statistics or DOS"). It is anticipated that the TFR will continue to fall gradually in the coming years. This supports the earlier expectation that the growth rate will also drop gradually.

According to DOS's 2002 estimates, the population of the Jordan Valley is a little over 191,000, or about 3.5% of Jordan's total population. It appears that traditional families are larger and the TFR is higher in the Jordan Valley than the national average. If the TFR drops, it will be a much smaller drop. Therefore, according to our projections, the total population of the Jordan Valley could reach 238,000 in 2010 and 314,000 in 2020, putting increased pressure on water supply, land, and government services.

As can be seen from Table 1 below, the 32 settlements in the Northern JV Study Area have a total population of 154,814 people, the most heavily populated area. Those in the Middle JV Study Area have a total of 5,963 people, the least populated, although this area is anticipated to experience intense tourism development pressure. The Southern JV Study Area, which is a

dry arid region, has a total of 30,308 inhabitants. Thus, the three areas amount to a total of 191,085.

Table 1: Population estimates of all the population settlements in the study area

Population areas	Governorate	Department of Statistics (2002 Estimates)
Zone 1: Yarmouk River to the Baptism Site		
Almukheibeh Alfouqa	Irbid	1,740
Almukheibeh Altahta	Irbid	2,576
Aladaseiah	Irbid	2,590
Al Baqura	Irbid	829
North Shuneh	Irbid	16,130
Al Manshiye	Irbid	6,979
Waqqas and Qleat	Irbid	5,769
Zimalia	Irbid	1,318
Mashara'	Irbid	19,018
Wadi Rayyan (Al Maraza)	Irbid	1,005
Abu Habeel	Irbid	1,108
Karn	Irbid	723
Suleikhat	Irbid	757
Abu Sido	Irbid	2,658
Kraymeh	Irbid	18,124
Balawna	Al-Balqa	5,523
Khazma	Al-Balqa	2,658
Dirar	Al-Balqa	5,910
Al Rweha	Al-Balqa	3,022
Deir Alla	Al-Balqa	1,478
Abu Ezzeghan	Al-Balqa	731
North Twal Al Rabeea	Al-Balqa	4008
West Twal	Al-Balqa	7,372
Mu'addi	Al-Balqa	4,052
Al Ardah	Al-Balqa	2,073
Damia	Al-Balqa	1,072
Daharat Al Ramle	Al-Balqa	1,622
Karamah	Al-Balqa	9,198
New Shuneh	Al-Balqa	4,858
South Shuneh	Al-Balqa	3,420
Al Jofeh Al Jawasreh	Al-Balqa	6,288
Al Rawdhah	Al-Balqa	8,093
Al Rama - Al Jalad (Al Nahda)	Al-Balqa	2,112
Sub-Total		**154,814**
Zone 2: The Dead Sea Area		
Suweimah	Al-Balqa	2,564
Al Haditha	Al-Karak	3,399
Sub-Total		**5,963**
Zone 3: The Southern Ghors and Wadi Araba		
Mazraa	Al-Karak	7,544
Safi-Ramleh	Al-Karak	17,052
Fifa	Al-Karak	1,985
Al Mamurah	At-Tafila	617
Alselemani	At-Tafila	206
Rahmeh	Al-Aqaba	905
Al Resheh	Al-Aqaba	984
Fenan	Al-Aqaba	337
Beermathkoor	Al-Aqaba	467
Qatar	Al-Aqaba	211
Sub-Total		**30,308**
Total		**191,085**

The tribes inhabiting the Jordan Valley are presented in Table 2. The largest concentration of Bedouin is in the Southern Ghor or SJVSA.

Table 2: Tribes of the Jordan Valley

North Ghor	Middle Ghor	South Ghor
Al-Shalabi	Al-Wahadneh	Al-Oushoosh
Al-Dagamsheh	Al-Balawneh	Al-Khutaba
Al-Sqoor	Al-Rababa'a	Al-Bawat
Al-Ghzawi	Beni Ata	Al-Khleifat
Al-Malkawieh	Al-Gawagneh	Al-Zahran
Al-Gharaibeh	Al-Za'areer	Al-Sha'ar
Al-Halbouni	Dar Al-Khatib	Al-Masha'aleh
Al-Bakkar	Abu Damis	Al-Ma'akeleh
Al-Obeidat		Al-Muradat
Al-Zainatieh		Al-Oshebat
		Al-Mahafzah
		Al-Shamalat
		Al-Saediyeen
		Al-Akrad
		Al-Deisat
		Al-Hweimil
		Al-Owneh
		Al-Jaarat
		Al-Maghasbah
		Al-Nawaysheh
		Al-Nawasrah
		Al-Dgheimat
		Al-Algin
		Al-Ajaleen
		Al-Khanazreh

Source: Peake, 1958

4.1.2 SWOT Analysis from Focus Groups (North, Middle, South)

Focus group interaction was used to arrive at a SWOT analysis, which describes local strengths, weaknesses, opportunities, and threats. A list of the focus group members and the detailed SWOT analysis are presented in **Annex 1**.

Generally, most of the participants from the Middle and Southern Study Areas were employed by the government. A high percentage of those from the Southern Study Area were employed by NGOs or were farmers. Those representing the Northern Study Area were mainly farmers and housewives.

Across the board, local community stakeholders were interested in stronger infrastructure including a widened primary access road running from north to south and paved farm roads, water and sewer networks and treatment plants, dump sites, regional hospitals and specialized health care, a bus system, and job creation. Stakeholders were quite amenable to a continued agriculturally based economy, but they wanted better access to information on crop markets and exporting. Farmers noted a need for land re-distribution by JVA to increase the size of their farm units, perhaps those lands that are earmarked as grazing areas (e.g., specifically mentioned the foothills east of the King Abdullah Canal).

Stakeholders were also in favor of tourism and other forms of development including factories, as their populations are young and rapidly urbanizing. Out-migration throughout the Valley is quite strong, and only Suweimeh seems to have a low unemployment rate due to Dead Sea based tourism.

Throughout the Jordan Valley residents expressed an interest in education and training. They asked for better and more comfortable schools with playgrounds and recreation areas (as one

stakeholder expressed: "People deserve to breathe."), with easy access for teachers, and specialized forms of training in agriculture, computers, and tourism to meet market demand.

Focus Group #1/Southern Jordan Valley Study Area (SJVSA)

The first focus group was held on March 18 at Ghor Safi, and of the 56 people invited, a total of 32 community members participated.

Stakeholders expressed a series of issues, including the following:

- need to reduce water loss;
- insufficient marketing of agricultural products;
- lack of public awareness about environmental issues, such as pesticides;
- crowded and hot schools that are located far away from teachers and a lack of upkeep of play areas;
- lack of training in agricultural best management practices and computers;
- need for jobs such as those provided by marble and shale quarries;
- lack of good bus service;
- lack of health centers and hospitals;
- lack of handicraft training facilities;
- lack of a slaughterhouse;
- lack of an organic fertilizer plant.

Land use recommendations for the Southern Study Area that resulted from this focus group include:

- commercial/tourism zone (primarily nature based attractions, as infrastructure is rare, agriculture is especially difficult because of soils and lack of water, and the desert landscape and geology is very picturesque, to include handicraft training facilities near or in communities and preservation of cultural resources);
- commercial/medical zone (regional health care center and/or hospital and a pharmaceutical industry to include traditional medicine as recommended by ASEZA);
- industrial zones (mineral quarries slaughterhouses, and organic fertilizer plants, all of which are to be located away from tourism or residential areas);
- institutional/educational zones (schools that are near and accessible to communities, and research and training centers); and
- transportation network (ease of transport between communities, schools, training and medical facilities, particularly important to women and youth).

Programmatic and policy recommendations included formulation of:

- an environmental public awareness program on the reduced use of pesticides and on the use of grey water (to irrigate trees, play areas, and agricultural areas that grow crops not consumed by humans, e.g., animal feed such as alfalfa fields);
- cooler, more comfortable schools and training centers to improve participation and stem out-migration (to be designed with traditional, environmentally sensitive cooling such as wind catchers and windows that allow breezes).

Focus Group #2/Middle Jordan Valley Study Area (MJVSA)

This focus group was held on March 20th at the JVA Rest House near Deir Alla; of the 49 people invited, 17 community members participated. Stakeholders expressed a series of issues, including some that were expressed in the South:

- need for larger farm units to farm efficiently;

- lack of public awareness in terms of appropriate crops and value of fish nutrition as it relates to fish farming, as fish farms would be an appropriate industry.

Suweimah seemed to have the strongest organized living heritage base with 41 women involved in handicrafts and traditional food production.

Land use recommendations for the Middle Study Area that resulted from this focus group include:

- agricultural zones (JVA has given farmers 12-24 square meter plots of land, but children get married and live with their families creating crowding – need more land and need agricultural research and training);
- commercial zones including medical (expanded tourism overlay near the Dead Sea with protection of birding area and archaeological sites and links to cultural heritage at Mukawir/Beni Hamida villages and Dead Sea Panorama; regional health care center with specialized care near Suweimah);
- industrial zones (production of canned foods and agricultural product packaging, equipment for the handicapped and quarries; to be located at least 1 km from tourism sites);
- institutional/educational zones (mosques, cemeteries, training centers, handicraft centers, agricultural college or vocational school with practical training, hotel or tourism school near Suweimah);
- infrastructure (sewage treatment and dump sites);
- municipal zones (allow expansion of municipal areas, particularly Suweimah);
- recreational zone (sports facilities to include a Suweimah public beach with picnicking near the Dead Sea, youth facilities);
- residential zones (Suweimah needs hotel related employee housing to link tourism to the town;
- protected areas (nature reserves in the secured border areas of the Jordan River and at Zara and to include 20-25 meter buffer zones around archaeological sites); and
- transportation network (widen road north to south and improve bus service).

Programmatic and Policy Recommendations for the Middle Study Area:

- Survey the youth (shabab) to uncover interests and training/employment needs;
- Create a campaign to promote all types of work and change the perception of what constitutes a “good job”;
- Work with DOA/MOTA and the international community (British Institute and ACOR) to identify and protect archaeological sites from illegal digging and other destructive problems; fence sites as necessary;
- Create a public awareness campaign against littering, illegal wood cutting, and environmental problems such as destruction of the Acacia tree and Arak (old toothbrushes – Miswak) and stagnant irrigation ponds that attract flies;
- Promote water conserving crops and sustainable fish production in saline water; and
- Begin an Environmental Impact Statement on the Red Sea to Dead Sea Canal Project.

Focus Group #3/Northern Jordan Valley Study Area (NJVSA)

Focus Group #3, Northern Jordan Valley Study Area, was held on March 24th at the JVA Rest House in Study Area 2; of the 74 people invited, 38 participated. Stakeholders expressed a series of issues including the following shortages:

- Secondary schools, laboratories, playgrounds, and teachers and a lack of specialized higher learning facilities;

- Regional health care or hospital facilities and trained staff (only 8 hospital beds per 35,000 people and low doctor to patient ratio);
- Youth recreational activities and facilities;
- Sewage system and landfill or dump sites;
- Widespread unemployment;
- Congested primary road running north and south (12 m in width but planned at 40 m);

Stakeholders supported existing agricultural cropping patterns because water intensive crops like bananas have steady, reliable markets, and they also expressed a strong need for expansion of their farm units and municipal boundaries.

Land use recommendations that resulted from this focus group include:

- agricultural zones (mix of traditional cropping patterns including bananas - Kraymeh, Deir Alla and Mashara' are good areas for agriculture - and more water efficient crops including date palms, olives, avocado, alfalfa near Khazma, plus new agriculture such as animal feed and fish farms; at Tabaqit Fahel separate farm units and residential buildings as unhealthy situation from pesticides and herbicides; increase size of farm units at Tabaqit Fahel, Deir Alla, and Al Kraymeh);
- commercial zones/tourism (cultural heritage and health tourism linkage from Umm Qais to new Zara hotel at Himmeh/Al Mukheibeh to replace old spa hotel, archaeology and handicrafts center near Deir Alla; recreational and industrial link to aquaculture at Karamah with some commercial and recreational activities; tourism linkages to Jordan River's Wadi Al Rayan eco-friendly banana leave project employing 150-170 women near N. Shuneh at Arayan Village, to Pella, to Baptismal Site; also links to religious tourism such as the Venerable Companions of the Prophet Trail and to living heritage including carpet production and the Jordan River Foundation Dairy Project in Khazma; support need for a regional hospital);
- institutional/educational zones (center for the disabled near Deir Alla or Karn and regional veterinary centre for animals, training in marketing, construction and computers for migrating youth, vocational and handicrafts center at Mashara or regional one - technical center at Fanoosh already exists in mechanical and carpentry training, local college, cemeteries);
- municipal zones (along the road from North to South Shuneh preserve land west of the road for agriculture including limited greenhouse tomatoes, cucumbers, beans, potatoes, and citrus; municipal expansion at Kreymeh, Mashara', Sheikh Hussein, Mu'addi);
- protected areas (biodiversity reserves and IBAs in the north along the Yarmouk River and running north to south along the Jordan River; numerous archaeological sites; playgrounds and public parkland with shaded recreation, including a pool at Tabqet Fahel, where children have drowned playing in the KAC, and playgrounds and public parks at Khazma, Deir Alla, Kraymeh, Al Mu'addi; Wadi Arab regional parkland with camp sites);
- recreational (need sports facilities, parks, playgrounds, especially for youth);
- infrastructure (sewage treatment plant at Deir Alla to stop cess pits from polluting the springs, or package plants and sewage network with recycling, paved roads for farmers at Mu'ath Bin Jabal and Al Himmeh and widen road at Kraymeh, bus service throughout area, specifically mentioned to Al Rayyan area/handicrafts center);
- residential zones (Mashara', Al Sheikh Hussein, Kraymeh, and Mu'addi – conflict between those who recommended planning on the ridgeline to keep away from agricultural land and those who said not in mountainous areas as problem for extending water lines);
- industrial zone (juice factory, plastic recycling factory, organic fertilizers plant, slaughter house – largest now at Deir Alla, olive oil producing plant for export, date

production and packing, marketing center for export, cattle feedlots, plan industrial areas away from residential areas).

Programmatic and policy recommendations include:

- Farm units are too small at 35 dunums - increase opportunity for buying larger acreage from JVA, including deeding back land from Wadi Khaled Dam to the people of Himmeh to be used for agriculture. Stop urbanization at the expense of agricultural land, the area's primary livelihood. (Conflict with those who said youth are not interested in working in agriculture.) License crop types to prevent annual over-planting and to increase water efficiency;
- JVA should work with Al Awqaf to protect religious sites;
- Solve foreign employment problem (conflict with those who said foreign workers were necessary, as Jordan Valley residents will not do certain types of work);
- Develop or preserve lands near border with Israel, taken by the Government in 1967;
- Change schools from JVA ownership to Ministry of Education control - 30-35% of area schools are under JVA's ownership;
- Maintain the King Abdullah Canal to stop water leakage and salinization;
- Clean up the pollution caused by wastewater and solid waste at Al Deyyat dump site (bad smell and insects); construct central treatment plant but away from ancient sites;
- Reuse treated wastewater for agriculture, particularly crops for animal consumption and landscape/tree watering;
- Do EIAs before allowing industrial plants and monitor Al Ardah Tomato Paste Factory-polluter and produces a bad smell.

4.1.3 Questionnaire Results from Focus Groups (municipalities can include more than one village)

In addition to verbal discussions at the focus group sessions, participants filled out questionnaires. The following is the analysis of their answers. Table 3 presents the respondents' occupations (See Questionnaire in **Annex 2**)

Table 3: Participants background (percentage)

	SJVSA (%)	MJVSA (%)	NJVSA (%)
Government Sector	37.6	40.0	13.5
Non-Governmental Organizations (NGOs)	25.2	10.0	7.7
Private Sector			11.5
Farmers	25.1	20.0	23.1
Municipalities		10.0	21.1
Housewives		20.0	15.4
Correspondents (Journalists)	12.5		
Others			7.6

In addition to employment, the participants were asked questions about other socio-economic characteristics. The analysis showed that 94% of participants in the south were males, while the percentage is around 70% in both the middle and the north. Of the 11 settlements in the south, the participants came from four communities (Mazra'a, Safi-Ramleh, Qatar, Rahmeh). In the Middle Ghor, the participants come from Suweimah. The participants in the North came from 18 population centres including Kreymeh, Himmeh, Al Mukheiba Al-Tahta, Abu Zeeghan, West Twal, North Twal, Mu'addi, Khazma, Blawana, Al Rdah, Deir Alla, and Damia.

Pollution seems to be the main problem in the south and middle study areas. The spread of mosquitoes, flies and rats, and the absence of sewage systems were expressed as

environmental problems in all areas. Environmental problems that were listed are shown in Table 4.

Table 4: Environmental problems (percentage)

	SJVSA (%)	MJVSA (%)	NJVSA (%)
Pollution resulting from factories (plastic)	50.0	40.0	17.0
Spread of mosquitoes, flies and rats	43.8	80.0	63.5
Dust and smoke	25.0	-	-
Use of insecticides	12.5	30.0	-
Salinization of water	12.5	-	9.6
No sewage system	12.5	20.0	34.6
Polluted water	-	-	9.6
Urban Growth	-	30.0	-

When asked about the economic activities they wish to see in their areas, the respondents expressed their opinions as illustrated in Table 5. It is clear that in the southern and northern study areas, participants believed that industrial plants via agro-processing and factories are the answer to unemployment, whereas in the Middle Study Area tourism was the primary solution. All expressed the desire to have some sort of workshops for females.

Table 5: Desired economic activities by community request (percentage)

	SJVSA (%)	MJVSA (%)	NJVSA (%)
Factories for Agricultural Processing (tomato paste and pickles)	50.0	30.0	36.5
Dairy and Juice Factories	-	-	25.0
Tourist Projects	12.5	50.0	-
Small Workshops for Women	-	20.0	13.5
Marketing Societies (ag fairs/exhib.)	-	-	11.5
Weaving Factory (includes handicrafts)	-	20.0	-

Public recreation was discussed and found greatly lacking, particularly for youth, in all the study areas. All respondents expressed the need to have shaded public parks and children's playgrounds to keep children busy and from playing in the streets. The Northern Study Area respondents emphasized the need for athletic and educational centres. In the middle study area, Suweimah wanted their own public beach along the Dead Sea, and this response is indicated under public parkland below in Table 6.

Table 6: Entertainment or recreational centres (percentage)

	SJVSA (%)	MJVSA (%)	NJVSA (%)
Establishment of Tourist and Entertainment Centre on the Dead Sea	31.3	10.0	-
Public Parkland and Playgrounds	31.3	50.0	40.0
Athletic and Education Centre	18.7	10.0	55.0
Teachers Club and/or Public Café	18.7	-	-

To overcome unemployment, all respondents emphasized the need for vocational training and education. Although the verbal response in support of training and hotel or private sector employment was very strongly expressed by participants from the middle study area, both responses were weak in the questionnaire, perhaps because they do not associate a tourism school and handicrafts with vocational training or tourism employment with the private sector. Government, army or private sector jobs were expressed as good employment sources by the people in the northern and southern study areas. Emigration out of the area was expressed by some of the respondents in the north as a way of overcoming unemployment.

Table 7: Overcoming unemployment (percentage)

	SJVSA (%)	MJVSA (%)	NJVSA (%)
Vocational Training	93.7	10.0	79.0
Education	50.0	50.0	42.0
Working for the Government	25.0	-	38.0
Working for the Army	18.7	-	42.0
Working in the Private Sector	18.7	-	38.0
Emigration	-	-	23.0

Vocational training in carpentry, mechanics, and computers was expressed by all respondents as needed, as illustrated below in Table 8. Training in the fields of tourism was expressed strongly in the middle and southern study areas.

Table 8: Type of vocational training needed (percentage)

	SJVSA (%)	MJVSA (%)	NJVSA (%)
Training in Establishing Small Projects	25.0	-	-
Training in Carpentry, Mechanics and Others	25.0	20.0	18.0
Computer Training	18.8	30.0	21.0
Other (packing of agricultural produce)	18.8	10.0	
Training in Tourism, Agriculture and Industrial Fields	-	40.0	40.0

The establishment of factories for agricultural processing was highly desired by many respondents due to the high incidence of agricultural lands. Project needs are presented in Table 9.

Table 9: Project needs

No.	Project	SJVSA	MJVSA	NJVSA
1-	Factories for Agricultural Processing (e.g., tomato paste and pickles)	X	X	X
2-	Tourist Projects	X	X	-
3-	Handcraft Projects	-	X	X
4-	Dairy and Juice Factories	-	-	X
5-	Marketing Exhibtions	-	-	X
6-	Weaving Factory	-	X	-

The respondents from north to south expressed the need for vocational training such as training in carpentry, mechanics, computer skills and others. Training in packing agricultural products and tourism was expressed strongly in the North and Middle JV Study Areas, while training in establishing small projects was highly expressed in the South JV Study Area.

4.1.4 Other Stakeholder Interviews

Hotel Interviews

Numerous private sector and public entities, as well as NGOs, were willing to participate in interviews. Hotel groups who were interviewed included Zara Group, developers of the Movenpick Dead Sea, Kempinski Hotel Dead Sea, Zara Hotel in Himmeh Hot Springs who also participated in the focus groups, the Dead Sea Spa Hotel, the Amman Marriott Hotel, the Amman Regency Palace, and the Jordan Hotels Association.

Representatives of planned Dead Sea hotel developments, including OMNIX Crystal City, Bella Vista, Sunday Company, and Holiday Inn were not willing to participate in the interviews. Ma'in Spa Hotel was contacted, as they are a nearby tourism resource and were

formerly managed by ACCOR, but they have no information about the planned ACCOR hotel in the Dead Sea Area. For a summary of the hotels' responses please refer to **Annex 3**.

Government Interviews

In addition to numerous interviews with USAID and the Ministry of Water and Irrigation, including JVA and WAJ, government agencies who participated included the Greater Amman Municipality, operator of the Amman Tourism Beach on the Dead Sea, the Ministry of Tourism, the Ministry of Environment, the Department of Antiquities, the Ministry of Agriculture, the Jordan Investment Board, the Ministry of Energy and Mineral Resources, the Ministry of Awqaf or Religious Affairs (who also attended the focus groups), the Ministry of Public Works and Housing, the Ministry of Transportation, the Ministry of Planning; and a number of Jordan Valley municipalities. ASEZA was extensively interviewed in Phase One of the master plan. USAID and GTZ funded agricultural and water conservation project managers were also interviewed.

(a) The Ministry of Water and Irrigation discussed the vision, mission, and goals of the JVA and noted that, in accord with the focus groups' point, 30 to 40 dunums could be insufficient area for an efficient farm unit to support a family.

WAJ indicated that there is a study (TYPSA) to determine the locations for three wastewater treatment plants. The WAJ staff also indicated locations of the Zara Main Water Conveyance System Project desalination plant and two pump stations, and a desalination plant at the intersection of the Dead Sea-Naour Road and Road to Jerusalem. The Tel Al-Mantah Wastewater Treatment Plant, run by the JVA, reuses 100% of its treated effluent. WAJ staff said there are other wastewater treatment plants in the JV, the locations of which JVA can provide.

(b) A Ministry of Agriculture rangeland specialist discussed grazing patterns, which are quite different in the southern ghor. Up to 85% of the animal feed is from the natural vegetation, which is scarce and concentrated in the wadis and stream valleys. Goats and camels adapt better than sheep to the harsh environment. In the south, the arak and acacia stands are significantly impacted by over-grazing and wood cutting. Near the Dead Sea, the tamrix woodland suffers from over-grazing and woodcutting.

In the Northern and Middle Study Areas, grazing includes sheep, cattle, and goats, and 75% of their feed is from the natural vegetation. In the north, particularly the Humra area, overgrazing is especially noticeable, where the deciduous oak and Kharob have been significantly impacted. Policy-wise there appears to be an ambiguity in terms of management responsibilities, which results in a lack of management, particularly the rangelands of the northern ghor (from the JU farms north). Grazing activities should be based on the capacity of rangelands, and overgrazed areas should be rehabilitated. Some rangelands might be suitable for agricultural expansion, and there should be an Agricultural Research and Training Center at Deir Alla or close to the Jordan University Farms (echoing the focus group recommendation). In addition, Qatar, Mas'ada Mountain, and Ghor al Safi should be declared reserves in cooperation with local communities.

(c) A program officer at the Enhanced Productivity Program, Ministry of Planning, gave the study team information on the Jordan Valley. He noted some facilities including an Environmental Rest House which belongs to the University of Jordan and 21 Enhanced Productivity Centers (Princess Basmaa Centers which are located within municipalities). For more information please refer to **Annex 3**.

(d) The biodiversity division head at the Ministry of Environment echoed the need for rangeland management, and said that pollution in the JV is primarily from industry and the misuse of chemicals in agriculture. The serious insect and fly problem in the JV results from mismanagement of natural fertilizers and stagnant bodies of water. The MOE, JVA, and the

MOA are preparing to implement a comprehensive mitigation plan. Integrated pest management systems should be implemented. Echoing the focus groups, he noted that a big problem in the Valley is the lack of parkland for local and international tourism, and that protected areas, important bird areas (IBA), and national parks should all be identified as land uses. He said the most threatened IBA is Al Maghtas at the northern edge of the Dead Sea.

(e) Two representatives of the Ministry of Tourism and Antiquities (MOTA) outlined the existing tourism sites, including Al Yarmouk Reserve area, Al Himeh (not a village but rather an area of springs called Al Mukheiba and Al Fouka), Umm Qais, Pella (Tabqet Fahel), Companions of the Prophet tombs and mosques, Baptism site, Al Maghtas, Deir Allah Hot Springs, and the Dead Sea. They noted that there are on-going projects at Lots (Luts) Cave, the Museum of the Lowest Point on Earth (near Lots Cave), Wadi bin Hammad, and the Tlal and Twahin El Suker or ancient sugar mines.

(f) The Director of the Deir Alla Research Station agreed with the head of the Farmers Association, who noted that the main obstacle to the success of agriculture is marketing, followed by a lack of water. He also disagreed with replacing tomatoes and citrus with less water intensive crops, as this would be problematic for the culture and traditional ways of farming.

(g) However, a USAID specialist said that the main obstacle to effective agriculture is improper crop selection, and that replacement of water intensive crops by less water consuming ones must be a slow and careful process. He emphasized that the water currently allocated for agriculture should continue but not be exceeded, and that the priority for water in the JV should be for tourism and industry. He noted that different pricing was much too difficult to execute.

Interviews with Consultants with USAID and other International Donor Projects

(h) The goal was to understand and coordinate existing information, particularly in regard to water conservation and management. For example, the Kafa'a project (USAID) is looking at more water conserving cropping patterns and ways to change behavior patterns, marketing, and management to increase water efficiency in agriculture. This will be critical to implementation of effective land use patterns.

(i) The Water Efficiency and Public Information for Action or WEPIA project (USAID) focuses on public participation in water conservation and grey water reuse and is involved in tourist activities, such as targeting Jordan Valley hotels to use water conserving devices.

(j) The German funded GTZ project, Water Resources Management in Irrigated Agriculture or WMIA, encourages farmers to participate in management and distribution of irrigation water.

Both WEPIA and WMIA could serve as conduits for JVA to continue their focus groups with JV farmers in regard to more effective cropping patterns.

Industry Interviews

Industries that participated included the Arab Potash Company on the Dead Sea, the Middle Ghor Industrial Company (polystyrene factory); and the Travertine Company/Travco Quarry at Al Ardah near the Baptism site. (Other industrial operations have been located on the baseline maps through field surveys.) Please refere to Table 31 for the findings on employment.

Zara Cosmetics (Dead Sea products), the Bromide Company, and the Magnesia Company representatives were not available, although the latter two were represented by their primary

stakeholder, the Arab Potash Company. The tomato paste factory at El-Qarn (Middle Jordan Valley) said that it was not operating. The Jordan Investment Board (JIB) said that the Industrial Estate or Jordan Gateway was closed or about to close.

Agricultural Interviews

Agricultural entities that were interviewed included the Jordanian Company for Marketing and Production of Agricultural Products, the Jordan Valley Farmers Association, the Deir Alla Research Station, and the Jordan Valley "Toulibeh" Fish Farm, all of whom also participated in the focus groups.

(k) According to the Farmers Association, the main obstacle to effective agriculture is not water but rather a lack of marketing. The representative felt that water pricing should be lower for agriculture than for tourism and industry, as agriculture is the main source of income in the JV. He supported treated wastewater for irrigation, and agreed that some water intensive crops can change but not citrus.

(See Section 6.0 for detailed results of fish farming interview.)

NGO Interviews

NGOs interviewed included the Royal Society for the Conservation of Nature and the Jordan River Foundation, who also participated in the focus groups, the Jordanian Hashemite Fund for Human Development, the Near East Foundation who were very helpful with the fish farming framework, and the Friends of the Earth Middle East (FoEME) who provided information on the Dead Sea.

(m) RSCN, as the environmental guardian of the Jordan Valley and its proposed and/or approved reserves and important bird areas, expressed special concern for the planned tourism development on the north coast of the Dead Sea and near Suweimah, since the Al Maghtas area is very environmentally sensitive. RSCN recommended ecotourism development with minimal construction activities, including a nature based tourism reserve from the northern part of the Dead Sea to Wadi Al Kharar with limited camp sites. RSCN noted that they are developing ecotourism facilities at Wadi Mujib and Wadi Fenan, in coordination with Dana, Petra, and Rum.

In terms of hunting, RSCN's mandate includes approval of hunting licenses for shooting pigeons, doves, quail, and wild boars. RSCN said that the area from Yarmouk to Fifa and Safi includes 45% of the illegal hunting violations in the Jordan Valley, although there are still 500 legal hunters. Hunters also hunt at Karamah Dam, which could be a conflict with tourism development and bird watching, as dams attract birds in search of water. RSCN has established three bird watching centers: Aqaba, Wadi Mujib, and Yarmouk. They noted that most marsh areas in secured border zones and the desert have been closed to hunting for the past 10 years.

RSCN is hoping to implement a Global Environmental Facility (GEF) funded project to develop an Integrated Ecosystem Management Strategy for the Jordan Valley, in close cooperation with JVA on land use issues, as detailed below. Other governmental ministries proposed to be involved include Planning, Environment, Tourism, Municipalities and Rural Affairs, and Agriculture, with the International Union for the Conservation of Nature (IUCN) as part of the steering committee. The project would move away from an "island mentality" for protected areas, to a more holistic approach that integrates reserves into conservation oriented land use planning with community involvement.

The International Union for the Conservation of Nature (IUCN) identified and the Jordan Government endorsed, under its National Environment Action Plan of 1995, a network of 12

priority areas for conservation throughout the country, of which six have been approved as protected reserves managed by RSCN. Two of the reserves have been approved in the Jordan Valley, i.e., the Mujib Nature Reserve and the Dana Nature Reserve, and five others are proposed and pending legislative approval: Yarmouk, Jordan River, Jabal Masu'da, Fifa, and Qatar. These areas would include visitor information and limited camping facilities and hiking trails. In addition, 27 International Bird Areas (IBAs) have been identified, and the Jordan Valley houses some of them as identified on the land use maps.

In addition, Bird Life International has identified 27 Important Bird Areas (IBAs) throughout Jordan, which RSCN supports, and the following are located in the Jordan Valley: the Yarmouk River IBA, the North Ghor IBA, the Maghtas IBA at the northern end of the Dead Sea which is the habitat for the endangered Dead Sea Sparrow, the Wadi Bin Hammad IBA, the Fifa IBA, the Dana IBA, the Wadi Araba IBA, and the Aqaba IBA in the south. Five IBAs are included within existing or proposed protected areas.

(Unlike reserves, IBAs do not require legislative approval, and are simply identification of very valuable environmental resources with ecological significance. Note that the Abatah Spring Area, a small area within the Safi Fifa IBA, is the only place where the endemic Fish Ghar Gharansis exists.)

RSCN stressed that the building of dams is preventing water from reaching the Dead Sea, and that the lack of land reclamation on sites destroyed by the construction of tourism projects is a primary concern.

(n) The Jordan River Foundation discussed and located their handicrafts development and training projects in the Jordan River. They also recommended road construction, to facilitate tourism linkages between the Beni Hamida villages and Mukawir and the Dead Sea. (JRF realizes that a new road is being constructed between the Dead Sea Panorama and the Dead Sea shoreline, but they would like another road that would facilitate quicker access. Unfortunately, cutting another road through the sensitive geology would create expensive environmental mitigation, and the developing road, which has already harmed the wadis, should be sufficient to encourage tourism linkages.)

(o) Friends of the Earth Middle East (FoEME), expressed that there are problems with JVA policies that negatively impact small and medium sized farmers. They noted that there is a lack of coordination and exchange of information amongst the various donor projects and a lost opportunity for integrated resource management (including environmental). They also said that the lack of a master plan is a major issue for the Dead Sea, and detailed its many environmental issues.

The Friends representatives indicated that there is great importance in developing services in urban areas, and that environmentally sensitive techniques for growing plants in Wadi Araba are important to minimize soil erosion. They also encouraged development of basic tourism facilities and services and effective tourism marketing by JVA.

(p) The Jordanian Hashemite Fund for Human Development has five centers in the Jordan Valley, four of which are Princess Basma Centers. They are located in Ghor Safi, Ghor Haditha, Ghor Al-Mazraa, the Irbid Governate (Sheikh Hussein Centre), and South Shuneh.

Most are involved in training women and youth in the development of irrigation for agriculture and sustainable management of water, and the centers could serve as conduits for public awareness training. In South Shuneh, they are creating an "environmental restaurant," which might link to tourism.

4.2 Environmental Resources

The Jordan Valley, situated along the northern edge of the Great Rift Valley, represents a rich blend of geologic formations, diverse plant and animal species, and ancient human history. With thousands of years of human presence, the Jordan Valley has natural, historical, religious and political importance for many people around the world. However, its natural and cultural environment is being severely impacted by agricultural and industrial development, tourism, and population growth.

These resources are threatened by the mismanagement of agricultural resources (water intensive cropping patterns, use of chemical fertilizers, lack of water conservation), industrial development tourism (over developed Dead Sea shoreline and water intensive operations), retraction of the Dead Sea and the associated sinkhole problems, and the mismanagement of liquid and solid waste.

Particularly impacted and a tremendous resource for nature based tourism are migrating and local birds, moving along the Great Rift from Africa to Europe through Jordan. Dozens of the migrating bird species are listed as globally threatened by the International Union for the Conservation of Nature (IUCN). With regard to other species, within the past century, some of the most impressive animals have been completely lost from the wilds of the Jordan Valley, including the Cheetah, Syrian Brown Bear, Nile Crocodile, Ostrich, Bearded Vulture, and Lappet Faced Vulture.

As a bridge connecting three continents, Asia, Africa, and Europe, the Jordan Valley supports a wide variety of habitat types such as riparian, marsh, grassland, scrub and arid desert. With its complex geology and great altitudinal range, the Valley's habitats include Mediterranean, non-forest Mediterranean along the margins which are considered transitional zones, Irano-Turanean, and Afro-Tropical. The high biodiversity is important regionally and globally.

Besides its extraordinary ecological and geological settings, the Jordan Valley enjoys deep rooted cultural and archaeological features with tremendous cultural and tourism value. These too are threatened by dam construction, industry, vandalism, and natural elements.

Most of the Valley's freshwater marshes were drained to increase agriculture. However, the relationship between agriculture and wildlife is complex – sometimes beneficial and sometimes detrimental. Although some types of agriculture, such as pesticide laden crops, can be detrimental to wildlife, other types, such as fish ponds and alfalfa fields, can be beneficial. On the other hand, wildlife, particularly birds, can cause significant damage to agriculture and aquaculture.

The tropical ecosystems in the Jordan Valley, Dead Sea area, and Wadi Araba occur at low altitudes and are characterized by hot climate and low precipitation. The presence of plants close to the water table allows in limited instances for a dense forest growth dominated by important species such as the Acacia, Ziziphus, Calatropis Procera, Balanites Aegyptiaca and many others. Some of theses plants are endangered. Rapidly developing land has led to destruction of the natural vegetative cover and a changing ecological balance, including the introduction of exotic species.

4.2.1 The Biological Environment

Two eco-zones in the Valley illustrated on the baseline maps as within protected areas are of global importance: the Jordan River Basin in the Northern Study Area and the Dead Sea Basin in the Middle Study Area. Several hotspots of threatened biodiversity can be identified within the eco-zones, and these areas should receive conservation priority due to their importance and sensitivity.

(a) Dead Sea Basin Eco-zone

As was discussed during the fall of 2002 at the Earth Summit in Johannesburg, South Africa, the primary environmental issue impacting market viability in the Jordan Valley is the health of the Dead Sea, the lowest and saltiest body of water on the Earth's surface at -414 metres or 1,476 feet below sea level. Located in a major fault zone of the Great Rift Valley, the Dead Sea, thought to be as much as five million years old, is an incredibly unique environmental asset for local and international tourism: remote, rocky, arid, and justifiably famous for its 5,000 years of civilization, ancient trade routes and religious significance to all three monotheistic religions.

The Dead Sea is evaporating and it is not being replenished, as water that normally feeds it is being harvested and diverted on both the Jordanian and Israeli sides for municipal, industrial, agricultural, and tourism uses. At the present rate, some estimate it will drop 300 feet in the next century. The Sea itself is sending out warning signs in the form of sinkholes, which are appearing along the shoreline. Sinkholes result from groundwater being pumped out and not replenished, which lowers the water table. Rainwater washes away the underground salt, and collapse occurs forming a sinkhole or deep depression on the earth's surface. The Sea itself is nearly lifeless with only algae and bacteria surviving its salty waters.

However, life abounds on the shores of and surrounding the Dead Sea. The northern and southern tips of the Dead Sea include semi-tropical marshland, mudflats, and wetlands, wet areas that are home to thousands of migrating birds. The Lisan Peninsula on the Jordanian shore, where it is believed the Roman Army possibly crossed to Masada, has unique geomorphologic chalk formations, and is the only location in Jordan where Rueppell's Fox has been spotted.

The shores of the Dead Sea and the oases in its vicinity preserve a rare blend of desert biota and bio-geographic relicts, which have survived in isolation of the surrounding desert. Several species have been separated from their species gene pool long enough to evolve into subspecies, and even into local endemic species. The presence of the latter is especially significant.

The Dead Sea Basin includes approximately 400 to 450 species of plants, and fauna includes 25 species of amphibians and 24 species of mammals, much of it in the Mujib Nature Reserve east of the Dead Sea, a lush oasis set amidst spectacular geological formations. One species of endemic fish and one of dragon-fly, Caloptryx Syriac, are known to occur in this area.

The Mujib Reserve, where evidence of breeding activity for the globally threatened Lesser Kestrel and the Egyptian Vulture has recently been discovered, is identified as an important bird and wetlands area for the entire Middle East. The Reserve supports birds of restricted range to the Middle East including the *Onychognathus tristrami* (Tristram Grackle), *Passer moabiticus* (Dead Sea Sparrow) and *Corvus rhipidurus* (Fan-Tailed Raven). Many vertebrates such as the Leopard, Hyena, Nubian Ibex, Rock Hyrax, Jungle Cat, Blanford Fox, Egyptian Mongoose, Caracal and other globally and regionally endangered species inhabit the Reserve.

Due to the ongoing deterioration of the biological habitat, the ecological status of many species is changing. Therefore, it is difficult to list the total numbr of endemic, endangered and threatened species.

The observed endemism and bio-geographic coexistence are biological rarities, confined to small biotopes that are easily disturbed. Therefore, proper resource management and conservation of the Dead Sea basin is imperative to maintain its extraordinary diversity and economic potential for local and international cultural heritage, health, and nature based tourism.

(b) Jordan River Basin Eco-zone

The Jordan River and its tributaries are biologically important, and have been feeding the Dead Sea for thousands of years. As in the case of the Dead Sea, many endemic forms have evolved over the millennium to create special habitats and communities. In dry and arid areas like the Jordan Valley, wetlands have become important ecosystems for the survival of diverse species and habitats. The Jordan River wetland area maintains many globally valuable species such as the Brown Fish Owl, the Common Otter, Arabian Leopard, Rock Hyrax, Freshwater Turtle, several endemic fresh water fish, fresh water snakes, and many other endangered species.

The Jordan River is part of the Great Rift Valley's globally important bird migratory route. A huge number migrate annually through this narrow corridor, such as the Black and White Stork, Dalmatian and Common Pelican, Kingfisher, Herons, Shovlers, Sandpipers, Shanks, Francolin and other globally threatened water fowl. In addition, the Jordan River basin has high economic value related to its forestry, agriculture, fishing, and religious and recreational tourism.

4.2.2 Important Bird Areas (IBAs) and Wetlands in the Jordan Valley

The Jordan Valley encompasses a series of distinctive geographic sections, including the Jordan River Valley, the Yarmouk River Valley, the Dead Sea and its eastern escarpments, the southern Ghors south of the Dead Sea, and the arid Wadi Araba. With its dramatic topographical and climatic variations, the Jordan Valley hosts a large variety of arid ecosystems. Locations of birds and other animal life are directly related to the availability of water resources, including irrigation, most of which is concentrated in the area north of the Dead Sea.

In 1994, Birdlife International published a book of Important Bird Areas (IBAs) in the Middle East. As mentioned earlier in this report, in 2000, a country-wide inventory of IBAs in Jordan identified 27 sites, covering a total area of around 7,000 km², representing all habitat types, ecosystems and bio-geographic zones. 90 bird species were identified in the Mujib and Dead Sea area. Maintenance of those 27 sites or IBAs is critical for sustaining bird populations within this region. There are two primary migratory seasons – Spring or March-May and Fall or September-November, which will be important to boosting nature based tourism.

Birdlife International's criteria for selecting IBAs in the Middle East (Evans, M.I., 1995) are presented in Table 10.

Table 10: Criteria for selecting IBAs in the Middle East

#	Category	Criteria
1	Sites supporting globally threatened species	The site regularly holds the species.
2I	Sites where birds concentrate in important numbers, either when breeding, in passage, or in winter	The site holds an average of 1% or more of a seabird or waterfowl species' bio-geographical flyway or Middle Eastern population
2II		The site holds an average of 20,000 or more waterfowl
2III		The site is a migratory bottleneck where, on average, more than 5,000 storks, 3,000 raptors, or 2,000 cranes pass during spring and/or autumn migration
3	Sites for species which are threatened or declining throughout all or large parts of their range in the Middle East	The site is one of the five most important for the species in the Middle Eastern country in question.
4	Sites for species which have relatively small total world ranges with important populations in the Middle East	The site is one of the five most important for the species in the Middle Eastern country in question.
5I	Sites for representative, rare, threatened or unique habitats possessing characteristics associated with bird communities	The site is a particularly good representative example of a natural or near-natural habitat with a characteristic bird community, in the appropriate bio geographical region
5II		The site is an example of a habitat (with a characteristic bird community in the appropriate bio geographical region) which is rare, and/or unusual, and/or vulnerable to detrimental change
6	Sites important for bird conservation because of their value for education, research or tourism	The site is a center, or has the potential to become a center, for education/recreation/research/tourism which generates benefits for bird conservation

The term IBA only refers to the importance and significance of the identified sites as important habitats for bird species. However, these sites also hold considerable importance for other life forms including vegetation, invertebrates and other vertebrates.

We would like to address the reader attention to the fact that IBAs do not necessarily indicate any land use activites nor the existing/required level of protection. However, protected areas and proposed protected areas might exist within the identified IBAs; for example, Yarmouk IBA encompasses a core area proposed for protection as Yarmouk Nature Reserve.

Globally, wetlands are considered as unique and yet threatened ecosystems. Nineteen wetlands exist in the Jordan Valley of which thirteen are considered as important ecological sites for their cleansing potential and their importance as stops on international bird migratory routes. These sites are shown in Figure 2. Most of these wetlands were found to be located within the previously discussed IBAs. Also, some of them are protected as part of existing or propose dprotected areas.

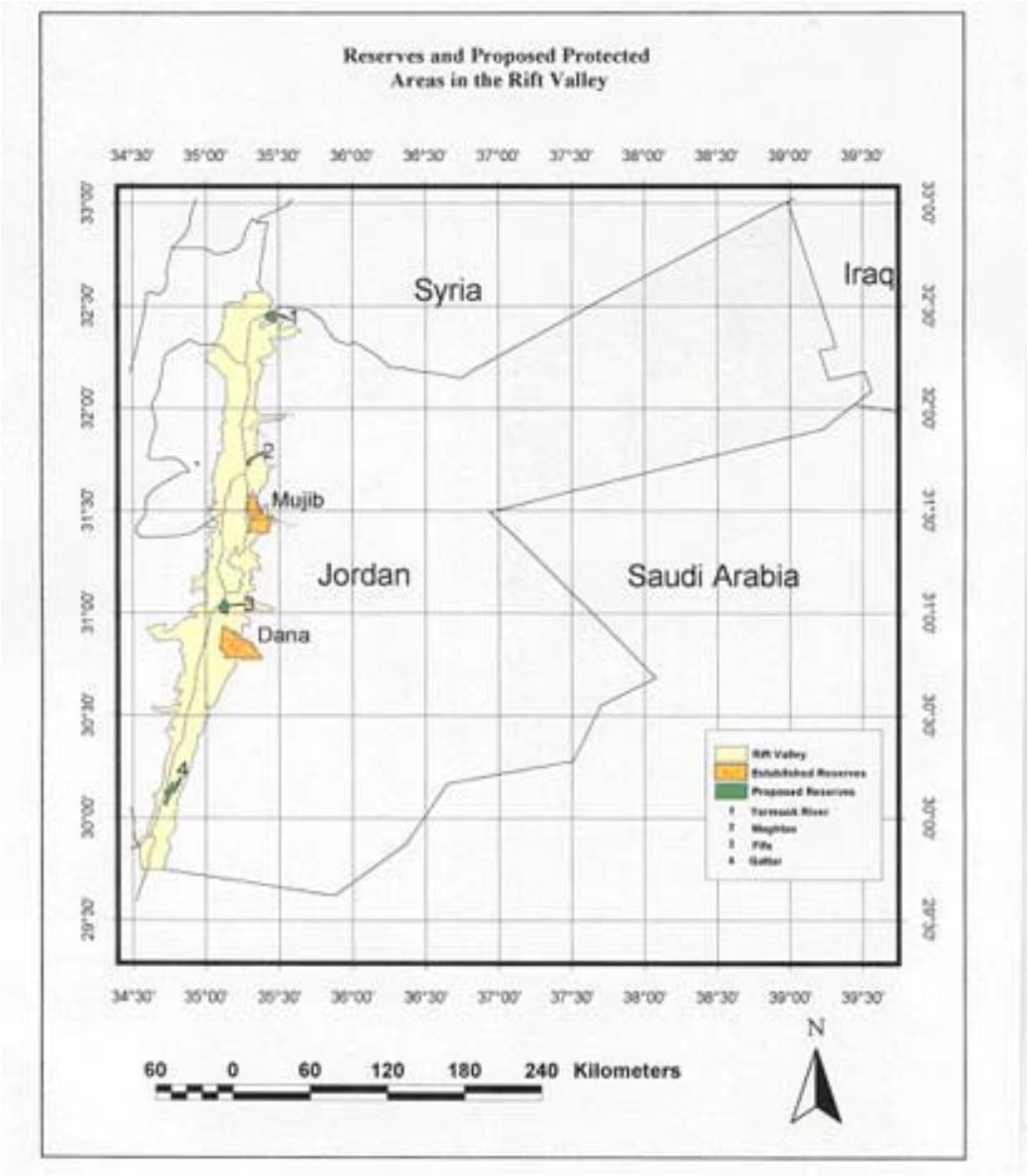

Figure 1: Reserves and proposed protected areas in the Rift Valley

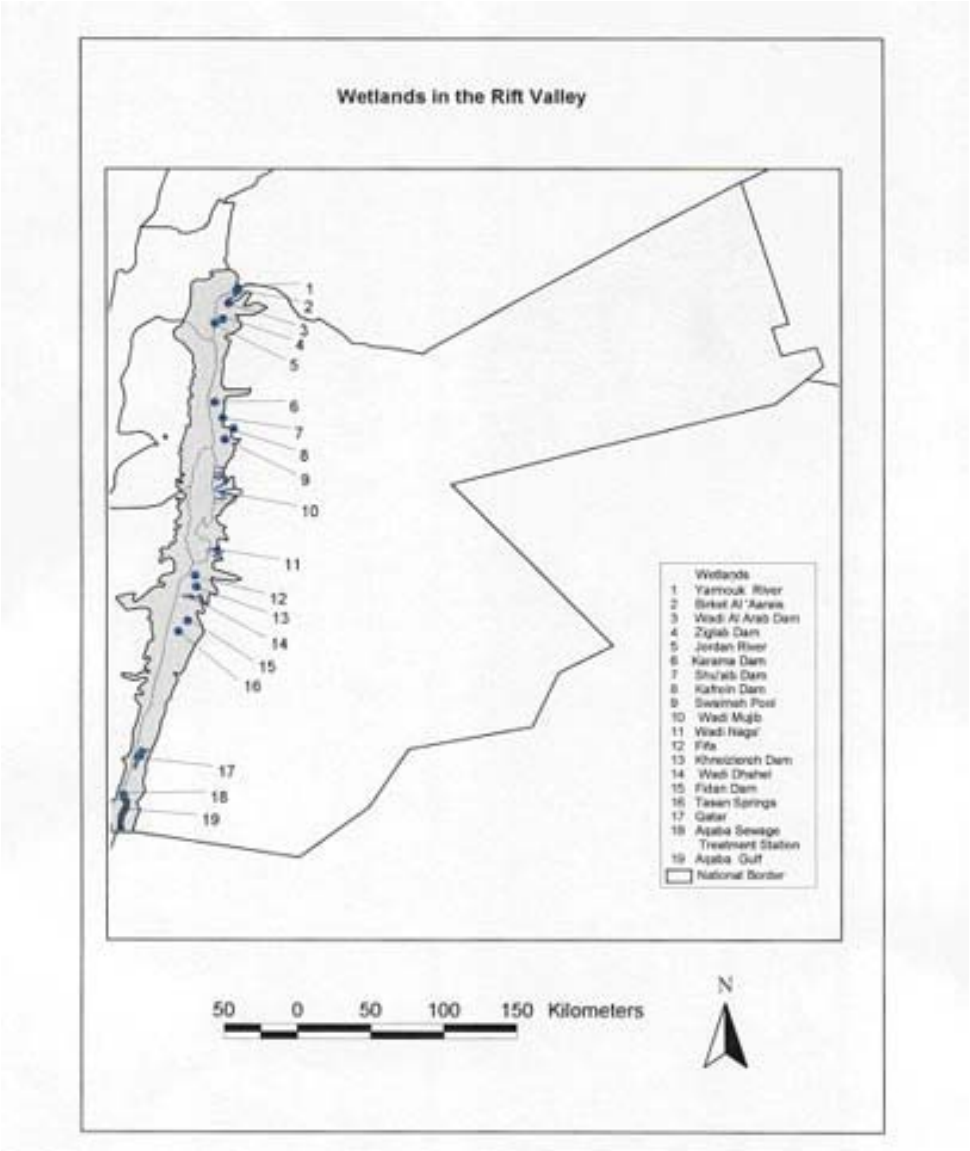

Figure 2: Wetlands in the Jordan Valley

4.2.2.1 Environmental Settings in the Northern Jordan Valley

IBAs and Reserves in the Northern Jordan Valley

(a) Yarmouk IBA and Proposed Nature Reserve (Northern Study Area)

Importance:	IBA (Criteria: 1, 2III, 3, 4, 5II), RSCN Proposed Protected Area, Biological Corridor
Protection Status:	Significant portion of the IBA is a Proposed Protected Area
Sensitivity:	High
Rarity:	High

The Yarmouk River wadi is a steep-sided valley with a small river surrounded by Nerium and Salix thickets. There are remnant stands of deciduous oak on the slopes which are generally covered by low shrubs and used as farmland. Located on the Syrian border, the Yarmouk River was once relatively undisturbed, but water pumping and agricultural expansion are increasingly threatening wildlife and habitats.

The proposed Yarmouk Reserve or protected area (see Figure 3) represents the deciduous oak forest vegetation type (*Quercus aegilops)*. This area of 30 square kilometres is one of the best pure stands of deciduous oak in the eastern part of the Mediterranean region. The forest varies in altitude from 200 meters below sea level to 500 meters above sea level. The local climate is characterized by humid, cool winters with temperatures reaching a minimum of 6.9 degrees Celsius and hot dry summers with maximum temperatures of 44.8 degrees Celsius. The average rainfall in the area is around 400 millimetres per year.

The physical and age structure of the forest as a whole is remarkably varied with trees of widely different ages and sizes and a distinct under-canopy in many areas. The variety is aided by the presence of wadis, which provide different moisture levels and soil conditions throughout the forest.

Resident and breeding birds include Griffon Vulture (non-breeding resident), Sand Partridge (rare), Smyrna and Pied Kingfishers, Syrian Woodpecker, Hoopoe, Palestine Sunbird, Rufous Bush Robin, Olivacuous and Sardinian Warblers, Little Swift and Spanish Sparrow. The Marbeled Teal might be present, as it once was, but the Brown Fish Owl is possibly extinct.

Migrating raptors include Honey and Steppe Buzzards and Lesser Spotted Eagle. Cormorant, Pygmy Cormorant, Finsch's Wheatear, Stonechat and European Serin are winter visitors to the site.

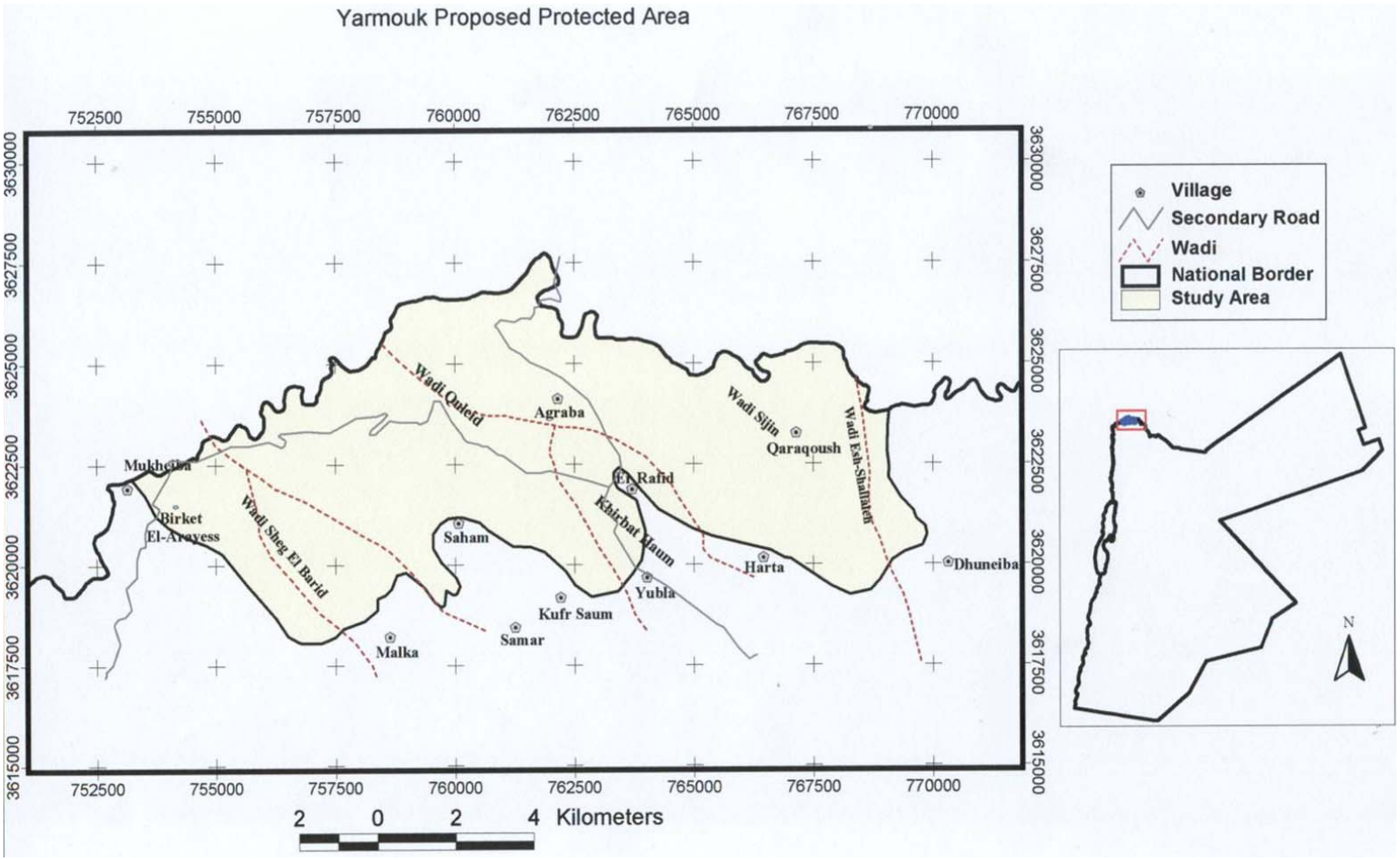

Figure 3: Yarmouk protected area

(b) North Ghor IBA (Northern Study Area)

Importance:	IBA (Criteria: 1, 2I, 2III, 3, 4, 5II), the stretch close to Jordan River is a biological corridor
Protection Status:	Not Protected
Sensitivity:	Medium
Rarity:	Low

The North Ghor IBA is a flat, open agricultural plain bordering the Jordan River (see Figure 4). Tamarix thickets and reed beds can be found along the river. Scattered poplar and eucalyptus trees attract several species of Herons. Other birds of this site include the breeding Marbeled Teal, Black Francolin, Pied Kingfisher and Clamorous Reed Warbler. Cattle Egret, Masked Shrike, and Indian Silverbill are usually present in neighbouring farms. Because of its topography and interest to nature based tourists, the land use plan recommends a compacted soil nature trail for bikers and hikers through this IBA from north to south.

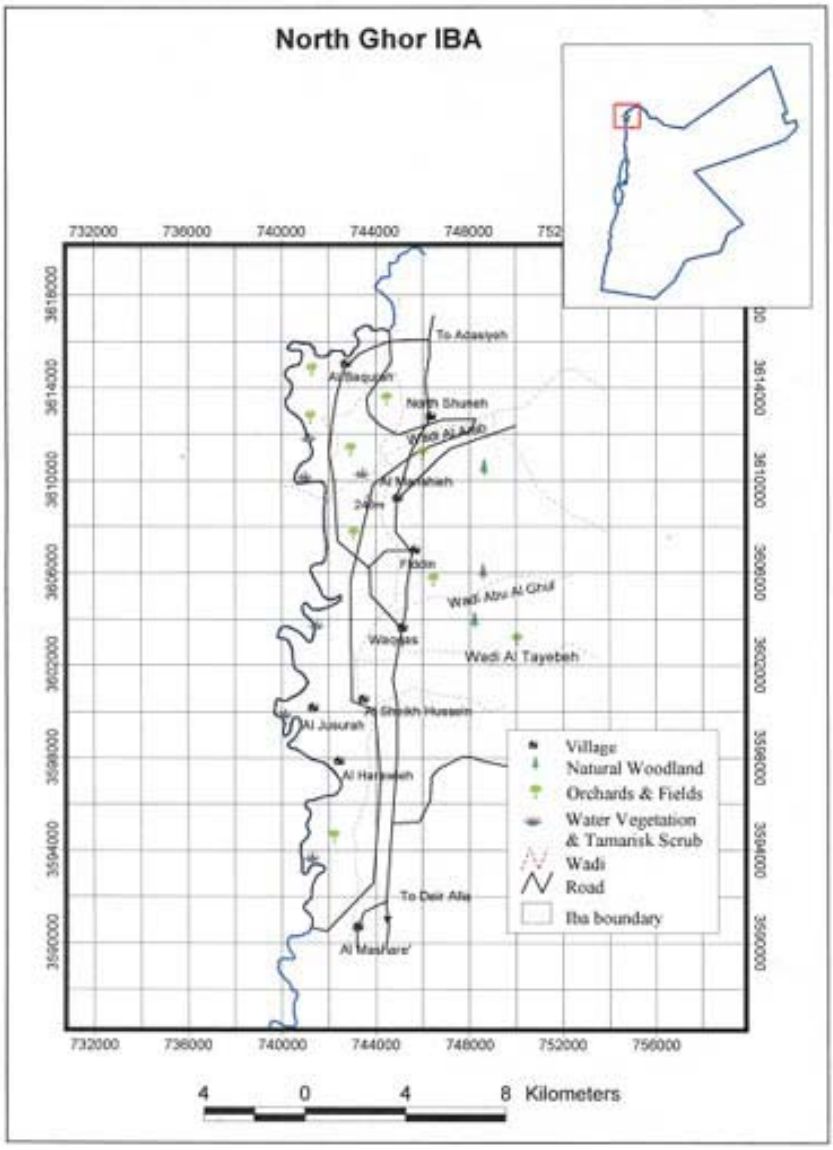

Figure 4: North Ghor IBA

Pygmy Cormorant and Egyptian Vulture are non-breeding residents, while Cornkrake, Bittern, White and Black Storks, Honey Bussard, Levant Sparrowhawk, Great Snipe and Syrian Serin have been recorded as migrants or winter visitors.

Wetlands in the Northern Jordan Valley

(c) Yarmouk River Basin including Arais Pool

The river banks are characterized by Phragmites Communis, Nerium Oleander, Juncus Maritimus and other plants typical of wetlands and river areas in the Middle East. Typical bird species include Ketupa Zeylonensis (rare) , Fulica Atra (breeding), Gallinula Chloropus, Anas Crecca, Ardea Cinerea , Ardea Purpurea, Bubulcus Ibis, Vanellus Vanellus, Alcedo Atthis, Larus Ridibundus, L. Melanchocephalus, Gallinago, Tringa Totanus, T. Nebularia, and Actitis Hypoleucos. The Lutra Lutra, Felis Chaus, Procavia Capensis, Tillapia, and Rana Ridibunda are some other species thought to inhabit the area.

The area lies under the jurisdiction of the Jordan Valley Authority, and is considered as a military zone. Occasional hunting occurs.

(d) Wadi El Arab

The area is inhabited by marsh plants such as Phragmites Communis, Nerium Oleander, and Tamarix Aphylla. Waterfowl known to occur include the Fulica Atra, Anas Crecca, Bubulcus Ibis, Egretta Garzetta, Ceryle Rudis, Alcedo Atthis, Halcyon Smyrnensis, Larus Ridibundus, Ardea Cinerea, Egretta Alba, Tringa Stagnatilis, T. Nebularia, T. Totanus and others. Rana Ridibunda, Tillapia Zilli, and Claris Lazera are also part of its hydrofauna..

A dam was constructed on Wadi El Arab in 1987, with a total capacity of 20 MCM to collect flood water and base flows to irrigate the Jordan Valley. The catchment area is in agricultural use, but the city of Irbid is expanding westward into the catchment area which may put increasing pressure on the quality of the water collected in the dam, which will negatively impact the flora and fauna.

(e) Wadi Ziqlab (Shurhabil Ben Hassaneh Dam)

The wadi basin is inhabited mainly by plant species typical of semi arid conditions such as Nerium Oleander, Phragmites Communis, Retama Reatam, and Tamarix Aphylla. Typical fauna includes Rana Ridibunda, Hyla Arborea, Agama, Geko, and Alectoris Chukar. Visiting waterfowl recorded include Ardea Cinarea, Nyctricorax Nyctricorax, Ixobrychus Minutus, Egretta Garzetta and others.

Various springs feed the Wadi Ziglab (ROLA – SPELLING ABOVE ZIQLAB – PLEASE STANDARDIZE) with a total discharge of some 5 MCM/ year. In addition Wadi Ziglab drains another 5MCM/year of floodwater. A dam, for irrigation in the Jordan Valley, was constructed in Wadi Ziglab with a total capacity of 4.3 MCM in 1966. The catchment area is agrarian with natural forests and very little population. Therefore, the water collected in the dam is of high quality and can be used for different purposes.

4.2.2.2 Middle Jordan Valley

IBAs and Reserves in the Middle Jordan Valley

(a) Maghtas IBA; includes the protected Tel Al Kharrar (Often Known as Baptism Site); adjacent to Suweimeh National Park and within the proposed Jordan River Reserve (Middle Study Area)

Importance:	IBA (Criteria: 1, 2I, 2III, 3, 4, 6), the stretch close to the Jordan River is a biological corridor
Protection Status:	Partially protected
Sensitivity:	High
Rarity:	High

The southern part of the Jordan River, including the Tel or Wadi Al-Kharrar (Baptism site), a Tourism Based Reserve), some private lands, Suweimeh National Park, and the northern shores of the Dead Sea (around 390 m below sea level) (see Figure 5), make up the Maghtas IBA.

Silt plains adjacent to the river are subject to occasional flooding. The water level of the river has become very low in recent years due to over pumping for agriculture and the water itself has become rather saline. *Tamarix* thickets, reeds and other, subtropical vegetation dominate along the river, in side wadis, and on the northern edge of the Dead Sea. Breeding birds include Collared Dove, Turtle Dove, Sand Partridge, Black Francolin, Little Bittern, Cream-coloured Cursor, Blue-checked Bee-eater, Smyrna Kingfisher, Arabian Babbler, Spanish and Dead Sea Sparrows (the broader Dead Sea area being its only habitat). Other non-breeding residents or visitors include Marsh Harrier, Egyptian Vulture and Cattle Egret, while the White Stork and Corncrake have been recorded as spring migrants.

Luckily, the most sensitive localities are close to the Jordan River and border with Palestine. This secured zone has allowed limited access, which unintentionally conserves this biological hotspot. However, the site is threatened by intensive grazing, and woodcutting and fires by the local community, visitors, and construction workers. The site should be monitored, and harmful activities should be stopped.

In planning the land use of this area, it is critical to consider its biological, cultural and spiritual value, and to take all of these factors into account so that the planned influx of tourists does not negatively impact the site. Conservation and resource management should be cautious of and protect against the following:

- Loss of sensitive and rare habitat by construction activities.
- Development of tourist infrastructure that introduces exotic and invasive species that could negatively impact existing rare and important species.
- Loss of biological diversity (birds, mammal and vegetation) due to hunting activities.
- Pollution problems caused by the accumulation of solid and liquid wastes (construction and operation).
- Fires made by campers.
- Disturbance caused by vehicles accessing the site.

Since the site's natural values are not yet exploited or aggressively promoted as a tourism destination, nature based tourism including bird-watching and other environmentally friendly activities, can be developed in the area and tourism linkages can be established to the Baptism site and the Dead Sea. Establishing a visitor's center with exhibits on the area's flora and fauna, particularly the Dead Sea Sparrow, carefully sited interpretive walking trails, and an

ecological monitoring station could attract many tourists to the site. A camp site might be organized just outside the area, to which visitors could walk. The natural primary vegetation including the Tamarix, an endemic plant, should remain untouched.

This land use plan recommends that Maghtas be linked to Suweimeh National Park to created a park or protected corridor with limited development of trails and training and management facilities, with cultural heritage tourism linkages to Jesus' Baptism site. JVA, MOTA, and RSCN should jointly establish a management plan, under which Jordan could reap the site's economic benefits and conserve its rare biological features. Prior to development of the site, an EIA should be prepared and implemented. Within the reserve, construction activities should be minimal and all tourism activities should be environmentally sound.

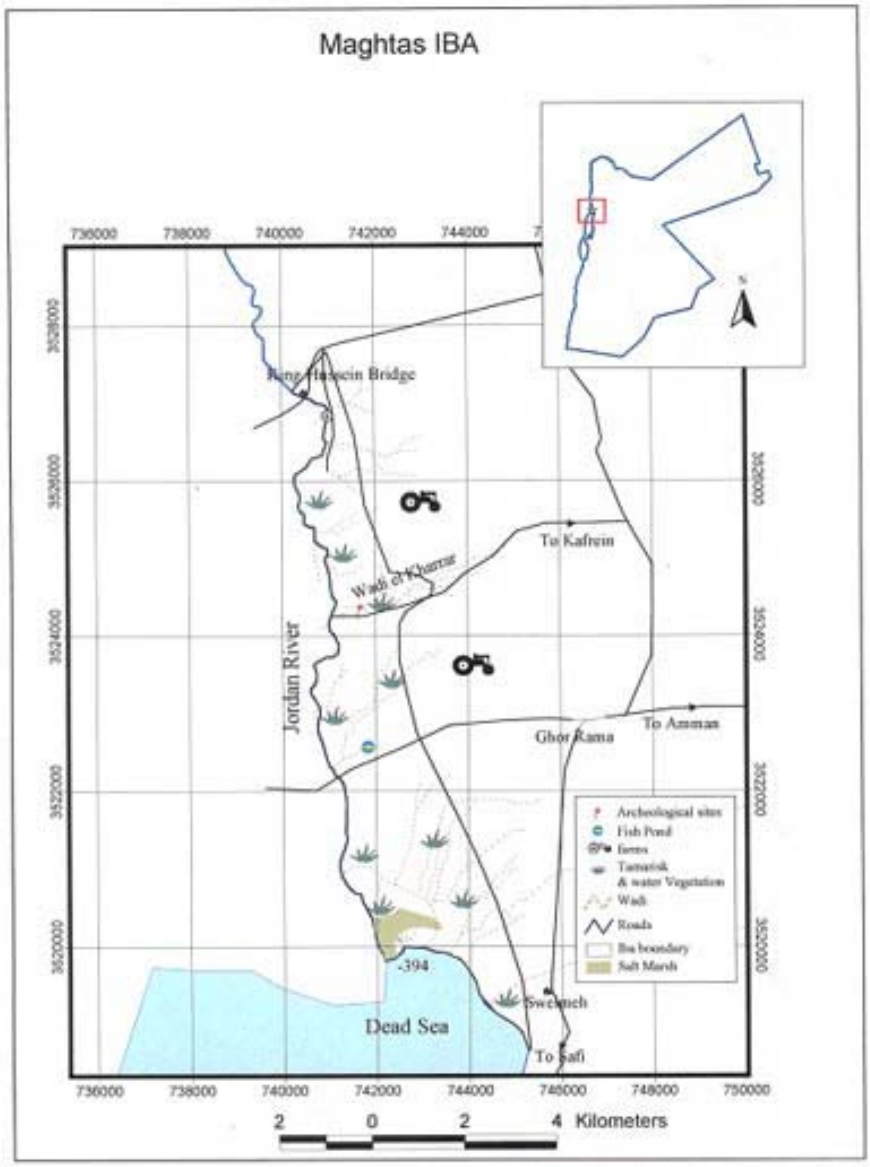

Figure 5: Maghtas IBA

(b) Mujib IBA and Nature Reserve

Importance:	IBA (Criteria: 1, 2III, 3, 4, 6), Al Mujib Nature Reserve managed by the RSCN, captive breeding and re-introduction of Ibex
Protection Status:	Partially Protected (IBA extends beyond reserve boundary)
Sensitivity:	High
Rarity:	High

Wadi Mujib is a mountainous, rocky, sparsely vegetated desert, with cliffs, gorges and deep wadis cutting through plateaux (see Figure 6). Perennial, spring-fed streams flow down wadis to the shores of the Dead Sea. The streams are lined with Oleander and Tamarix thickets and reeds with some scattered wild palm trees. The main land use is nature based tourism, and RSCN has recently opened a camping site and visitors center near the newly constructed highway bridge. There is also some mining in the lower areas and farming and grazing at higher altitudes. Water resources are threatened by water extraction and diversion.

RSCN has a programme for captive breeding and re-introduction of the Ibex in the Mujib Nature Reserve. Breeding birds include Lesser Kestrel, Sooty Falcon, Barbary Falcon, Lanner Falcon (possible), Egyptian and Griffon Vultures (probable), Bonelli's Eagle, Long-legged Buzzard, Chukar, Sand Partridge, Hume's Tawny Owl (probable), Smyrna Kingfisher, Little Swift, Fan-tailed Raven, Mourning, White-crowned Black-eared and Hooded Wheatears, Blackstart, Arabian Babbler, Tristram's Grackle, House Bunting and Sinai Rosefinch. Migration is a great event at Mujib with thousands of birds, including Levant Sparrow Hawk, Steppe Buzzard and White Stork, passing over annually.

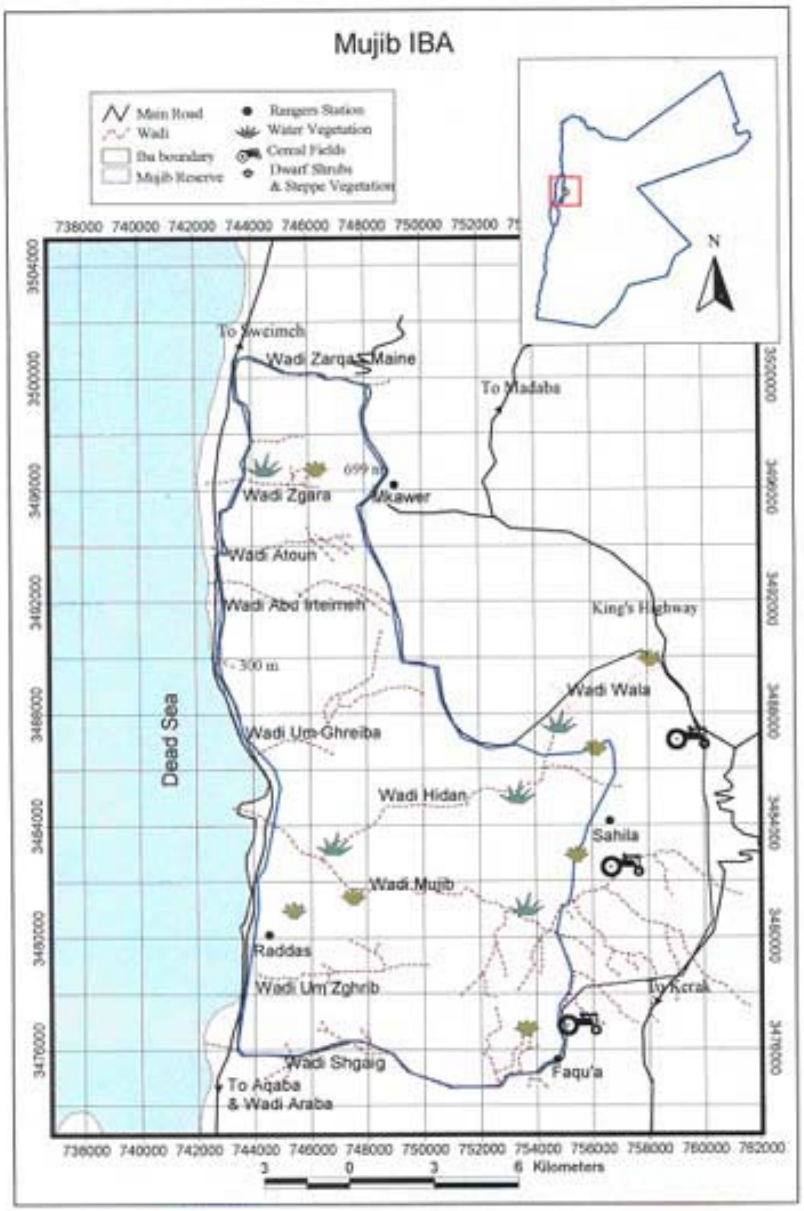

Figure 6: Mujib IBA

Wetlands in the Middle Jordan Valley

(c) Zarqa River Basin (King Talal Dam)

The main important areas for waterfowl within the Zarqa Basin are respectively King Talal Dam (KTD), and Khirbet As-Samra sewage treatment plant, and both are visited by migrating waterfowl such as Ardea Cinerea (breeds), Egretta Garzetta, Bubulcus Ibis, Ixobrychus Minutus, Fulica Atra, Anas Crecca, Anas Platyrhynchos, Alcedo Atthis (breeds), Tringa Ochropus, Vanellus Spinosus, and Ciconia Ciconia. The area of KTD is famous for sustaining big stocks of fish, indigenous and introduced species, Tilapia spp, Claris lazera, Noemacheilus damascena, Aphanius spp. Adjacent to the dam are natural pine forests where the Persian Red Squirrel still inhabits the area. In 1987, the river otter Lutra Lutra was recorded in one of the streams near the Zarqa River. Unfortunately both sites have been extensively contaminated by waste from the sewage treatment plant. In terms of land use, the plan recommends that the pollutants be cleaned and that the area becomes an environmental

corridor of parkland for birding, with hiking and biking trails linked to a Jordan River environmental corridor.

(d) Wadi Damia, Kibed Pool

Vegetation becomes less common and scarce in the middle Jordan Valley areas due to the site elevation (200 a.s.l.). The dominant vegetation cover is Phragmites, Tamarix, and some areas are inhabited by Populus Euphratica.

The main water bodies are inhabited by many Crustaceans such as Gammarus spp, Crabs, Barbus Canis, Barbus Longiceps, Gara Rufa, Tilapia spp, and Aphanius spp. Observed waterfowl are Gallinula Chloropus (breeds), Rallus Aquaticus, Prozana Prozana, Himantopus Himantopus (breeds), Recurvirostra Avosetta, Calidris Minuta, Caladris Alpina, Ardea Goliath, Tadorna Tadorna, T. Ferruginea, Pluvialis Squatorola, Anas Penelope, Tringa Hypoleucos, Tringa Nebularia, Ardea Cinarea (breeds), Egretta Garzetta, Nycticorax Nycticorax, Vanellus Vanellus, Vanellus Spinosa, Tringa Ochropus, Ceryle Rudis (breeds), Halcyon Smyrnensis (breeds), Acrocephalus Scripaceus (breeds), Charadrius Dubius, Francolinus Francolinus, Anas Crecca, Anas Querquedule, Larus Ridibundus, Alcedo Atthis (breeds), Ciconia Ciconia, Fulica Atra, Bubulcus Ibis, and Chlidonias Leucopterus.

All sites mentioned above are surrounded by cultivated land and are exposed to over-pumping, pollution, hunting and unplanned urban expansion. Kibed Pool is distinguished with high water salinity. In terms of land use, both dam sites have the potential for either fish farming, nature based tourism and parkland, or both.

(e) Wadi Mujib

Elevation ranges from 1,100 m a.s.l. to 400 m b.s.l., the rocks forming the catchment area consists of fractured limestone, dolomites, shales, and sandstone and shert beds. The wadi is inhabited by beds of *Phragmites spp*, *Juncus maritimus* and scattered *Phoenix dactylifera*. Main indigenous animals are: *Barbus spp.*, *Capoeta damascena*, *Gara spp.*, *Hemiggrammacopoeta nana*, *Aphanius spp.*, Crabs, *Rana ridibunda*, *Hyla arborea, Agama spp.*, *Capra ibex nubiana*, *Procavia capensis*, *Caracal caracal lynx*, *Canis lupus*, *Vulpes vulpes*, *Hystrix indica*.

The waterfowl observed include *Ciconia ciconia,* which occurs *in* large numbers during migration season, *Ardea cinerea, Charadrius hiaticula, Egretta garzetta, Himantopus himantopus, Haemtopus ostralegus, Phoenicopterus ruber, Ciconia nigra, Platalea leucorodia, Plegadis falcinellus* and *Bubulcus ibis*.

A dam at Wadi Mujib was recently built, and the area is vulnerable to the effect of over-pumping and increasing salinity.

4.2.2.3 Southern Jordan Valley

IBAs and Reserves in the Southern Jordan Valley

(a) Wadi Bin Hammad- Haditha IBA

Importance:	IBA (Criteria: 1, 2III, 3, 4, 6), Biological Corridor
Protection Status:	Not Protected
Sensitivity:	High
Rarity:	High

Wadi Bin Hammad-Haditha is a rocky, mountainous sloped area cut by a wadi running to the Dead Sea at Ghor Haditha (see Figure 7), north of Kerak. The altitude of the site ranges from

900 m above sea level to 400 m below sea level. Ground water levels have sunk in recent years due to over-pumping; consequently, the stream in the wadi dries out in summer. Remnants of natural vegetation, mainly Acacia trees, do grow in the area. The area is used mainly for agriculture, both at high altitudes and near the shores of the Dead Sea. There is potential for nature based tourism as a land use. Breeding and resident birds include Lesser Kestrel and Bonelli's Eagle (probable), Short-toed Eagle, Long-legged Buzzard, Sand Partridge, Turtle Dove, Yellow-vented Bulbul, Alpine Swift, Red-rumped Swallow, Arabian Babbler, Tristram's Grackle and Dead Sea Sparrow. Spring raptor migration involves significant numbers of Egyptian Vulture (may breed in the site), Steppe and Honey Buzzards and Levant Sparrow Hawk.

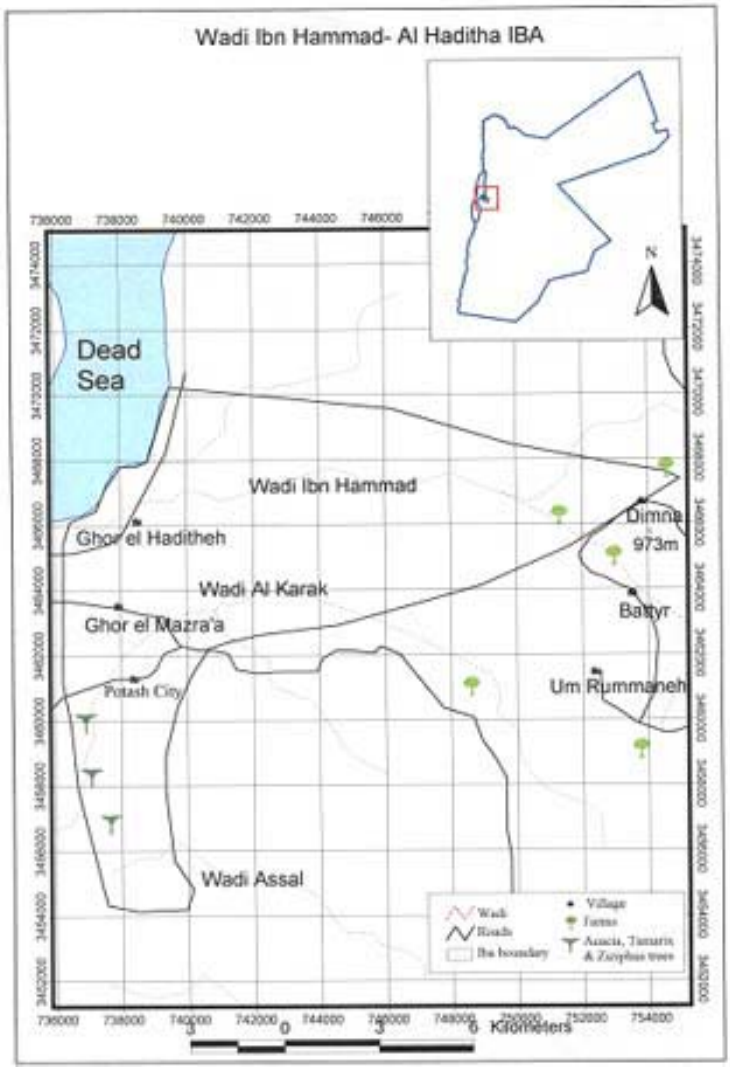

Figure 7: Wadi Ibn Hammad- Al Haditha IBA

(b) Fifa IBA and Proposed Nature Reserve

Importance:	IBA (Criteria: 1, 2III, 3, 4, 5II), the stretch close the Dead Sea is a biological corridor, Proposed Protected Area
Protection Status:	Not Protected
Sensitivity:	Medium
Rarity:	High

The proposed Fifa Reserve or protected area and IBA are comprised of agricultural plains with sand and silt dunes covered with halophytic and subtropical vegetation. The area is

located south of the Dead Sea between the villages of Safi and Fifa. (see Figure 8). Several wadis run into the Dead Sea through this site and there are water springs supporting locally dense Tamarix scrub and reed stands. Threatened trees include Salvadora Persica and Mareua Crassifolia.

The industrial dikes of the Arab Potash Factory at Safi attract migrating waders, and Black-winged Stilts have even bred at this artificial wetland site. Breeding birds include Bonelli's Eagle, Sooty Falcon, Black Francolin, Sand Partridge, Namaqua, Turtle, Collared, Palm and Rock Doves, Blue-checked Bee-eater, Great Grey Shrike, White-crowned Black and Hooded Wheatears, Tristram's Grackle, Arabian Babbler, Fan-tailed Raven and Dead Sea Sparrow. The Indian Silverbill was recently recorded as a breeding resident, while the Houbara Bustard and Syrian Serin were seen at Fifa in winter. Migrants include Levant Sparrow Hawk, Honey Buzzard, Black Kite, White Stork and Corncrake. In terms of land use, the surrounding area will continue as primarily industrial land with some agriculture, but as a reserve and IBA it could also attract nature based tourism, linked to RSCN's Wadi Mujib facilities to the north and their Dana and Fenan facilities to the south.

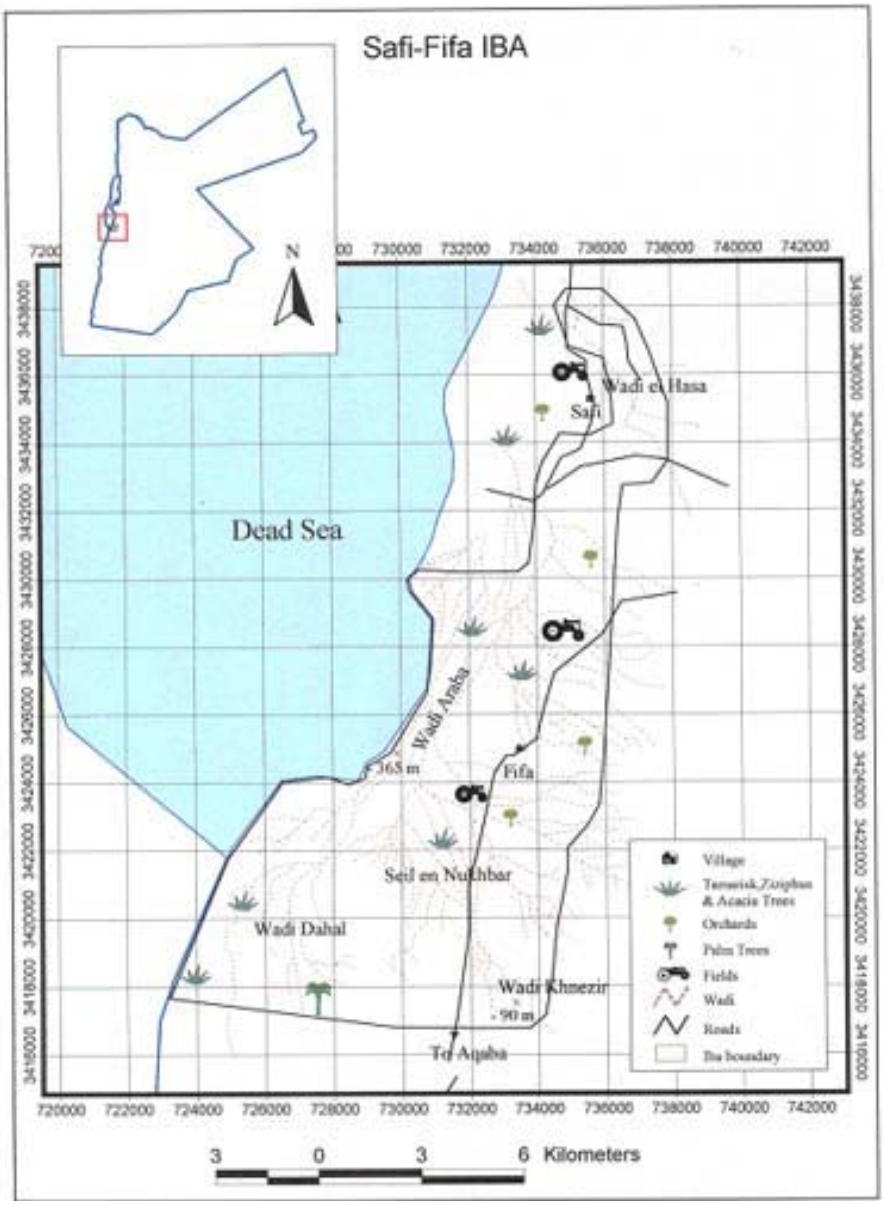

Figure 8: Safi-Fifa IBA

(c) Dana IBA (adjacent to protected Dana Nature Reserve)

Importance: IBA (Criteria: 1, 2III, 3, 4)
Protection Status: Not Protected
Sensitivity: High
Rarity: High

At the center of the site lies Wadi Dana, a scenic major wadi of the southern rift margin flowing from the high Sharrah Mountains down to the Rift Valley (Wadi Araba) at sea level. The primary land use is grazing which is causing local habitat degradation and soil erosion, while agriculture is practiced at higher elevations and locally in Wadi Araba. Although there is a cement factory at Rashadiya and mining at Jebel Sarab, both sites are out of the JV mandate. At least 80 bird species breed here, including the Lesser Kestrel, Bonelli's, Short-toed and Verraux's Eagles, Griffon Vulture, Hume's Tawny and Eagle Owls, Hooded and Isabelline Wheatears, Dunn's, Bar-tailed and Short-toed Larks, Woodlark, Tawny and Long-billed Pipit, Arabian, Upcher's and Orphean Warblers, Palestine Sunbird, Arabian Babbler, Tristram's Grackle, House and Cretzchmar's Bunting, Sinai Rosefinch and Fan-tailed Raven. The site holds the only breeding population of Syrian Serin in Jordan, and probably up to 50% of the world's population of this species, which is endemic to the Near East. There is a huge raptor migration in the spring, which may total up to 100,000 birds per season including Egyptian Vulture, Imperial, Steppe and Lesser Spotted Eagles, but most numerous are Levant Sparrow Hawk, Honey and Steppe Buzzards. Other migrants or winter visitors include Wryneck, Cyprus and Menetries Warblers, Rock Bunting, Hawfinch and Red-fronted Serin. There is strong potential to link this area through nature based bird watching to sites to the north and the south including the Dana Nature Reserve.

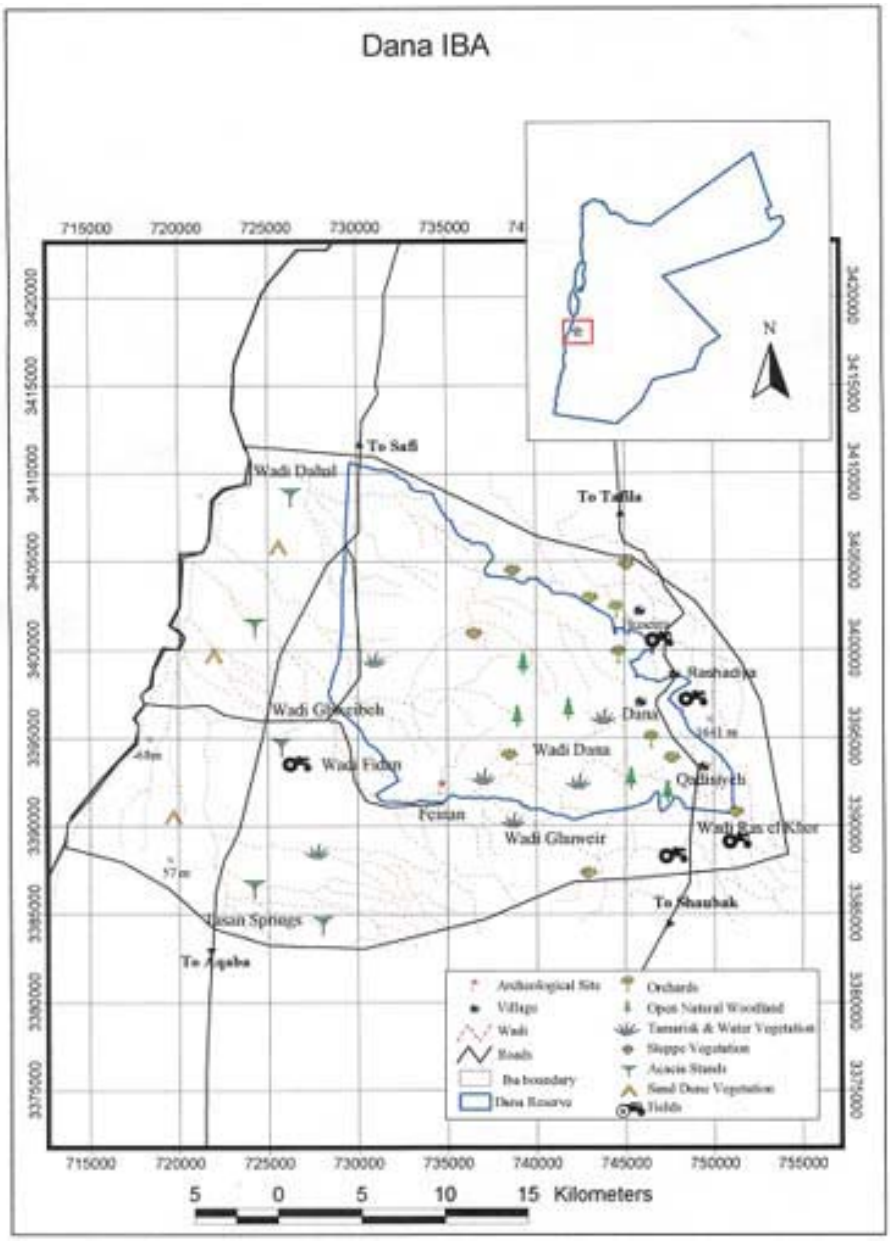

Figure 9: Dana IBA

(d) Wadi Araba IBA

Importance:	IBA, Biological Corridor and significant portion linked to Qatar area, a proposed protected area by the RSCN
Protection Status:	Not Protected
Sensitivity:	High
Rarity:	High

The IBA extends from Fifa (south of the Dead Sea) to Aqaba, and the proposed reserve is limited to the Qatar area. The IBA includes desert sand dunes, gravel outwash plains, and mudflats (see Figure 10). There is some bush land and extensive stands of Acacia are present on adjacent alluvial fans. Other marsh species include Juncus sp., Wild Palm, and *Nitraria retusa*. The climate of the site is arid subtropical and thus differs from the more continental arid climate of the eastern deserts. Extensive sand dunes dominated by *Haloxylon persicum* are a major habitat type in the area. The avifauna includes Houbara (resident or winter

visitor), Sand partridge, Hoopoe and Bar-tailed Larks, Spotted and Crowned Sandgrouse, Little Green Bee-eater, Hooded Wheatear, Blackstart, Arabian Warbler, Tristram's Grackle. The Sinai Rose Finch breeds in neighbouring mountains but visits the site in winter. Migrants include Lesser Kestrel, White and Black Storks, Egyptian Vulture, Griffon Vulture (non-breeding resident/visitor), Steppe Eagle and Black Kite. In terms of land use, there is vast potential for nature based tourism in this area, linking it to the Bedouin's living heritage and tourism sites north and south.

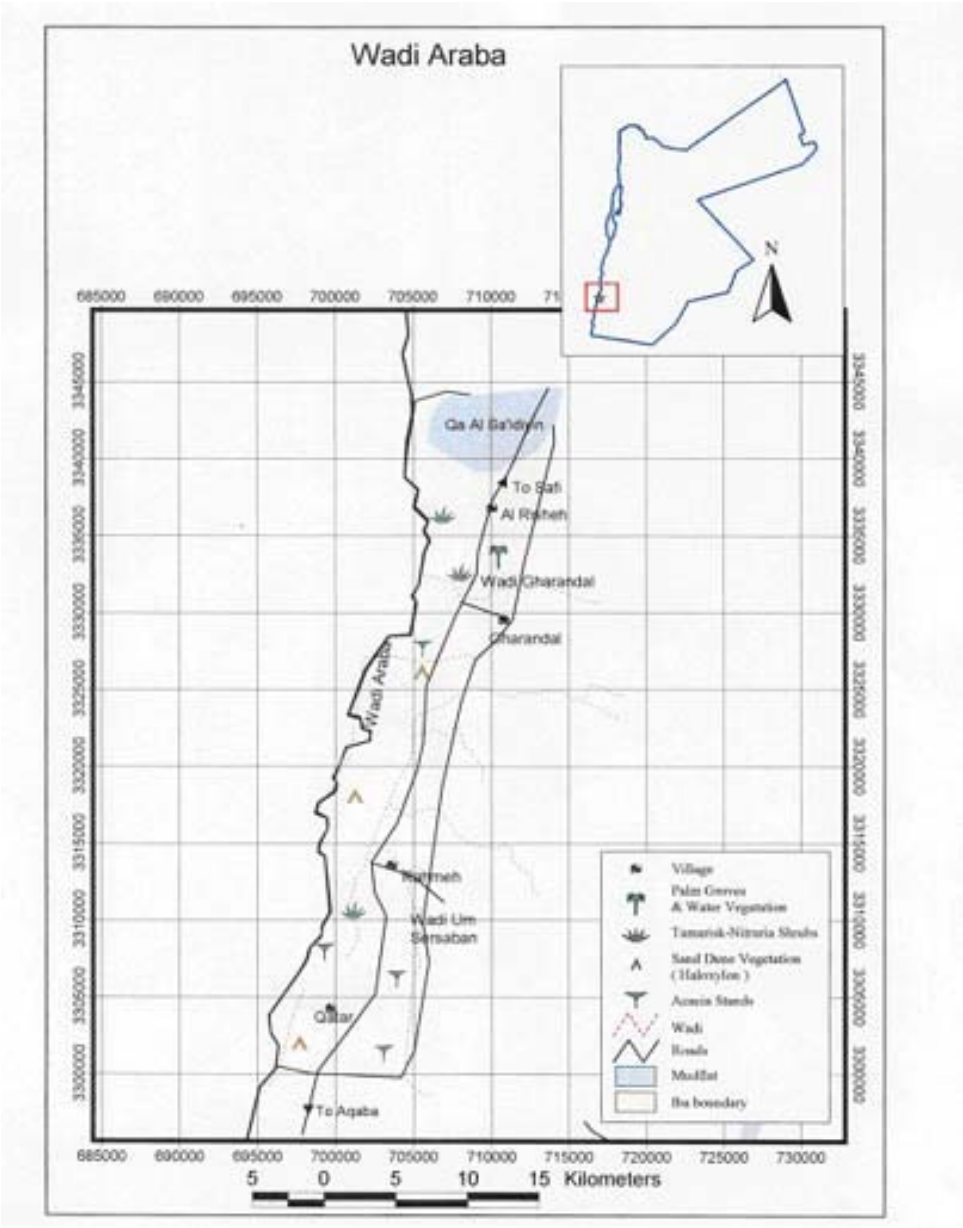

Figure 10: Wadi Araba IBA

Wetlands in the Southern Jordan Valley

(e) Qa Al Taybeen and Qa Al Omareen

Qa Al Taybeen and Qa Al Omareen are two seasonally flooded mudflats located in Wadi Araba. These mudflats are surrounded by beds of *Phragmites spp*, *Juncus maritimus* and scattered *Phoenix dactylifera*. Main indigenous animals are: *Barbus spp.*, *Capoeta damascena*, *Gara spp.*, *Hemiggrammacopoeta nana*, *Aphanius spp.*, Crabs, *Rana ridibunda*,

Hyla arborea, Agama spp., *Capra ibex nubiana*, *Procavia capensis*, *Caracal caracal lynx*, *Canis lupus*, *Vulpes vulpes*, *Hystrix indica*.

The waterfowl observed include *Ciconia ciconia,* which occurs in large numbers during migration season, *Ardea cinerea, Charadrius hiaticula, Egretta garzetta, Himantopus himantopus, Haemtopus ostralegus, Phoenicopterus ruber, Ciconia nigra, Platalea leucorodia, Plegadis falcinellus* and *Bubulcus ibis*.

4.2.3 Xeric Plants indigenous to the Jordan Valley

There are a number of low water usage plants that are found in the Jordan Valley, as listed below. This chart should be used to encourage planting of Xeriscaping or low water landscaping. One land use that this plan recommends is the establishment of Xeric nurseries.

Table 11: Xeric plants

Species	Family
Phoenix dactylifera	Aricaceae (Palmae)
Calotropis procera	Asclepiadaceae
Anabasis articulate	Chenopodiacea
Atriplex dimorphostegia	Chenopodiacea
Atriplex halimus	Chenopodiacea
Halocnemum stroblaceum	Chenopodiacea
Haloxylon persicum	Chenopodiaceae
Hammada salicornica	Chenopodiaceae
Salsola vermiculata	Chenopodiaceae
Seidlitzia rosmarinus	Chenopodiaceae
Traganum nodatum	Chenopodiaceae
Acacia raddiana	Leguminoseae
Acacia tortilis	Leguminoseae
Calligonum cumosum	Polygonaceae
Ochradenus baccatus	Resedaceae
Ziziphus spina-christae	Rhamnaceae
Salvadora persica	Salvadoraceae
Tamarix jordanis	Tamaricaceae
Tamarix nilotica	Tamaricaceae
Tamarix tetragyna	Tamaricaceae

4.2.4 Grazing, Forest Conservation, and Wood Cutting

Grazing in the northern and middle parts of the Valley varies, including cattle, sheep and goats. Range vegetation provides up to 75% of the feed consumed by these animals. The grazing pattern in the northern and middle parts of the Jordan Valley is quite different from the grazing pattern in the south, where up to 85% of the animal feed, primarily for goats and camels which are more adaptable to the harsh conditions, is from the natural vegetation, and this concentrates grazing in settled areas near wadis and streams. Primarily Bedouin tribes use portions of the area between the Dead Sea and the Red Sea for seasonal grazing. However, as a result of increased settlement of the Bedouin, low rainfall, expansion of agricultural projects, and availability of civilian and military employment, herding and pastoral activities have been decreasing.

Overgrazing is usually associated with aggressive woodcutting. The limited amount of forest land remaining in the Jordan Valley plays an important role in flood and erosion control, water quality protection, and wildlife habitat. Increases in fragmentation will result in negative ecosystem effects. The impact is more apparent on the Humra area in the northern parts where the Deciduous Oak and Kharob trees are significantly impacted. In the southern parts the important Arak and Acacia stands are significantly affected. These sites are proposed protected areas.

Overgrazing and woodcutting require more attention in the southern parts of the Jordan Valley since the vegetative cover is already scarce and the climatic conditions are harsh. Another sensitive site is the Tamrix woodland north of the Dead Sea, which suffers from heavy woodcutting and grazing.

One of major problems facing the conservation of rangelands and forests is the ambiguity of responsibilities and related lack of management, especially in the northern parts of the Valley starting from the Jordan University Farms and continuing in a northerly direction. Prolonged heavy grazing changes rangeland, both quantitatively and qualitatively. Quantitatively, it results in fewer and smaller plants. Qualitatively, it results in a decrease in the most palatable and nutritious plants. Other problems include plastic waste disposal and dispersal and soil erosion caused by the overgrazing and woodcutting.

From 1998-2000, the Canadian International Development Agency (CIDA) completed the Sustainable Range Land Management Project in Jordan. The goal was to assist the MOA to create a Range Land Management Department and built its capacity to provide sustainable policy. It also developed and implemented a participatory rangeland management model as a pilot project.

4.2.5 Planned Conservation Projects

The conservation of the biological and environmental resources in the Valley is of major concern for several governmental and nongovernmental organizations. The Ministry of Environment, Ministry of Agriculture, and the Jordan Valley Authority are preparing to implement a promising environmental solution for managing flies and insects through treating the underlying causes, mainly through promoting and enforcing adequate management of organic fertilizers and agrochemicals.

Two planned projects were recently announced by NGOs. The first project is the Integrated Ecosystem Management of the Jordan Valley by the Royal Society for the Conservation of Nature (RSCN), and the second is the Friends of the Earth – Middle East (FoEME) proposal for declaring the Dead Sea area as a Man and Biosphere Reserve.

RSCN received a World Bank/GEF Block B grant of $300,000 to partially start implementing an integrated ecosystem management plan, and to prepare a Block C proposal of a higher amount to fully implement and monitor the implementation of the ecosystem management activities. The primary objective of the project is to ensure the ecological integrity of the Jordan Rift Valley, as a globally important ecological corridor and migratory flyway, through a combination of site protection and management, nature based tourism, and land use planning. Principal outputs include the protected areas illustrated above, viable nature-based businesses for local communities living in or around the protected areas, and effective institutional systems. As recommended herein, other outputs include agricultural extension services with integrated pest management and low water consumption technology, and new and improved wastewater treatment facilities. Pilot projects to promote sustainable agriculture and alternative livelihoods are also included. RSCN hopes to use the baseline information and to build on JVA's Preliminary Land Use Plan.

FoEME has been actively conducting research and promoting activities to create a trans-boundary Dead Sea Basin Biosphere Reserve. The proposed project includes the following objectives:

- To develop and implement a management plan for the entire Dead Sea Boundaries (DSB) in order to conserve and restore its unique ecosystems and to foster integrated regional sustainable development. The plan would also address issues of resources and

projects, which impact on, or are impacted by the Basin although they are technically outside its geographic boundaries.

- To strengthen the involvement and participation of local communities and other stakeholders in planning and management of the DSB and its resources.
- To promote the creation of a trilateral management authority for the DSB.
- To promote education, training and research in order to support conservation and sustainable development of DSB resources.
- To promote cooperation among Israel, Jordan, and Palestine through coordinated research, planning and management of mutually shared resources in the Dead Sea Basin.
- To promote the fair share of benefits and costs resulting from the conservation and use of the DSB's resources.
- To promote peace through sustainable development in the Dead Sea region.

FoEME has also carried out an interesting economical analysis of different water uses affecting the Dead Sea Basin, and a summary report is to be provided to JVA.

4.2.6 Geology and Soils

The Jordan (Rift) Valley offers spectacular geological formations, including Precambrian granite rock south of the Dead Sea; Cambrian rock and multi-colored sandstone outcroppings as rugged cliffs along the Dead Sea; and limited areas of Triassic-Jurassic bluegrey shale and limestone in the eastern escarpment.

Cretaceous Rocks**:** Covers the area from the southern tip of the Dead Sea to about 15Km below the northern limit of the study area.

Quaternary Rocks: Limited outcrops of basalt are encountered at the most northern part of study area and at the eastern shore of the Dead Sea penetrating to a distance of 25Km from the shoreline, especially found in the wadis.

The most important soils are the Lisan Marl formation, which were deposited in Lisan Lake during the Middle Pleistocene Period and covered the Jordan Valley. Later the lake retreated towards the Dead Sea. As it retreated, the Jordan River cut through the formations and formed a flood plain, the Zor. In later periods, the Jordan River's sediments were deposited in the floodplain. The formation of the Zor left the Ghor terrace of Lisan marl at both sides of the River. Water eroded it, giving the jagged appearance. In addition to Lisan marl, gympsum and clay are common.

In addition to soil problems that require more expensive deep foundations to prevent sliding, there are a number of other issues that impact construction in the Jordan Valley. The chemical composition of the soils includes sulphates and chlorides, which must be protected against by coating with reinforcement steel and concrete. Generally, the Jordan Valley is the most active seismic zone in Jordan, which imposes additional costs for earthquake resistant construction, particularly in regard to the Dead Sea hotels and the pending Red to Dead Sea pipeline.

In the Middle and Northern Study Areas, the water level is high and seasonally fluctuates. This mandates that structures be raised and that special foundations be used with appropriate drainage systems. In addition, sinkholes have been identified near the Dead Sea (Ghor Hadetheh). These areas are considered to be high risk areas for anything but the existing natural landscape.

4.2.7 Carrying Capacity Framework

Carrying capacity is a term that implies a fixed number of visitors that a site can hold at any one time or over a day, month, or year, without either harming the resource or negatively impacting the visitor experience. Carrying capacity can change over time, depending upon weakening or strengthening of the resource and site management efficiency. Natural processes that change a resource can also change the carrying capacity.

A standard method for analyzing carrying capacity is the Visitor Experience and Resource Protection Process (VERP), which systematically, rationally, and in a well documented fashion addresses carrying capacity for protected areas. It does not have to specify the exact number of visitors to a site, as long as a site management plan is in place that protects the resource and social conditions. This can be determined through the use of management zones, indicators and monitoring, to concentrate management efforts on those areas that might be most impacted.

If a site management plan is in place, carrying capacity is greater because visitor interaction with the resource is controlled, and the site is presumably protected. If there is no site management plan, the number of allowable visitors is less in order to reduce negative impact on the resource. A standard definition is: "The type and level of visitor use which can be accommodated while sustaining the desired resource and social conditions that complement the purposes of a park and its management objectives." (US National Park Service, 1996, Jordan Sustainable Tourism Development Plan for Petra Carrying Capacity Analysis)

Carrying capacity, although useful, is not scientific, as it involves subjective opinion. Each visitor's judgment of what constitutes a positive experience varies. Nonetheless, it is an important tool for examining interactions between supply and demand and between resource quality and visitor experience, and a carrying capacity study is highly recommended under the RSCN GEF project for the Dead Sea eco-zone and basin. This would probably include a statement of significance, management objectives, interpretive themes, and development of management zones and structures.

According to the World Tourism Organization (WTO), examples of appropriate visitors per hectare vary greatly according to the activity. A forest park might be 15visitors per hectar, while picnicking could vary between 60 and 600 visitors per hectar. Team sports are 100-200 visitors per hectar, while golf is 10-15 visitors per hectar. Nature trails are about 40 visitors per hectar for hiking, but ski trails might be 100 per hectare.

As the above numbers indicate, if nature based tourism is a primary objective at the Dead Sea, which the Study Team believes it should be, the number of visitors per hectar, whether in hotels or campsites, or involved in activities, would be lower than those of mass tourism. Positive visitor experience would relate to the environmental and experiential condition of the natural environment, and it would be important to conserve a natural reserve or national park environment or stretch of the undeveloped, historic, pristine Dead Sea coastline, unencumbered by the built environment.

The Study Team endorses the Sigma Plan's goal of clustering hotels in the Shweimeh area, but does not endorse the concept of a large number of hotel rooms in the Zara area. Currently JVA has approved 12 hotels and the Mujib Reserve Campsite, for a total of 13 facilities with up to 3400 hotel rooms along the entire coastline. The Sigma Plan discusses up to 25,000 bed units, including approximately 5000 as residential units, leaving 20,000 hotel rooms, and camp sites.

Under 4 story zoning restrictions. it would be physically difficult to achieve. More importantly, occupancy rates would remain low, and the public's access to the Dead Sea would be greatly decreased. In addition, the physical result would destroy the full potential for nature based tourism. The Study Team believes that full build-out of the Dead Sea

shoreline should not exceed 5,000-6,000 hotel rooms and campsites, and that development should be clustered, not spread, to facilitate a natural environment, particularly a preserved shoreline in the Zara area, where nature based tourism can build upon the existing culture based tourism and Roman archaeological sites.

4.3 Cultural Resources

According to the International Cultural Tourism Charter, ICOMOS, 1998:

"Heritage is a broad concept. It encompasses landscapes, historic places, sites and built environment, biodiversity, cultural practices, and living experiences. The collective memory of each community is irreplaceable and an important foundation of past and future development. Tourism can capture the economic characteristics of heritage and harness them to generate funds for conservation and community awareness. A significant portion of the revenue generated by cultural sites should be utilized for their protection, conservation, and presentation. Tourism programs should train and employ local guides to enhance their skills in the presentation of their cultural values."

Heritage is the link between nature based and cultural heritage tourism, wherein both segments want to understand the collective memory of a community. Successful tourism preserves this collective memory and presents it in an interesting way to create economic and educational value for local people and international visitors. Heritage tourism can result in community pride, a revival of local traditions, improved technological access and infrastructure, along with enhanced conservation of resources.

4.3.1 Archaeological Sites

Approximately 1,300 sites in the Jordan Valley have been recorded by the Department of Antiquities (DOA), most of which DOA labels as "survey sites." Of those ,1300, 52 sites, as illustrated below, are identified as the most salient or important archaeological sites. With regard to land use planning, under Article 4A of the Antiquities Law, the Minister of Tourism and Antiquities (MOTA) may, through the Director of DOA, cooperate with the Department of Lands and Survey to decide on the names and boundaries of the archaeological sites. Lands holding such sites shall not be leased or sold or in any way delegated to any authority without the approval of the Minister of MOTA.

The terms used herein – high and medium value of archaeological sites – were suggested by members from the Study Team. Site value is based upon several criteria including the historical period, the rarity of that period in Jordan, the size of the site, the nature of the remains, the integrity and conservation of the site, and the tourism attention given to the site.

According to DOA, the most important sites are the following, indicated by the JADIS or computerized survey list name, common or touristic name, significance, period, and threats to their existence. Each site has been illustrated on the baseline maps, in addition to the Zara sites, with tourism linkages to other sites outside the mandate including Umm Qais.

Table 12: Sites identified as most valuable archeological and cultural heritage sites

No.	Site Name (As presented in the JADIS* list)	Other Names	Significance	Threats	Period
1.	UMM QAIS	Gadara	High Value Site.	Protected, natural threats.	Classical
2.	TELL EL-ARBA`IN	None	High Value Site.	Looting, natural threats.	Bronze Age
3.	EL- HUSN	Tall Al-Husn	High Value Site.	Looting, natural threats.	Classical
4.	TABAQAT FAHL (PELLA)	Pella	High Value Site	Partially protected.	Roman + Byzantine
5.	TELL ABU KHUS	Abu Al-Khas	High Value Site.	Agriculture activities, looting, natural threats.	Bronze Age
6.	TELL ESH SHUNA (North)	Non	Medium Value Site.	Urban activities, natural threats.	Bronze Age
7.	TELL EL - HAYYAT	None	High Value Site.	Agricultural activities, natural threats.	Bronze Age
8.	TELL SHERHABIL BEN HASSNEH	Makam Sherhabil Ben Hassaneh	High Value Site	Looting, natural threats.	Islamic
9.	TANNUR	Khirbet Tannur	High Value Site.	Natural threats.	Nabatean
10.	TELL ABU HABIL NORTH	None	High Value Site.	Looting, natural threats.	Chalcolithic Age + Bronze Age
11.	TELL ABU HABIL SOUTH	None	High Value Site.	Looting, natural threats.	Chalcolithic Age + Bronze Age
12.	TELL EL TWAL	Tell El Twal	Low to Medium	Agricultural activities.	Unspecified Structure
13.	TELL ABU EN-NI'AJ (TOMBS)	Abu Naaj	Medium Value Site	Agriculture activities, modern cemetery, natural threats.	Bronze Age
14.	TELL EL - KHARAZ	Abu Al-Kharaz	High Value Site.	Agriculture activities, looting, natural threats.	Bronze Age
15.	TELL EL-MAQBARAH	None	Medium Value Site.	Agriculture activities, looting, natural threats.	Bronze Age
16.	TELL ABU HAMID	None	High Value Site.	Looting, natural threats.	Chalcolithic Age + Bronze Age
17.	TELL EL-HANDAQUQ	None	Medium Value Site.	Looting, natural threats.	Bronz Age
18.	TELL ES-SAIDIYEH	None	Medium Value Site.	Looting, natural threats.	Bronze Age + Iron Age
19.	ABU OBEIDAH	Makam Abu Obidah	High Value Site.	Protected.	Islamic
20.	TELL E L-MAZAR	None	Medium Value Site.	Looting, natural threats.	Iron Age II
21.	DIRAR TOMB	Makam Dirar	High Value Site.	Protected.	Islamic
22.	TELL DEIR ALLA	Deir Allah	High Value Site.	Close to the existing road, natural threats.	Iron Age

No.	Site Name (As presented in the JADIS* list)	Other Names	Significance	Threats	Period
23.	TELL EL-FUKHAR	None	High Value Site.	Looting, natural threats.	Bronze Age
24.	TELL EL-HANDAQUQ SOUTH	None	High Value Site.	Looting, agriculture activities, natural threats.	Bronze Age
25.	TELL UMM HAMAD E L-SHARQI	None	High Value Site.	Looting, natural threats.	Bronze Age
26.	TELL UMM HAMAD E L-GHARBI	None	High Value Site.	Looting, natural threats.	Bronze Age
27.	TELL DAMIEH	None	High Value Site.	Agriculture activities, looting, natural threats	Bronze Age
28.	DAMIYEH DOLMENS	Dolmen Fields	Medium Value Site.	Agriculture activities, looting, natural threats.	Bronze Age
29.	TELL EL-MAQBARAH	None	Medium Value Site	Agriculture activities, looting, natural threats	Bronze Age
30.	SHUNAT NIMRIN	Tal Nimrin	High Value Site.	Site fragmentation by the main road, expansion of urban area, looting.	Bronze Age + Byzantine
31.	TELL GHRUBBA	None	High Value Site.	Agriculture activities, natural threats.	Chalcolithic Age
32.	TELL EDAHAB	Al Madash	Medium Value Site.	Quarry, natural threats.	Roman + Byzantine
33.	TELL EL - GHARABA	Gharabeh	Medium Value Site.	Agriculture activities, natural threats.	Byzantine
34.	TELL KUFREIN	Tell Esh-Sharab	High Value Site.	Looting, agriculture activities, natural threats.	Iron Age II + Classical
35.	TELL ET-TAHUNEH	None	High Value Site.	Looting, agriculture activities, natural threats.	Bronze Age
36.	TELL EL-HAMMAM	None	High Value Site.	Looting, agriculture activities, natural threats.	Bronze Age
37.	TELL EL-KHARRAR	(Baptism Site) Bethany Beyond the Jordan	High Value Site.	Protected.	Roman + Byzantine
38.	ES- SADD EL-GHARBI	Tell Barakat	Medium Value Site.	Looting, natural threats.	Early Broanze Age
39.	TELL ER-RAMA	Livias	High Value Site.	Modern cemetery, looting, agriculture activities.	Classical + Islamic

No.	Site Name (As presented in the JADIS* list)	Other Names	Significance	Threats	Period
40.	TULEILAT EL-GHASSUL	Ghassul	High Value Site.	Agriculture activities, natural threats.	Chalcolithic Age
41.	EZ- ZARA OASIS (Villa and Harbour)	Callirhoe	High Value Site.	Looting, natural threats, agriculture, fragmentation by the existing road.	Roman Age
42.	Zara Archaeological Survey Site	Callirhoe	High Value Site.	Construction of new road and agricultural activities.	Roman - Bezantine
43.	MUKAWIR	Makam Jhon the Baptist	High Value Site.	Natural threats.	Roman
44.	KHIRBET ISKANDER	None	High Value Site.	Looting, agriculture activities, natural threats.	Bronze Age
45.	AS SIFIYYA	None	High Value Site.	Dam construction, agriculture activities, looting, natural threats.	Neolithic Age
46.	QASR AL RIASHI	EL QASR	High Value Site.	Natural threats.	Byzantine
47.	BAB EDH-DHRA	None	High Value Site.	Looting, natural threats.	Bronze Age + Byzantine
48.	TAWAHIN ES-S UKKAR II	Khirbet Sheikh Isa (This archaeological site is located within the borders Al Naqa'a area which also includes Al Naqa'a Cemetry)	High Value Site.	Looting, natural threats.	Byzantine + Islamic
49.	KHIRBE T `ESAL	None	Medium Value Site.	Quarry, natural threats.	Byzantine
50.	QASR ESAL/ WADI ISAL F 3-2	Rujum Isal	Medium Value Site.	Natural threats, Wadi Essal floods.	Byzantine
51.	RUJM NUMEIRA	Al-Rujum	High Value Site.	Natural threats, Wadi Essal floods.	Nabatean + Byzantine
52.	LUT'S CAVE	Deir Ain Abattah.	High Value Site.	Natural threats.	Bronze age + Byzantine
53.	FENAN	Punon	High Value Site.	Potential Mining Project, natural threats.	Neolithic + Chalcolithic+ Bronze
54.	EL NAQA'A CEMETERY	None	High Value Site.	Looting, natural threats.	Bronze Age
55.	FIFA CEMETERY	Fifa (Islamic site inside and Early Bronze cemetery outside)	High Value Site.	Looting, developmental activities and natural threats.	Bronze Age
56.	GHARANDAL		Medium Value Site.	Natural threats.	Neolithic + Nabatean+ Roman, Byzantine, Islamic

Threats and Challenges

Several threats and challenges face the conservation of the archaeological and cultural heritage sites in the valley. The most prominent threats are a lack of site management and the following:

1- Direct threat of destruction by development activities (construction, quarries, dams, roads, agriculture, urban expansion;
2- Indirect threats caused by the vibration and dust generated by construction activities within the sites;
3- Looting of archaeological sites and cultural remains by scavengers, mainly the looting of cemeteries;
4- Natural factors such as erosion, water, sun, and earthquakes;
5- Lack of conservation and restoration;
6- Lack of local public awareness of the importance of sites to heritage and tourism, due to their lack of involvement in protection and promotion.

Recommended Conservation Measures

The Jordanian Temporary Antiquities Law No. (23) of 2003 (draft stage), the Antiquities Law No. (21) of 1988, and the Regulations of Archaeological Excavation and Surveys provide the basis for the conservation of archaeological sites in Jordan (see **Annex 3**). The proposed conservation measures have been formulated to comply with the above-mentioned laws and regulation:

(a) Improve the identification and assessment of all archaeological sites. In addition to the regular excavation activities, site assessment should be carried out to identify the significance and rarity of the site, the site direct and indirect zones of effect, and the buffer zone (exclusion areas) required by each site;
(b) Implement a Cultural Resource Management (CRM) strategy including coordination of responsibilities with the Department of Antiquities / Ministry of Tourism and the Ministry of Religious Affairs. CRM should include site management, maintenance, conservation, and restoration. CRM shall include regular monitoring and inspection activities of sites to be excavated or under excavation and chance-find sites, and audits of ongoing construction or development al activities anticipated to impact sites.
(c) Enforce antiquities laws and regulations, and improve protection against looting, as all trading in antiquities (dated prior to 1700 AD) is forbidden without the consent of the DOA/MOTA and is punishable by imprisonment up to three years.
(d) Establish archaeological and cultural heritage reserves for highly significant sites, such as the recommended reserve at Zara along the Dead Sea. (Note: Sites located within existing nature reserves would be protected from man-made intrusions, however, additional CRM activities might be necessary to protect the cultural remains, and should be coordinated with the DOA and the RSCN.)
(e) Conduct archaeological and cultural heritage impact assessments as part of Environmental Impact Assessment (EIA) studies for any proposed developmental projects.
(f) Enforce implementation of the recommendations made by the archaeological assessment study and charge the contractors and project owner penalties for non-compliance.
(g) Shift development activities related to construction, quarries, dams, roads, agriculture, and urbanism to allow for protection of significant sites and buffer zones around sites.

(h) Follow "chance-find" procedures as detailed under Article 15 of the Antiquities Law, which states that any person who discovers any antiquity without a license to excavate must give notice to the Director of DOA within ten days from the date of discovery. The Director, with the approval of the Minister of the MOTA, may grant reasonable compensation for finds that are returned to the Government. (Only DOA has the legal authority to excavate in Jordan, although it may grant special permission to archaeological missions and other groups, but all finds are considered to be the property of the State.)

(i) Implement physically protective measures such as fencing.

(j) Implement visitor educational and directional signage systems for all archaeological and cultural heritage sites.

(k) Implement well-planned and adequate public awareness programs concerning the conservation of and involvement in site management of archaeological sites, in order to gain local support and participation.

(l) Side by side, governmental agencies should work with NGOs and communities near sites to develop alternative business opportunities, including tourism and training programs, and effective marketing strategies, in order to tie site protection to economic benefit.

Recommended Policy for Construction Projects

Note that under Article 13 of the Antiquities Law, no permit shall be granted for construction, including buildings and fences, unless a distance of 5-25 meters is left between the construction and the antiquities (buffer zone).

(a) The DOA should approve locations of borrow areas (or areas where digging produces materials for construction activities) and quarry sites to prevent harm to cultural remains. Such inspection schedules should be reasonable, so as not to hold up construction.

(b) In areas where DOA knows or suspects the existence of remains under the surface, but where there is insufficient time for excavations (or the importance of the site does not warrant full scale investigation prior to construction), a DOA representative shall be present during the opening of any excavation or borrow pit to identify and record the archaeological remains.

(c) In areas where DOA has determined that further salvage excavation will be necessary, based on the iaouctio iohe( )-su.4(o)-r9(e i)-5.4(a)-g6(on)-35.8(t)-5.1his e iaa4.4(i)- Dese io hsrry10.5

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salvageable material shall be removed, without causing unnecessary damage, in sections or pieces which may be readily transported, and shall be stored by the Contractor at approved locations for later use or possession by DOA. The Contractor should also note that the "chance find" procedure covers graveyards and individual burial sites.

4.3.2 Other Aspects of Cultural Heritage

The Jordan Valley is comprised of various cultural landscapes or sites that establish community and identity, which are the results of long periods of interaction between people and nature. Unfortunately, because Jordan's Antiquities Law covers only those sites that date back to 1700 AD or earlier (whereas the historic preservation laws in the US look to "50 years of age or older"), important villages from the last few centuries are not protected. However, the Study Team has identified the following vernacular villages that deserve protection, and could be utilized for tourism development, in the Jordan Valley. They include the villages of Qarquma, Abu Habeel, and Hujeijeh, and two nearby villages outside the JVA mandate boundary - Agrabah and Sila (for which MOTA is currently doing a tourism master plan).

An interesting concept might be to work with local communities to implement a pilot project that includes a survey of the Jordan Valley's early 20th Century housing stock, much of which was adobe, followed by renovation and presentation of a few village buildings as local museums or handicraft centers. The buildings would act as remnants of their cultural or vernacular landscapes. Projects like these, that create tourism facilities or supply along an existing tourism route, can give stronger identity and income to local communities, and serve as catalysts for other types of economic development, such as cafes and rural gite lodging.

"Living Heritage," or that which exemplifies the traditional arts and crafts and way of life of a region, provide countries with unique identities. This authenticity is very attractive to both cultural heritage and nature based tourism segments. Until the 1940s, Jordan's population was largely nomadic, and crafts were quite practical and developed out of need, such as ceramics, hand blown glass, woven straw mats, and wooden utensils. Each craft was associated with production by either a man or a woman (The Crafts of Jordan, Meg Abu Hamdan, Al Kutba Publishers).

With the introduction of inexpensive materials, such as plastic, some crafts have died out. However, through Jordanians' interest in their heritage and additional foreign aid/NGOs and tourism markets, some crafts have revived such as embroidery and weaving. The craft of weaving on ground looms has been practiced in Jordan by both Bedouin and village women, and woven products include tents (bait esh-sha'ar or house of hair), rugs (mafrash and fejaj), storage bags (idel), cushion covers (mizwad), and saddle bags (khurj). The Bedouin preferred the dark colors including rich reds, navy blues, evergreens, blacks, and oranges. Some weavers have remained traditional while others have adapted their designs to new markets. Men are only involved in the sheep shearing process, which is carried out in the spring. In the Jordan Valley, indigo was grown extensively to produce the different shades of blue and black. Red shades came from the cochineal beetle and chermes insect. Sumac provided the color yellow. Other plants that produced natural dyes included the pomegranate, mulberry, onion peel, flowers, and tree bark. These were replaced by chemical dyes, although a re-birth of planting and harvesting traditional plants and colors could be part of a an agro-tourism and handicraft development project.

It is believed that the origins for Jordanian embroidery are in China, which exported textiles via Petra and the Silk Route. Unique Palestinian embroidery is quite famous throughout the Levant, and embroidery is practiced by many Palestinian and non-Palestinian women today. Traditionally, fabrics for embroidered dresses came from outside Jordan in Syria, Palestine, Lebanon, and Egypt. Today's fabrics still come from the Levant, but they are also imported from Japan. The designs of the East Bank are very different from those found on the West

Bank of the Jordan River. Traditionally, the dresses of the Jordan Valley were brightly coloured floral designs, while those in Ramtha were decorated in white embroidery.

A traditional craft that is quite popular with tourists is silver jewelry, which was originally highly sought after by Bedouin women during the first half of the 20th Century, representing social and economic status. The designs were influenced from internal and external silversmiths, including some from Circassia, the Hejaz, and Yemen. Today NGOs, such as RSCN's Dana project, and Ammanis have created a new, contemporary silver industry that is creative and thriving. This could be part of any heritage tourism project in the Jordan Valley.

The traditional craft that once thrived but today is perhaps the most under-developed is ceramic pot making. Until about 80 years ago, village women throughout Jordan made their own ceramic ware, the most common being the khabiyeh or water jug. In Ajlun, the tradition continues to a certain extent. However, there is limited contemporary ceramic production in Jordan, other than the exquisite Sil Sal and various types of "Jerusalem" pottery, while around the world this is a primary handicraft for every major tourism market. New contemporary forms should be encouarged.

The craft of making cane baskets has been carried out for generations by the men of Mukhaibeh in the NJVSA. The Mukhaibeh women weave baskets and trays out of the leaves of the date palm trees. The Jordan River Foundation is working in the Jordan Valley with weavers to use the by-products of the banana plants. Weaving of trays from wheat is practiced by village women throughout Jordan. With additional training and market quality designs, the cane, palm, banana, and wheat weavers could produce some contemporary designs, as well.

Another traditional product is woodworking from olive, apricot, wild pistachio, and oleander, particularly in the north near Irbid (Mazar), including the mihbash or coffee grinder. These are all Xeric or low water consuming plants, and most would grow in the Jordan Valley.

Glassmaking has a long history in the Levant, and contemporary glassmaking is a commonly sought craft world-wide. This, too, could be facilitated in Jordan as a high value product.

Along with handicrafts, other aspects of living heritage that could be supported through tourism projects are traditional song, music (oud and drums), dance (dapke), and food. Jordan is famous for its cheese, olives, olive oil, honey, jams, dates, fruit juices, etc, all of which are completely underexploited by the tourism industry. Community agro-processing projects could provide jobs. Clean operations with well displayed products as an agro-cottage industry,, perhaps powered by solar energy panels, could become tourism stops on cultural heritage and nature based routes, linked to heritage food festivals, rural gites, and local hotels.

Religious Sites

In 1997, King Hussein ordered the building of mausoleums and mosques to commemorate the Battle of Mou'ta, including the Mou'ta Mausoleum, the Mausoleum of Abdullah Ibn Rawahah, soldier and third martyr of Mou'ta and friend and poet to the Prophet, and Wael's Ja'far al-Tayyar. Other Venerable Companions of the Prophet sites include the Tomb of Ja'far al Tayyar, Mausauleum of Abdallah Ibn Rawahah, Ja'far Ibn Abi Talib Mosque, and the Mausoleum and Gardens of Zayd Ibn Haritha.

Jordan Valley Venerable Companion sites that could link to the above on a religious pilgrimage route are Mu'ath Bin Jabal, Obeida Bin Abi Jarah, Waqqas Bin Jabal and Sharhabeil Bin Hasna. Those three sites have been illustrated on the baseline map. The Baptism site of Jesus or Wadi Kharrar along the Jordan River is also illustrated, as an important contributor to religious tourism.

Wadi Fenan

Wadi Fenan is the primary stream that flows westward across the copper ore rich Fenan district located mid-way between Petra and the Dead Sea. According to DOA and ACOR, Fenan represents one of the world's most unique landscapes of ancient mining and metallurgy with some of the best-preserved remains. Since 1997, DOA and an international team of archaeologists have been excavating five major sites in the Jabal Hamrat Fidan, a mountain range that borders Wadi Araba. JVA intends to build a dam that would help to create 300 farms in the area, to be completed by December of 2005. Actually, the cultural remains in the area indicate thousands of years of dam building and other water diversion systems to support agriculture and settlement.

Twenty-two archaeological sites will be destroyed by the dam, one an Early Bronze age metal workers village called Wadi Fidan 4, and the other a unique Iron Age cemetery called Wadi Fidan 40 that belonged to a group of nomads known as the Shasu. Generous funding from the JVA is being used to excavate the sites, build a small museum and dig house, and bring specialists to teach the DOA team the latest archaeological recording techniques, a sort of open air classroom. This development will be quite attractive to nature based tourists in the area.

4.4 Water Resources

Water consumption in the Mediterranean region has increased 60% over the past 25 years. In Jordan, the water supply is operating on borrowed time. Thus, JVA and USAID are very concerned about current and increasing supply deficits. Sustainable land use planning must address the need for water conservation as a primary objective.

Jordan is one of the world's ten most water-poor countries, according to the World Bank, with greatly diminishing surface and ground water supplies. Yet water is the single most critical natural resource, upon which economic, social, and political development depend. In Jordan, water demand is being met by damming and pumping of water from wadis and springs, over pumping of aquifers, exploiting fossil water, and restricting municipal use. Jordan is suffering from an increasing population estimated at around 10 million people by the year 2020, and an immediate and rapidly growing water deficit, wherein water demand exceeds supply by about 140%, and exceeds the renewable supply by about 175%. In addition, structural fundamental issues are involved such as supply and demand management and economic evaluation of water, including water pricing, watershed management, crop selection, and water efficient technology.

The Jordan Valley's water scarcity is exacerbated by climatic changes that have reduced supply, inefficient agricultural practices and water intensive cropping patterns, urbanization and population increases, particularly in Amman since the Gulf War in 1991, growing industrialization, tourism development, and inadequate wastewater treatment and recycling of grey and brackish water.

4.4.1 Water Supply and Demand

The land use plan's baseline information includes water sector projects that are both existing and proposed, including dam sites, weirs, wells, and canals. Primary responsibility for planning, developing and managing water resources in Jordan is under the jurisdiction of the Ministry of Water and Irrigation (MWI) and its two authorities, the Water Authority of Jordan (WAJ) and the Jordan Valley Authority (JVA). The region's agricultural sector consumes around 65% of water supply over 843,000 dunums, and is characterized by water-intensive crops, wasteful irrigation methods, and high rates of chemical that leach into water supplies and deteriorate quality. Due to over-pumping, water is drying up the natural settings threatening communities and wildlife, lowering water tables and leading to increased salinity.

The publicly managed irrigation system in the Jordan Valley uses mostly surface and reclaimed water conveyed through Wadi Zarqa and the King Talal Reservoir. The King Abdullah Canal (KAC), considered to be Jordan's primary water carrier, runs for approximately 110 km parallel to the Jordan River, through the Jordan Valley from a tunnel on the Yarmouk River in the north to the Dead Sea Area (shown in Figure 15). The canal is a lined concrete trapezoidal channel with a capacity ranging between 25 and 2.6 m^3/s. There are also 195 privately managed wells.

Development of conventional water resources includes: management and water conservation, quality control through regulations, development of groundwater and over-exploitation of two fossil aquifers, development of surface water through dam construction, and water harvesting systems. Fresh water should be used primarily for domestic purposes rather than for irrigation, although some fresh water is necessary for crop irrigation to compensate for and replace salt in the soil and water. High concentrations can result in loss of land and aquifers.

Development of non-conventional water resources includes high quality treated wastewater from sewage treatment plants for irrigation (and aquifer recharge), recycling of grey water, and desalination of surface and ground brackish or saline water for domestic use. The National Water Strategy of 1997 stressed that population pressure has caused a chronic deficit in available freshwater, which has resulted in over extraction of ground water, and that appropriately treated wastewater is a necessary solution for crops wherein vegetables are not eaten raw. Although about 70% of Jordan's urban population is provided with sewerage services through 19 facilities that serve 26 cities, sewage treatment plants and networks are insufficient in the Jordan Valley. This is the only water resource that will become available in increasing quantities. Most of the potential for brackish water resources are within the Dead Sea basin. The location of brackish desalination plants and brine disposal units must be carefully decided to prevent pollution.

In the short-term, the most cost-effective options for reducing the gap between supply and demand are improving water management and improving the quality and quantity of treated wastewater. Unfortunately, even after these conventional and non-conventional methods are utilized, there will still be insufficient supply to cover Jordan's growing demand. Therefore, additional water must be provided, either through imports from the north by sea or land, through pipelines/canals or tankers, or desalination of seawater.

An increasingly scare commodity in the Middle East, water is being imported into Syria from Lebanon's Litani River and from Turkey's Seyhan River and Manavgat River. These sources, as well as the Euphrates River in Iraq, are being studied as sources for importing water into Jordan. Under the Jordanian-Israeli Peace Treaty, Israel is to supply Jordan with 10 MCM (Million Cubic Meters) of desalinated water annually, and with 20 to 30 MCM per year of brackish water, originating in saline springs and wells currently diverted to the Jordan River downstream of Lake Tiberias. Regional options require political cooperation and resource management. Seawater desalination, through the Red-Dead Canal or Pipeline, is in some ways a strong development option, as it can provide large volumes of water at a lower cost, and is not impacted by regional instability. In addition, if the proposed alignment as illustrated on the baseline maps is within government lands, there is no requirement for land acquisition. However, the environmental impacts have not yet been studied, and the impact of changing the composition of both the Red Sea and the Dead Sea is unknown.

Table 13 and Figure 11 show the historical supply for the period 1985-2001 to the different sectors with future demand forecasting up to the year 2020 (MWI projections). Demand forecasting is conditioned by water availability which is in turn sensitive to rainfall conditions. The sector most affected by water availability is irrigated agriculture during years of drought. Since agriculture has the least priority in water allocation, the supply fills up the domestic demand before irrigation and consequently the deficit concentrates in the agricultural sector. This is evident by comparing the irrigation supply during the wet years of

1992 and 1993 to the irrigation supply of the dry year of 2001. In addition, Figure 12 matches the behaviour of irrigation supply, domestic and industrial supply and rainfall.

This matching reveals no change in the behaviour of domestic and industrial supply in response to changing rainfall conditions, whereas the behaviour of the agricultural supply reveals a similar variation to that of rainfall. Water year 1991/1992 divided the rainfall record into two intervals: before and after. The rainfall trend for the period before 1991/1992 was increasing, which was reflected on irrigation water supply. For the period after 1991/1992, the decrease in both irrigation water supply and rainfall was detected. The projection for irrigation considers the average water year with growing demand and that the growing demand in irrigation cannot continue due to water shortages. This fact is considered in the 2015 and 2020 projections.

Municipal and industrial demand were increased from 21% at the year 1985 to 36% at the year 2001 out of the total demand according to MWI figures, as shown in Figure 13. Table 14 shows the irrigation water supply from 1996 to 2000. Surface and groundwater supplies show a decreasing trend as compared to the increasing trend of treated wastewater reuse for irrigation. This trend is reflected in Figure 14.

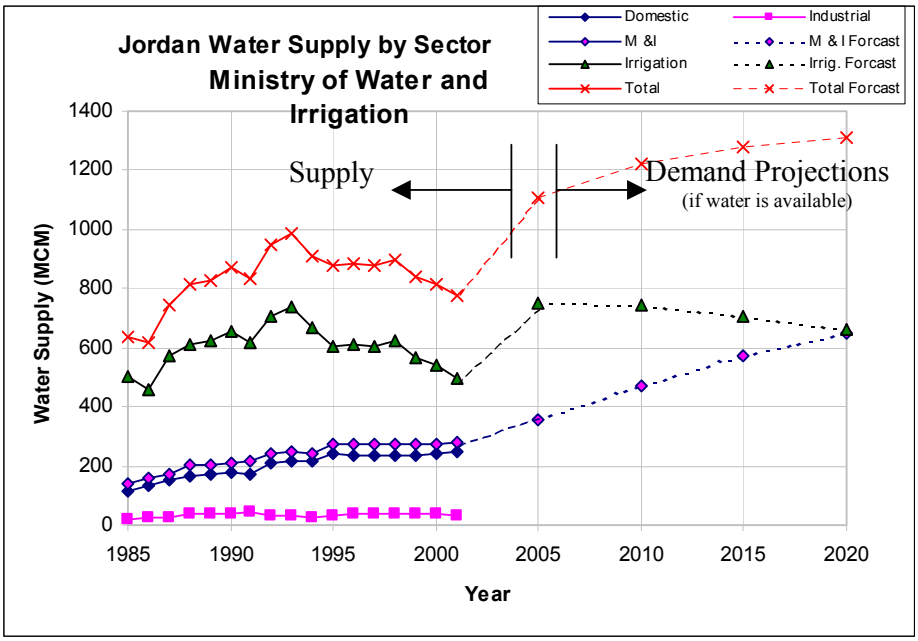


Figure 11: Jordan water supply by sector, historical and future forecasting according to MWI projection

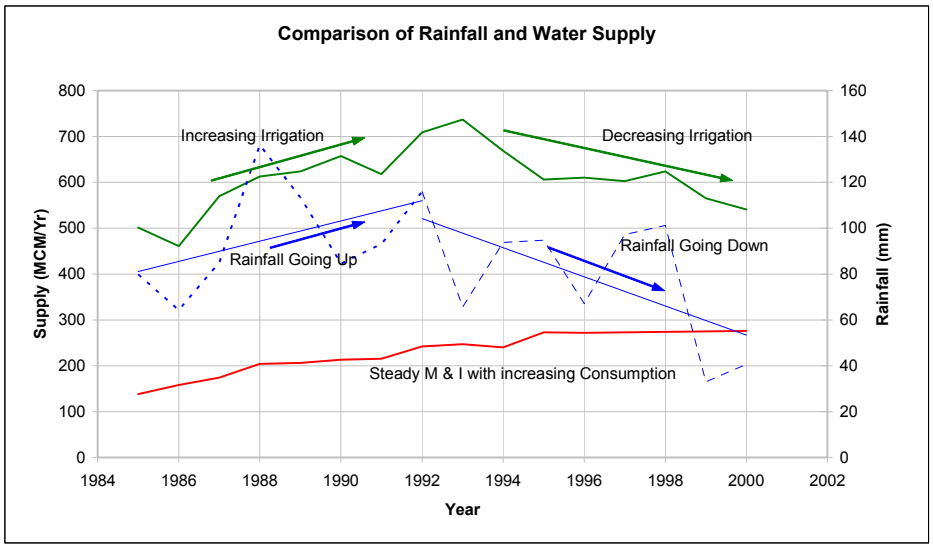


Figure 12: Irrigation and "Domestic and Industrial" Supply versus Jordan's average annual rainfall

Table 13: Jordan water supply (MCM) by sector according to the MWI

Year	Domestic	Industrial	Irrigation	Total	M&I
1985	116	22	501	639	138
1986	135	23	461	619	158
1987	150	24	570	744	174
1988	165	39	613	817	204
1989	170	36	624	830	206
1990	176	37	657	870	212
1991	173	42	618	833	215
1992	207	35	709	951	241
1993	214	33	737	984	247
1994	216	24	669	909	240
1995	240	33	606	878	272
1996	236	36	610	882	272
1997	236	37	603	876	273
1998	236	38	561	835	274
1999	232	38	532	801	207
2000	239	37	541	817	276
2001	246	33	495	774	279
2005	281	76	750	1107	357
2010	380	93	746	1219	473
2015	463	112	704	1279	575
2020	517	130	665	1312	647

Source: Ministry of Water and Irrigation (MW, 2003I)

Table 14: Irrigation water supply according to source

Item	1996	1997	1998	1999	2000	2000
Surface Water	254	272	294	239	216	39.93%
Groundwater						46.77%
Upland	237	222	209	198	195	36.04%
Midland	4	4	4	5	5	0.92%
JRV	56	44	46	53	53	9.80%
Subtotal	297	270	259	256	253	
Wastewater						13.31%
Upland	7	8	11	11	12	2.22%
JRV	52	53	60	59	60	11.09%
Subtotal	**59**	**61**	**71**	**70**	**72**	
Total	**610**	**603**	**624**	**565**	**541**	**100%**
Surface + Ground Water	**551**	**542**	**553**	**495**	**469**	

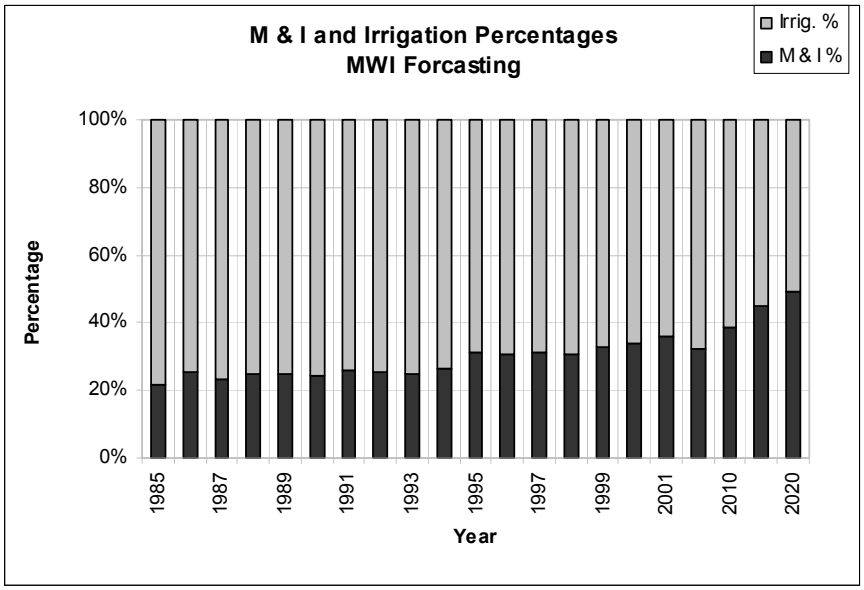


Figure 13: Municipal and industrial (M & I) percentage compared to irrigation consumption according MWI projection

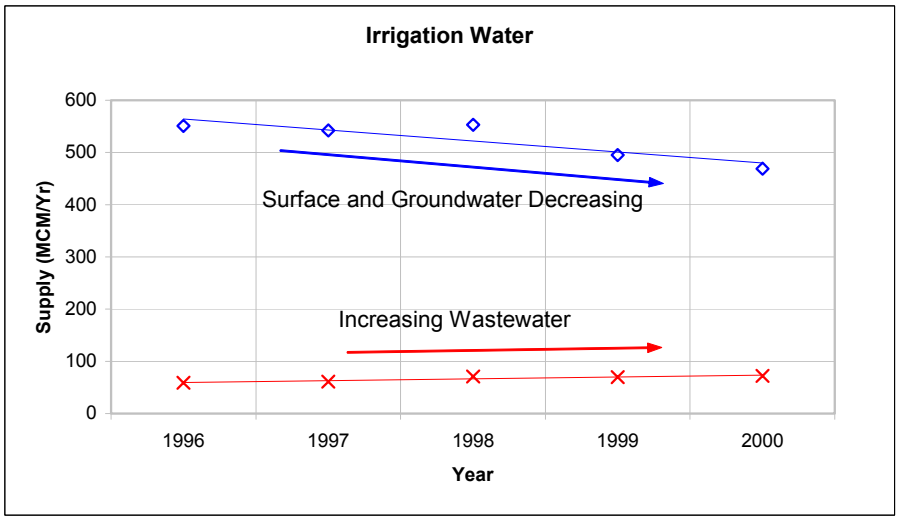


Figure 14: Irrigation Water Supply by source

Figure 15 shows a schematic plan of the Jordan Valley System. Options to provide the additional needed water are:

- Storage Dams to facilitate water through construction of:
  - Al Wehdah Dam
  - Jordan River Storage System
  - Southern Dams System
- The use of RO Plant for King Talal Reservoir to enhance water quality before mixing.

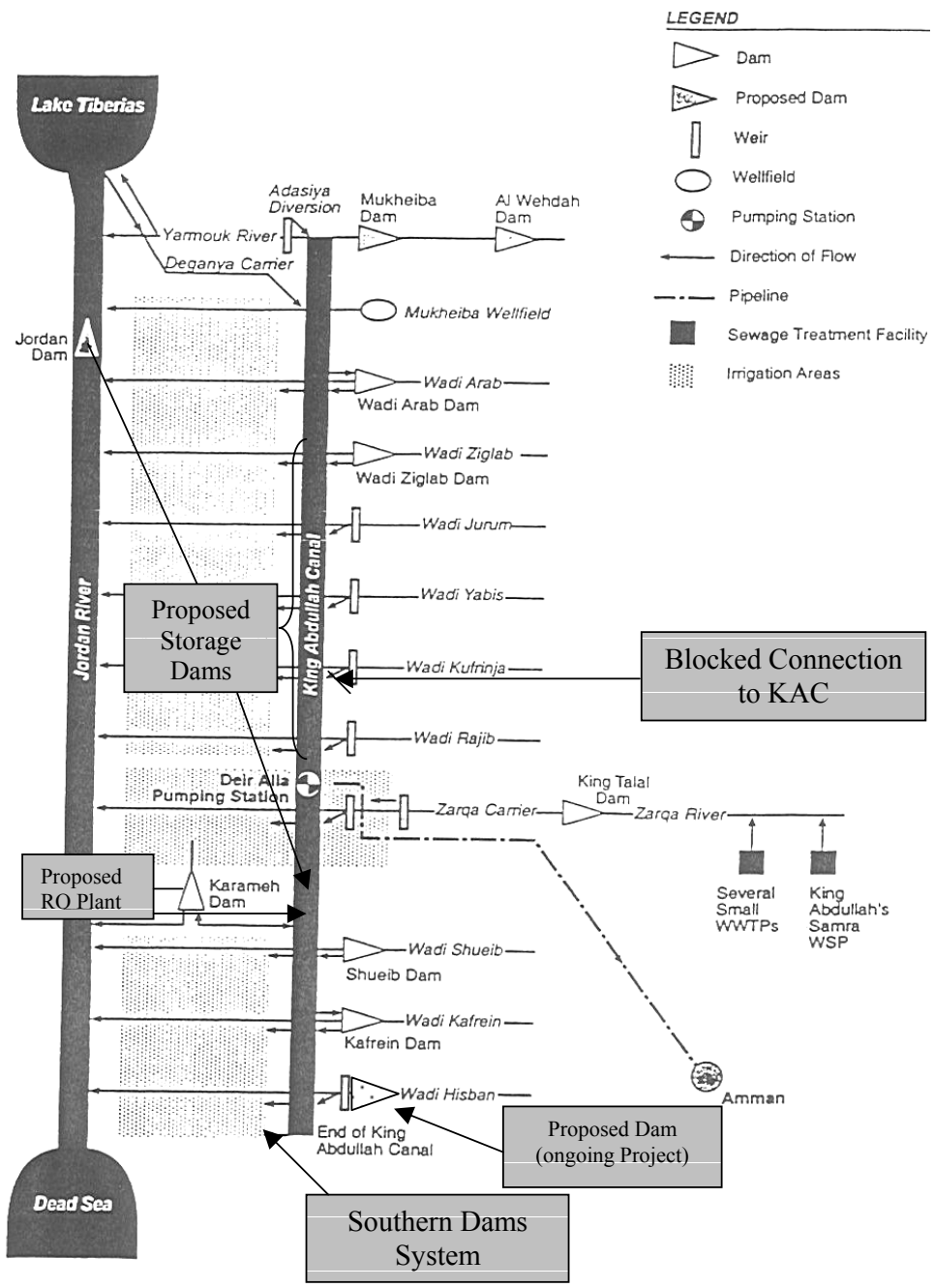


Figure 15: Schematic Plan of Jordan Valley (Source MWI-JVA)

The water resources are discussed at three different time scales:

- Present supply.
- Long term average with and without adjustment due to drought periods.

- Future forecasting in three time scale action:
    - Short-term.
    - Medium-term.
    - Long-term.

The forecasting takes into consideration the Action Plan and the Investment Program. The section integrates all water resources:

- Surface Water
- Groundwater
- Treated Wastewater
- Management
- Non-Conventional
- Regional

Climate

The climate of Jordan ranges from Mediterranean to desert. The Rift Valley and the highlands belong to the semi-arid to arid climate zone, which is largely affected by moist westerly air masses in winter. In summer, dry easterly and north-easterly desert winds affect the Kingdom. Winds are generally westerly to south-westerly.

Mediterranean climate dominates most of the highlands on both sides of the Jordan River and in the mountain chains east of the Dead Sea and Wadi Araba. Dry summers with an average maximum annual temperature of 39 °C occur between April and October. In winter months, from November until March, the average minimum annual temperature is 0-1 °C. In winter, the average mean daily temperatures recorded at Amman Airport and Deir Alla were 10 °C and 17 °C, respectively, for the period 1981-1998, illustrating the pleasant winter weather in the Jordan Valley.

The average temperature in the wet season is generally higher in the Jordan Valley than along the seashore on the west and falls again over the highlands and within the eastern plateau. The average annual evaporation rate ranges from 2,042 mm in Zarqa to 5,038 mm in Ma'an and from 2,594 mm in the Jordan Valley to 3,516 mm in the eastern hills.

Seasonal, uneven and fluctuating rainfall affects the country between October and May. Eighty percent of the annual rainfall occurs between December and March. Average annual rainfall in Jordan ranges from < 50 mm in the eastern desert to approximately 600 mm over Ajloun heights. Table 15 presents the categories into which Jordan may be classified based on the rainfall distribution:

Table 15: Classified categories according to rainfall distribution

Zone	Annual Rainfall (mm/year)	Area (km^2)	Area as a percentage of the total area of Jordan	Rainfall Volume Fifty Years Average (MCM)
Semi- humid	500-600	620	0.7 %	425
Semi- arid	300-500	2,950	3.3 %	1,170
Marginal	200-300	2,030	2.2 %	530
Arid	100-200	20,050	22.3%	2,950
Desert	< 100	64,350	71.5 %	3,425
Total		**90,000**	**100 %**	**8,500**

Source: MWI, 2003

Rainfall is the only source of water supply in Jordan to recharge the groundwater aquifers. It is scarce and unevenly distributed over the country. The mountainous highlands along the

Jordan Valley-Dead Sea-Wadi Araba depression receive the majority of total rainfall volume. Estimates of long-term records (1937/1938-2000/2001) of rainfall distribution over Jordan indicate that the average annual rainfall volume over the country is around 8,360 MCM. Figure 16 shows the average rainfall in mm per year over Jordan.

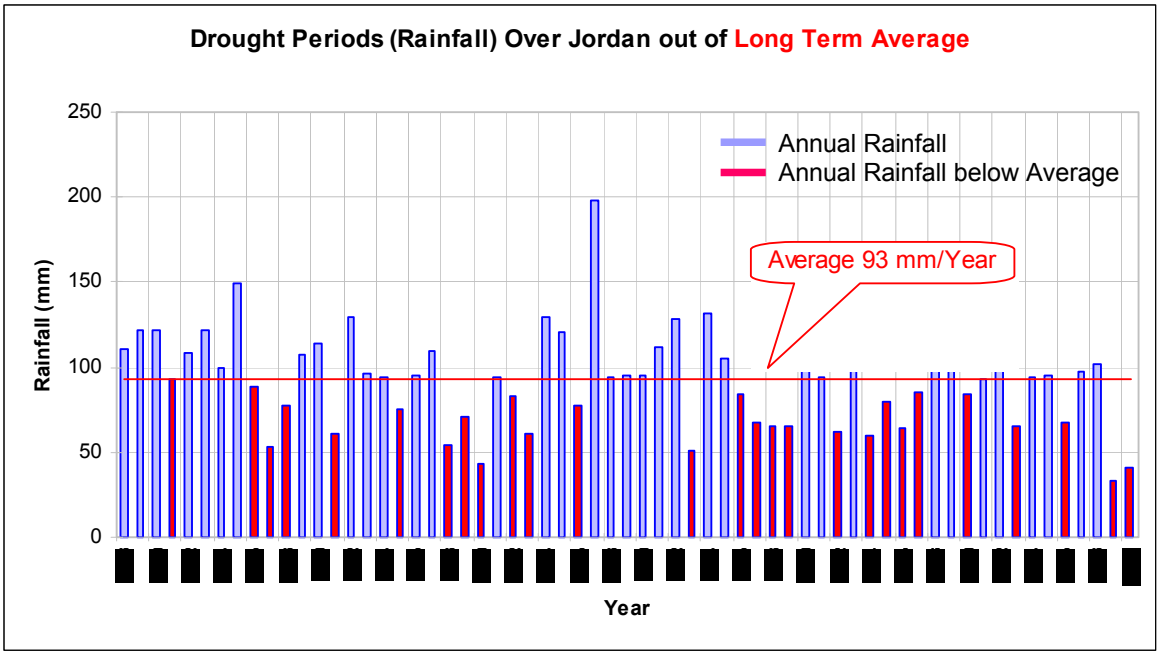


Figure 16: Average rainfall over Jordan in mm/year
(Source: MWI with development by the Consultant)

Drainage and Water Basins

The major topographic and geomorphologic features in Jordan control the drainage pattern. The overall drainage system in Jordan consists of two main flow patterns. The first one drains rainfall towards the Jordan Rift Valley, through deeply incised wadis and rivers dissecting the Jordan Valley-Dead Sea escarpments, to ultimately discharge into the Dead Sea. The second one drains rainfall through shallow streams and washes, which generally run eastwards from the western highlands towards the internal desert depressions and mudflats.

Based on the prevailing topographic terrain, there are fifteen surface water basins in the country as shown in Figure 17 and Table 16. The ten hatched basins are related to the Jordan Valley, as illustrated by the boundaries of JVA's mandate area on Figure 17. Five basins are related directly:

- Jordan Valley Basin # 3
- Jordan Valley Side Wadis North Basin # 4
- Jordan Valley Side Wadis South Basin # 5
- Dead Sea Side Wadis Basin # 8
- North Wadi Araba Basin # 9

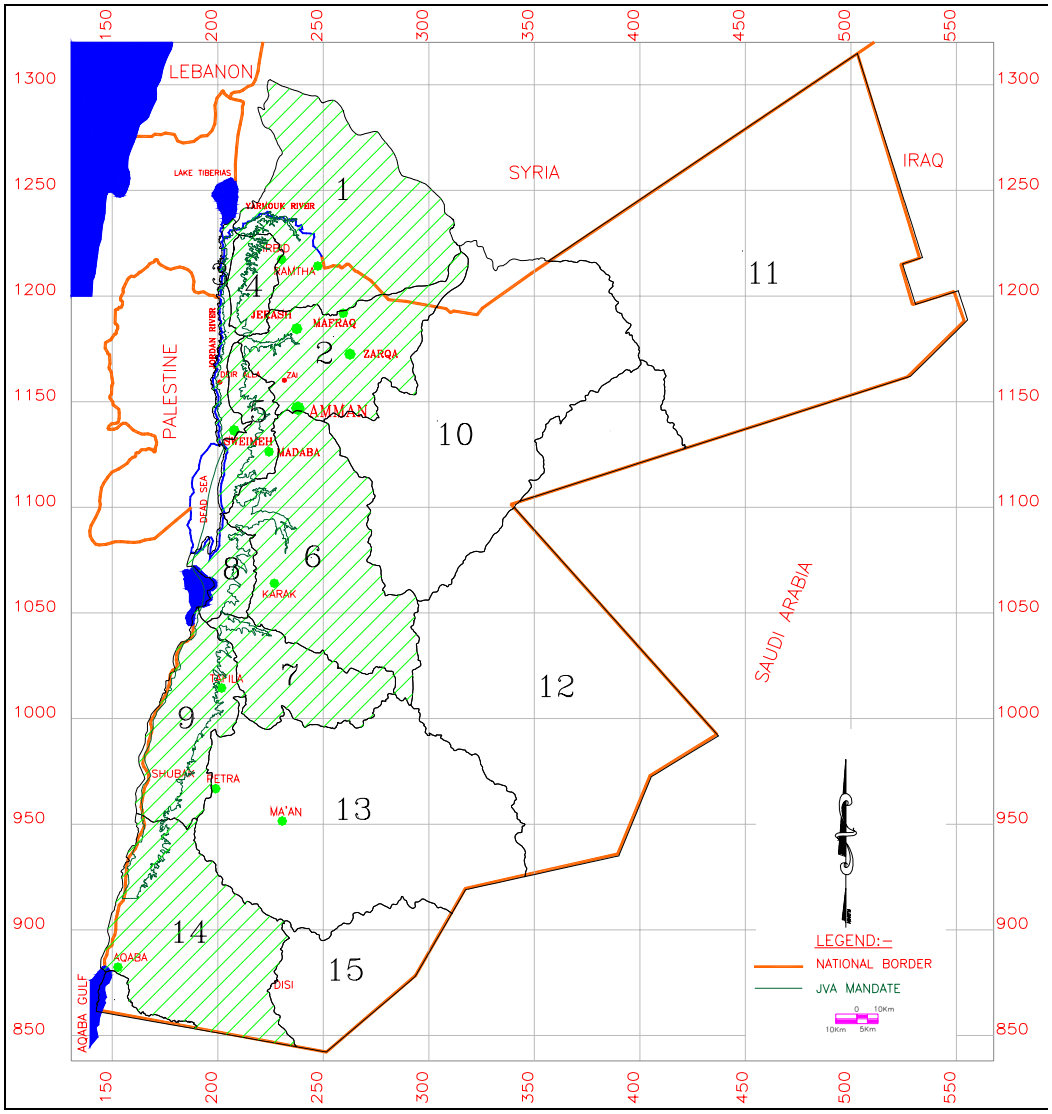


Figure 17: Major Surface Water Basins in Jordan and related basins (hatched) for Jordan Valley (Source: MWI with development by the Consultant)

Table 16: Surface water resources in Jordan[1]

No	Surface Water Basin					Sy	Population (1994)**	Area (Km^2)	Average Annual Rainfall (mm)	Estimated Runoff Coeff. (%)	Long Term Rainfall Average 61 Years (MCM)	Surface Water Flows (MCM) Long-Term Av. (1937-1998)
	Region			Name								
1	DEAD SEA BASIN	JORDAN RIVER SUBBASIN	Northern Basins	Yarmouk*		AD	355,083	1,500	293	5.1	439	Base: 246 Flood: 109 Total: 355
2				Amman- Zarqa		AL	2,239,043	3,725	249	2.9	926	Base: 43.00 Flood: 25.30 Total: 68.30
3				Jordan Valley		AB	139,373	775	300	1.9	233	Base: 0.0 Flood: 2.73 Total: 2.73
4				J.V. Side Wadis	N	AE, AF, AG, AH, AJ, AK	500,024	975	599	2.9	584	Base: 37.37 Flood: 12.02 Total: 49.39
5					S	AM, AN, AP	137,906	725	404	3.4	293	Base: 25.18 Flood: 7.93 Total: 33.11
6		DEAD SEA SUBBASIN	Central Basins	Mujib		CD	260,244	6,675	132	4.0	884	Base: 31.38 Flood: 33.62 Total: 65.00
7				Hasa		CF	20,570	2,600	128	2.8	334	Base: 26.26 Flood: 5.47 Total: 31.73
8				D.S. Side Wadis		C	196,697	1,525	178	2.5	290	Base: 33.63 Flood: 6.06 Total: 39.71
9				N.Wadi Araba		D	79,128	2,975	135	0.7	403	Base: 8.58 Flood: 2.35 Total: 11.13
10	Eastern Desert Basins			Azraq*		F	26,031	12,200	71	2.7	866	Base: 0.0 Flood: 22.47 Total: 22.47
11				Hamad*		H	9,966	18,150	112	0.7	2,050	Base: 0.0 Flood: 9.58 Total: 9.58
12				Sirhan*		J	3,851	15,700	28	1.9	445	Base: 0.0 Flood: 7.49 Total: 7.5
13				Jafer		G	47,783	12,450	43	1.5	545	Base: 0.0 Flood: 8.0 Total: 8.0
14	Southern Basins			S. Wadi Araba		E	89,220	3,725	37	1.3	138	Base: 0.0 Flood: 2.09 Total: 2.09
15				Southern Desert*		K	958,	6,300	16	1.0	103	Base: 0.8 Flood: 1.18 Total: 1.18
T O T A L							**4,105,877**	**90,000**	**95**	**3.0**	**8,532**	**Base: 452 Flood: 255 Total: 706**

[1.] Source of rainfall: JICA Study, 2001 & WIS/MWI
* Basin area in Jordan
** DOS Population and Housing Census, 1994.

The groundwater resources are very scarce and vary widely in quantity and quality. Generally, the groundwater basins in Jordan are divided into renewable and non-renewable groundwater resources. There are twelve groundwater basins, which are subdivided according to the upper most aquifer system. Groundwater divides indicated by different groundwater flow systems separate these basins from each other. Figure 18 presents the groundwater basins in Jordan and the general flow system in the upper aquifer. The highlighted basins are related to Jordan Valley. These basins are:

- Jordan River Valley
- Jordan River Side Wadis
- Dead Sea
- Northern Wadi Araba
- Red Sea

The safe yields of the upper aquifer systems of the different groundwater basins are shown in Figure 19. According to the geological succession and the different rock units occurring in the different areas of the groundwater basins, Jordan's rock formations deposited above the basement complex form the base of the above sedimentary rocks of different ages. A generalized classification of the geological succession in Jordan is presented in Table 17. Based on the lithological characteristics of the different rock units of the geological succession, these rocks are subdivided into aquifers and aquicludes.

Table 17: Generalized geological succession in Jordan

Period	Epoch	Group	Formation	Thickness (m)		
				Amman	Mujib	Jafer
QUATERNARY	Recent	Alluvial & Aeolian Rocks				
	Pleistocene	Plateau	Azraq			
TERTIARY	Pliocene		Sirhan			
	Miocene	Volcanic	Upper Basalts			
	Oligocene		Basalt Tuff			
			Middle Basalt			
			Lower Basalt			
	Eocene	Belqa Group	Wadi Shallala (B5)			
	Palaeocene		Rijam (B4)			40-50
UPPER CRETACEOUS	Maestrichtian		Muwaqqar (B3)		100-145	20-450
	Campanian		Amman (B2)	80-115	70-200	
	Santonian		W. Ghadran (B1)	20-40	Absent	
	Turonian	Ajloun Group	Wadi Sir (A7)	65-90	70-100	
	Cenomanian		Shu'eib (A5/6)	65-100	127	
			Hummar (A4)	40-65	Absent	
			Fuheis (A3)	80	70	
			Na'ur (A1/2)	200-230	Thin	
LOWER CRETACEOUS		Kurnub	Subeihi (K2)			
			Arda (K1)			
JURASSIC		Zarqa	Azab (Z2)			
TRIASSIC			Ma'an (Z1)			
PALAEOZOIC		Khreim	(K)			
		Disi	(D)			
PRECAMBRIAN		Sarmuj	(S)			
		Basement Complex (BC)				

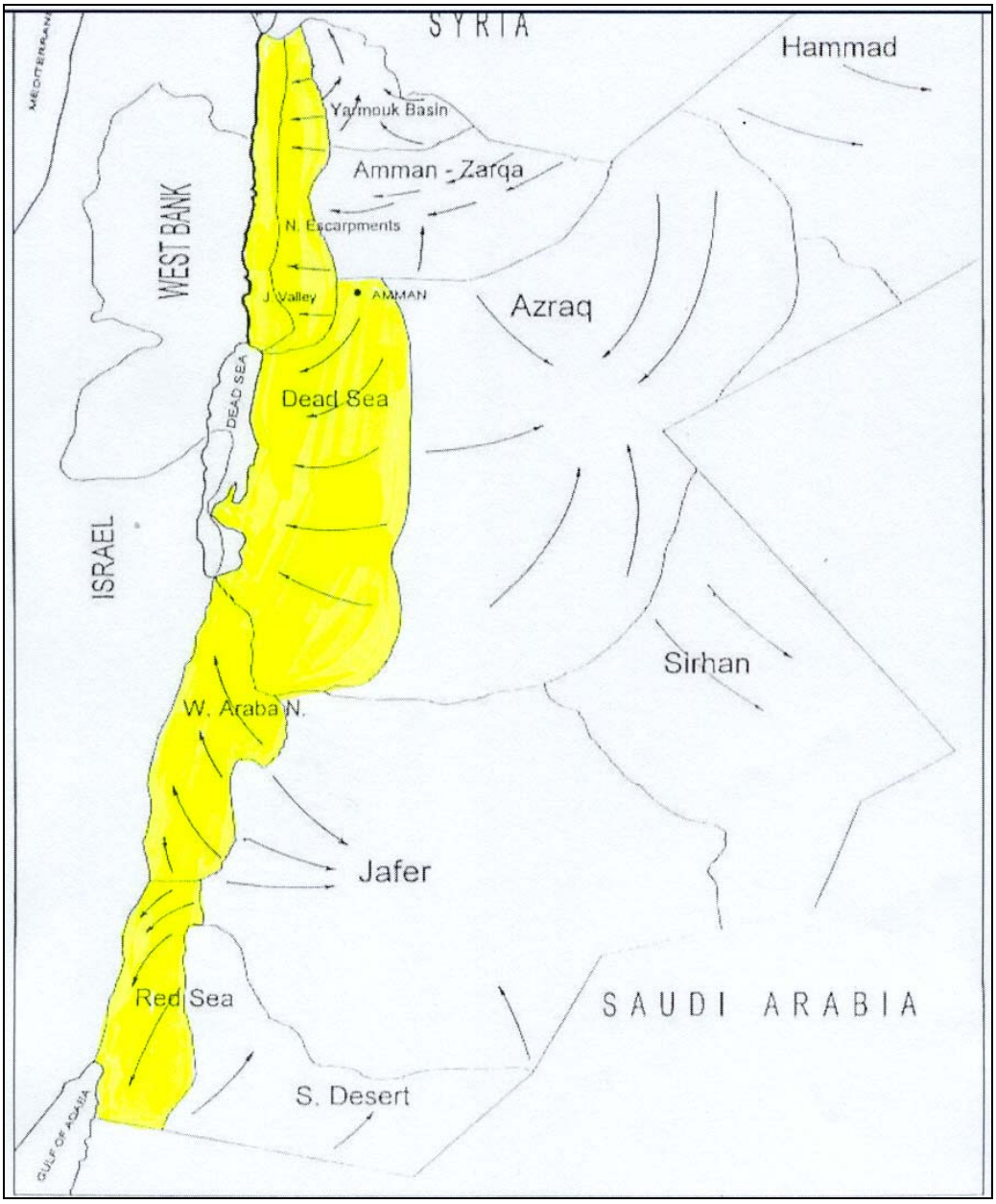
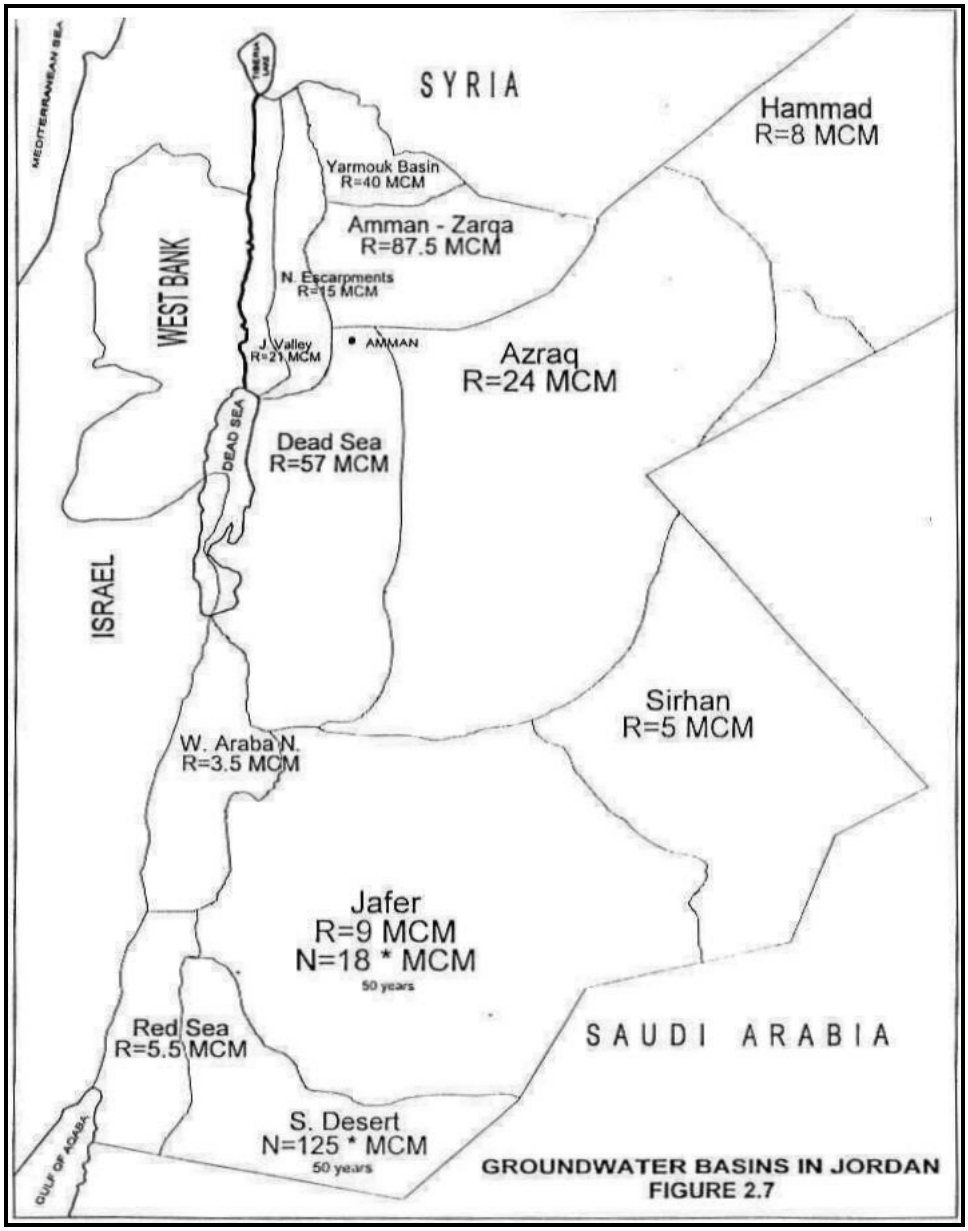


Figure 18: Groundwater basins and the general flow directions of the Upper Aquifer System in Jordan (Source: GTZ, 1996)



R: Renewable = 275 MCM/year
N: Non-Renewable = 143 MCM/year (50 years Abstraction)

Figure 19: Safe Yield of the different groundwater basins in Jordan (Source: GTZ, 1996)

All of the groundwater basins in Jordan are constituted from three main aquifer systems distributed vertically by geology. These aquifer systems are namely the upper aquifer system, intermediated aquifer system, and deep aquifer system. According to the surface geology of each basin, the vertical distribution of each aquifer system varies from one basin to another. The distributions of the upper, intermediate and deep aquifer systems in the different groundwater basins are presented in Table 18.

Table 18: Aquifers distribution in the different groundwater basins in Jordan

	Groundwater Basin	Upper Aquifer System	Intermediate Aquifer System	Deep Aquifer System
1	Yarmouk	Basalt Basalt + B_2/A_7[1] B4[2]	A_{1-2} [3] + A_4 [4]	Kurnub (K) [5] K + Rum Triassic-Jurassic (T-J) [6]
2	Azraq	Basalt Basalt + B_4 + B_5	B_2/A_7 B_2/A_7 + A_{1-2} + A_4	K K + T-J + Rum
3	Zarqa	Alluvial Alluvial + B_2/A_7 Alluvial + A_4	A_{1-2} + A_4	K + Rum + T-J K + Rum
4	Dead Sea	Alluvial B_2/A_7	A_{1-2} + A_4	K + Rum + T-J K + T-J T-J + Rum
5	Jafer	B_4 B_4 + Alluvial	B_2/A_7 A_{1-2} + A_4	K K + Rum
6	Mudawarra-Southern Desert	Rum (Disi) + Khreim		
7	Sirhan	B_4	B_2/A_7 A_{1-2} + A_4	K K+ T-J + Rum
8	Hammad	Basalt Basalt + B_4	B_2/A_7 A_{1-2} + A_4	K K+ T-J + Rum
9	Northern Wadi Araba	Alluvial	B_2/A_7 A_{1-2} + A_4	Rum K
10	Red Sea	Alluvial	B_2/A_7	Rum
11	Jordan River Side Wadis	Alluvial Alluvial + B_2/A_7	A_{1-2} + A_4	K K + T-J K+ T-J + Rum
12	Jordan River Valley	Alluvial	B_2/A_7 A_{1-2} + A_4	K K + T-J K+ T-J + Rum

(1) B_2/A_7= Amman-Wadi Sir Formation Deposits of Late Cretaceous Age (Mesozoic Rocks)
(2) B_4 = Rijam Formation Deposits of Late Cretaceous – Early Tertiary Rocks (Mesozoic-Cenozoic Rocks)
(3) A_{1-2}= Fuhais Formation Deposits of Ajlun Group of Late Cretaceous Age (Mesozoic Rocks)
(4) A_4= Hummar Formation Deposits of Ajlun Group of Late Cretaceous Age (Mesozoic Rocks)
(5) K= Kurnub Group Deposits of Early Cretaceous Age (Mesozoic Rocks)
(6) T-J= Triassic and Jurassic Rocks Deposits (Mesozoic Rocks)

The prevailing conditions of the groundwater basins are presented in Table 19. This table shows that most of the groundwater basins are over abstracted and the result is salinization in the upper aquifer system.

Table 19: Water budget, safe yield and abstraction from the groundwater basins for the year 2000

No	Basin	Aquifer	Safe Yield (MCM/a)	Domestic (MCM/a)	Industrial (MCM/a)	Agriculture (MCM/a)	Sum	Sy.-Abst.	Water Quality
1	Yarmouk	B4, B2/A7, A2	40.0	22.755	0.184	32.922	56.267	-16.267	Fresh but getting partly salinized
2	Side Wadis	A+K	15.0	4.913	0.000	5.120	10.033	4.967	Fresh
3	Jordan Valley	ALL	21.0	8.369	0.160	28.206	36.735	-15.735	Salinization
4	Amman/ Zarqa	Ba, B2/A7, A4, A2, K	87.5	67.141	6.121	62.516	137.812	-50.312	Salinization
5	Dead sea	B2/A7, A4, A2	57.0	33.855	15.098	32.117	83.204	-26.204	Salinization
6	Disi – Mudawarah	D	125.0	9.720	4.483	50.920	66.259	58.741	Fresh
7	Wadi Araba – North	ALL, B2/A7, K, D	3.5	0.000	2.784	0.563	3.514	-0.014	Salinization
8	Red Sea	ALL, D	5.5	1.061	0.157	3.695	5.016	0.484	Salinization
9	Jafer	Ba, B4, ALL, B2/A7, A1, K	18.0	7.183	6.282	9.931	23.450	-14.450	Salinization
10	Azraq	Ba, B4, B2/A7, AB, K	24.0	27.202	0.208	28.694	56.657	-32.657	Salinization
11	Sarhan	B5/4, AB	5.0	0.000	0.000	1.618	1.821	3.179	Fresh-brackish
12	Hammad	B4	8.0	0.562	0.000	0.097	1.148	6.852	Fresh-brackish
		Total		**182.761**	**35.477**	**256.399**	**473.000**	**-81.416**	
		Renewable	275.5						
		Renewable & Non-Renewable	418.5						

The total annual municipal water supply across the country maintains more or less the same level of around 240 MCM for the period between the year 1996 and the year 2001 as shown in Table 20. With regard to demand, the Governorate of Amman consumed 37.5% of the total water supply as an average for the entire period, followed by the Governorate of Zarqa and Irbid with 13.2% and 12.8%, respectively.

Table 20: Municipal Water Demand by Governorate 1996 to 2001

Governorate	Municipal Water Supply											
	1996		1997		1998		1999		2000		2001	
	MCM	lcd	MCM	lcd	MCM	Lcd	MCM	lcd	MCM	lcd	MCM	lcd
Amman	89.6	145.2	88.8	139.6	85.7	131.4	88.2	131.7	91.3	133.1	93.6	133.2
Zarqa	31.7	126.9	31.5	122.4	32.0	121.2	30.1	111.1	31.8	114.5	32.7	115.2
Irbid	31.7	107.5	29.6	97.6	29.1	93.3	31.8	99.5	30.3	92.4	30.9	92.0
Mafraq	17.4	250.3	18.4	256.7	18.5	251.6	19.0	251.8	18.5	239.1	18.9	238.4
Balqa	19.2	176.7	18.9	168.8	19.1	166.4	17.9	152.2	16.3	135.4	15.2	123.3
Karak	8.5	127.6	8.7	127.6	9.4	134.0	9.2	127.3	9.2	124.8	9.4	124.4
Tafileh	2.0	83.7	2.3	92.0	2.3	89.8	2.2	83.8	2.4	89.3	2.6	94.5
Ma`an	6.8	219.5	6.8	213.5	7.3	224.7	7.2	214.3	7.5	220.6	7.7	220.5
Madaba	12.9	305.8	12.0	276.1	11.7	263.5	8.8	191.6	5.6	119.2	5.9	123.9
Aqaba	15.3	498.2	15.1	475.5	15.0	462.0	16.5	493.9	15.2	443.1	15.0	426.5
Ajloun	3.5	93.4	3.7	96.5	3.9	99.3	3.0	75.0	3.2	76.3	3.1	71.9
Jarash	3.9	79.2	4.1	82.8	5.2	100.4	3.6	67.5	4.2	78.5	3.9	71.2
Total	**242.5**	**149.6**	**239.9**	**143.7**	**239.2**	**139.7**	**237.3**	**135.1**	**235.6**	**130.8**	**239.0**	**129.6**

Source: WAJ
Notes: 1) The figures include touristic water and the water for small and medium industry.
2) The figures include physical losses.

With regard to water restrictions, although Jordan's population grew at the average annual rate of 2.7% (for the period 1996 to 2001), the per capita per day municipal water supply over the whole country decreased from 150 litres in 1996 to 130 litres in 2001 as shown in Table 20.

Table 21 presents domestic consumption by Jordan Valley communities in the Study Areas. The domestic consumption is considered as 130 l/c/d including the losses in the network and illegal connections (Unaccounted For Water- UFW).

Table 21: Present Domestic Consumption for Jordan Valley

NJVSA: Yarmouk River to the Baptism Site		
Population areas	**Governorate**	**Domestic water (MCM/yr)**
Aladaseiah	Irbid	0.123
Al Baqura	Irbid	0.039
Abu Habeel	Irbid	0.053
New Shuneh	Al-Balqa	0.231
Abu Sido	Irbid	0.126
South Shuneh	Al-Balqa	0.162
Al Manshiye	Irbid	0.331
Muaddi	Al-Balqa	0.192
Karn	Irbid	0.034
Mashara	Irbid	0.902
Waqqas & Qleat	Irbid	0.274
Suleikhat	Irbid	0.036
Al Rweha	Al-Balqa	0.143
Daharat Al Ramle	Al-Balqa	0.077
Al-Nahda (Al Rahma Al Jalad)	Al-Balqa	0.100
Dirar	Al-Balqa	0.280
West Twal	Al-Balqa	0.350

NJVSA: Yarmouk River to the Baptism Site		
Population areas	**Governorate**	**Domestic water (MCM/yr)**
Khazma	Al-Balqa	0.126
Al Ardah	Al-Balqa	0.098
Deir Alla	Al-Balqa	0.070
Al Maraza	Irbid	0.048
Kraymeh	Irbid	0.860
Zimalia	Irbid	0.063
Abu Ezzeghan	Al-Balqa	0.035
Damia	Al-Balqa	0.051
Karamah	Al-Balqa	0.436
Al Jofeh Al Jawasreh	Al-Balqa	0.298
Balawna	Al-Balqa	0.262
North Twal Al Rabeea	Al-Balqa	0.190
North Shuneh	Irbid	0.765
Almukheibeh Altahta	Irbid	0.122
Almukheibeh Alfouqa	Irbid	0.083
	Sub-Total	**6.962**
MJVSA: The Dead Sea Area		
Population areas	**Governorate**	**Domestic water (MCM/yr)**
Al Haditha	Al-Karak	0.161
Al Rawdhah	Al-Karak	0.384
Suweimah	Al-Balqa	0.122
	Sub-Total	**0.667**
SJVSA: Southern Ghors and Wadi Araba		
Population areas	**Governorate**	**Domestic water (MCM/yr)**
Safi_ Ramleh	Al-Karak	0.809
Mazraa	Al-Karak	0.358
Fifa	Al-Karak	0.094
Rahmeh	Al-Aqabah	0.043
Qatar	Al-Aqabah	0.010
Al Resheh	Al-Aqabah	0.047
Fenan	Al-Aqabah	0.016
Beermathkoor	Al-Aqabah	0.022
Alselemani	At-Tafilah	0.010
Al Mamurah	At-Tafilah	0.029
	Sub-Total	**1.438**
	Total	**9.067**

Touristic water demand at the Dead Sea is the most important touristic consumption in the Jordan Valley. According to a JICA Study (Dec. 2001), the growth in the next 10 years could reach 14 MCM. The growth at Suweimeh is 2.45 MCM per five years starting from year 1998 and 2.22 MCM for Zara. Table 22 shows the touristic demand at Balqa and Madaba Governorates for three scenarios for the period between 1998 and 2020 according to JICA Study. The sum could reach 14 MCM at year 2020.

Table 22: Projection of Touristic Water Demand by Scenario for Jordan Valley

Governorate	1998	2005	2010	2015	2020
Scenario 1					
Balqa	0.01	2.67	4.70	6.94	6.94
Madaba	0.00	2.35	4.41	6.55	6.56
Scenario 2					
Balqa	0.01	5.13	7.29	7.29	7.29
Madaba	0.00	3.29	6.56	6.57	6.60
Scenario 3					
Balqa	0.01	5.13	7.29	7.29	7.29
Madaba	0.00	3.28	6.55	6.55	6.56

The Movenpick Hotel at the Dead Sea has been considered as a typical example. **Table 23** presents the water consumption for the last four years in the hotel. The consumption ranged between 50,000 m^3 and 60,000 m^3 per year.

Table 23: Movenpick at Dead Sea Water Consumption for the Period 2000-2003

Month	Guests	No. of Employees	YEAR 2000		
			Water JD's		Waste Removal (Sweage)
			m^3	Total JD	Total JD
Jan-00	6,974	367	4,469	4,469	815
Feb-00	6,672	367	3,649	3,649	380
Mar-00	9,583	367	5,329	5,329	260
Apr-00	11,774	367	5,073	5,073	280
May-00	10,287	367	4,539	4,539	215
Jun-00	7,967	367	4,199	4,199	90
JLY 00	5,475	367	4,583	4,583	450
Aug-00	7,501	367	4,724	4,724	360
Sep-00	8,486	367	4,987	4,987	180
Oct-00	11,070	367	5,033	5,033	510
Nov-00	8,085	367	4,703	4,703	165
Dec-00	4,046	367	2,776	2,776	450
Total Year JD	97,920	4,404	54,064	54,064	4,155

Month	Guests	No. of Employees	YEAR 2001		
			Water JD's		Waste Removal (Sweage)
			m^3	Total JD	Total JD
Jan-01	2,618	340	3,010	3,001	90
Feb-01	4,187	340	3,379	3,405	105
Mar-01	8,867	340	5,686	5,688	105
Apr-01	10,667	340	5,652	5,654	135
May-01	8,164	340	5,612	5,648	135
Jun-01	5,245	340	4,230	4,234	90
JLY 01	5,773	340	4,482	4,489	140
Aug-01	7,301	340	4,985	4,986	90
Sep-01	4,282	340	4,312	4,322	105
Oct-01	4,668	340	3,739	3,757	150
Nov-01	2,905	340	3,315	3,311	150
Dec-01	2,576	340	3,114	3,128	30
Total Year JD	67,253	4,080	51,516	51,623	1,325

Month	Guests	No. of Employees	YEAR 2002		
			Water JD's		Waste Removal (Sweage)
			m^3	Total JD	Total JD
Jan-02	2,260	390	3,415	3,432	60
Feb-02	3,470	390	3,907	3,916	75
Mar-02	5,711	390	4,653	4,664	150
Apr-02	8,139	390	6,081	6,085	45
May-02	8,475	390	6,953	6,959	150
Jun-02	7,721	390	6,427	6,431	225
JLY 02	5,532	390	5,065	5,069	475
Aug-00	6,576	390	5,813	5,827	150
Sep-02	5,659	390	5,208	5,340	285
Oct-02	7,495	390	5,391	5,397	135
Nov-02	4,378	390	3,784	3,806	75
Dec-02	3,840	390	3,483	3,490	30
Total Year JD	69,256	4,680	60,180	60,416	1,855

Month	Guests	No. of Employees	YEAR 2003		
			Water JD's		Waste Removal (Sweage)
			m^3	Total JD	Total JD
Jan-03	2,702	344	3,033	3,038	60
Feb-03	2,869	344	2,995	3,000	45
Mar-03	808	344	1,816	1,949	135
Apr-03	2,889	344	2,393	2,438	75
May-03	4,713	344	4,046	4,061	135
Jun-03	5,020	344	6,653	6,682	390
JLY 03	4,391	344	5,325	5,340	120
Aug-03	6,630	344	6,226	6,238	75
Sep-03	5,983	344	4,477	4,487	270
Oct-03	9,423	344	3,304	3,309	159
Nov-03	7,060	344	4,610	4,613	120
Dec-03	5,201	344	4,604	4,601	0
Total Year JD	57,689	4,128	49,482	49,754	1,584

4.4.2 Agricultural Consumption of Water

A large amount of water is consumed in the Jordan Valley by irrigated agriculture. Two periods were considered to show the history of the agricultural water consumption for comparison and reference. These periods are four years at end of the 1980s and five years in mid 1990s. Table 24 shows the average annual crop water requirements and average cultivated areas of main crop categories for two periods 1987-1990 and 1994-1998. Only the areas of fruit trees in the northern JV increased by 6 thousand dunums and by 3 thousand dunums in the southern JV, whereas the cultivated areas of vegetables decreased in the three zones by 59.5 thousand dunums. Furthermore, the average cultivated areas in the two periods decreased from 290.7 thousand dunums to 242.7 thousand dunums.

Table 24: Average crop water requirements and cultivated areas at JV

Crop categories	Average crop water requirements m^3/dunum	Cultivated areas (dunum)	
		1987-1990	1994-1998
NJV Fruits Trees Area	1,724	52,524	58,482
NJV Vegetable Area	404	70,960	45,207
NJV Field Crops Area	500	24,929	20,930
NJV Total Area		**148,414**	**124,619**
MJV Fruits Trees Area	1,875	9,930	9,671
MJV Vegetable Area	398	55,848	50,785
MJV Field Crops Area	624	16,629	17,218
MJV Total Area		**82,406**	**77,674**
SJV Fruits Trees Area	1,830	11,193	14,641
SJV Vegetable Area	355	45,725	17,052
SJV Field Crops Area	685	3,050	8,766
SJV Total Area		**59,968**	**40,459**
JV Total Fruits Tress Area	1,810	73,647	82,794
JV Total Vegetable Area	386	172,533	113,044
JV Total Field Crops Area	603	44,608	46,914
JV Total Area		**290,788**	**242,752**

In the NJVSA during the 1987-1990 period, fruit trees used 90.7 MCM compared to 7.1 MCM for autumn vegetables and 22.9 MCM for summer vegetables (Table 25). This is mainly due to the large area planted with citrus in the northern part of Jordan Valley. Meanwhile, vegetables (70.9 thousand dunums) needed 30 MCM as a total amount for irrigation. Field crops require 8.7 MCM. As shown in Table 25 fruits trees require about 70% of total water requirements in NJV. Due to the expansion of fruit tree areas during the period (1994-1998), fruit trees used 100.4 MCM which represents 79% of total water requirements in NJV. Vegetables used only 17.2 MCM which represent only 13.7% of total water requirements in NJV. The peak demand of water in this zone is during the period of April-July.

Table 25: Total monthly crop water requirements (MCM) of major crops cultivated in Northern JV

Crop	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1987-1990													
Fruits trees	8.2	2.8	0.0	0.0	0.0	2.4	8.9	13.4	15.4	15.8	14.1	9.7	90.7
Vegetable-Autumn	1.9	2.1	0.9	0.3	0.0	0.1	0.4	0.0	0.0	0.3	0.4	0.7	7.1
Vegetable-Summer	0.0	0.0	0.0	0.2	0.2	2.7	6.6	8.8	3.7	0.8	0.0	0.0	22.9
Field Crops	0.0	1.3	0.0	0.0	0.2	2.0	3.9	1.3	0.0	0.0	0.0	0.0	8.7
Total	10.1	6.2	0.9	0.5	0.4	7.2	19.8	23.5	19.2	16.8	14.4	10.4	129.4
1994-1998													
Fruits	9.0	3.1	0.0	0.0	0.0	2.6	9.9	14.9	17.1	17.4	15.6	10.7	100.4
Vegetable-Autumn	1.7	1.9	0.8	0.4	0.0	0.1	0.4	0.1	0.0	0.2	0.3	0.5	6.5
Vegetable-Summer	0.0	0.0	0.0	0.0	0.0	1.1	3.1	4.1	1.9	0.6	0.0	0.0	10.8
Field	0.0	1.1	0.0	0.0	0.2	1.9	3.5	1.3	0.0	0.0	0.0	0.0	8.0
Total	10.8	6.0	0.9	0.4	0.3	5.7	16.9	20.4	19.0	18.2	15.9	11.2	125.7

In the MJVSA during the period 1987-1990, fruit trees used 18.5 MCM compared to 9.8 MCM for autumn vegetables and 12.7 MCM for summer vegetables (Table 26). However, vegetables (55.8 thousand dunums) required 20.5 MCM of irrigation water, which represents about 45% of total water requirements in this zone. Field crops required 9.1 MCM, which represents about 18.1% of total water requirements as shown in Table 26. During the period 1994-1998 fruit trees consumed 24.6 MCM which represent 44.4% of total water

requirements. Vegetables used 20.7 MCM which represents only 37.4% of total water requirements. The peak demand of water in the MJV is during October-November for autumn vegetables and April-May for summer vegetables.

Table 26: Total monthly crop irrigation water requirements (MCM) of major crops cultivated in Middle JVSA

Crop	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1987-1990													
Fruits Trees	1.6	0.6	0.0	0.1	0.2	0.5	1.9	2.7	3.1	3.1	2.8	1.9	18.5
Vegetable-Autumn	2.7	3.0	1.8	0.9	0.2	0.2	0.0	0.0	0.0	0.0	0.1	0.9	9.8
Vegetable-Summer	0.0	0.0	0.0	0.3	0.4	2.0	4.2	4.4	1.1	0.3	0.0	0.0	12.7
Field Crops	0.0	1.0	0.6	0.4	1.1	1.9	3.1	1.0	0.0	0.0	0.0	0.0	9.1
Total	4.3	4.6	2.4	1.6	1.8	4.8	9.2	8.1	4.2	3.5	3.0	2.8	50.1
1994-1998													
Fruits Trees	2.1	0.8	0.0	0.1	0.2	0.7	2.6	3.7	4.1	4.2	3.7	2.5	24.6
Vegetable-Autumn	3.0	3.4	2.0	1.3	0.3	0.3	0.0	0.0	0.0	0.0	0.1	1.1	11.7
Vegetable-Summer	0.0	0.0	0.0	0.1	0.2	0.9	2.4	2.9	1.6	0.9	0.0	0.0	9.0
Field	0.0	0.9	0.5	0.4	1.3	2.3	3.5	1.0	0.0	0.0	0.0	0.0	10.1
Total	5.1	5.2	2.6	1.9	2.0	4.2	8.4	7.6	5.7	5.1	3.9	3.6	55.4

In the SJVSA during the 1987-1990 period, fruit trees consumed 27.5 MCM compared to 21.24 MCM for autumn and summer vegetables as shown in Table 27 the autumn vegetables (45.7 thousand dunums) required about 12.6 MCM. Field crops required 2.3 MCM. Vegetables used only 7.6 MCM which represent only 15.2% of total water requirements in the SJVSA compared to 21.24 MCM during the 1987-1990 periods. This reduction in total crop water requirements of vegetables was due to the shrinking of vegetable-planted areas by 28.6 thousand dunums between the two periods.

Table 27: Total monthly crop irrigation water requirements (MCM) of major crops cultivated in Southern JVSA

Crop	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1987-1990													
Fruits trees	2.4	1.0	0.2	0.4	0.7	1.3	2.7	3.8	4.2	4.4	3.9	2.7	27.5
Vegetable-Autumn	2.8	3.5	2.3	0.7	0.6	0.4	0.3	0.0	0.0	0.0	0.7	1.3	12.6
Vegetable-Summer	0.0	0.0	0.0	0.2	0.4	1.7	2.9	2.2	1.0	0.1	0.0	0.0	8.6
Field Crops	0.0	0.2	0.1	0.1	0.3	0.6	0.7	0.3	0.0	0.0	0.0	0.0	2.3
Total	5.2	4.6	2.7	1.5	1.9	4.0	6.6	6.3	5.3	4.4	4.6	4.0	51.1
1994-1998													
Fruits	3.2	1.3	0.3	0.6	0.9	1.7	3.6	5.0	5.6	5.8	5.2	3.6	36.7
Vegetable-Autumn	1.2	1.6	1.1	0.3	0.6	0.4	0.3	0.0	0.0	0.0	0.1	0.4	6.0
Vegetable-Summer	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.5	0.3	0.0	0.0	0.0	1.6
Field	0.0	0.5	0.4	0.4	0.8	1.4	1.8	0.5	0.0	0.0	0.0	0.0	5.8
Total	4.4	3.3	1.9	1.3	2.3	3.8	6.1	6.0	5.9	5.8	5.3	4.0	50.1

The water requirements for the whole JV during the period 1987-1990, reached 230.7 MCM, whereas it increased to 231.2 MCM during the period 1994-1998 as shown in Table 28. In general, the JV's total irrigation requirement was estimated to be around 230 MCM annually, of which 128 MCM was allocated to irrigate 124.6 thousand dunums in NJV; 55.4 MCM to irrigate 77.6 thousand dunums in the MJV; and 50 MCM to irrigate 40.5 thousand dunums in the SJVSA.

During the period of 1987-1990 it was found that, the total water demand for 290.8 thousand dunums was about 230.6 MCM, and was distributed as follows: 59.2% for fruit trees, 19.2% for summer vegetables, 12.8% for autumn vegetables, and only 8.8% for field crops. For the period 1994-1998, the results show that although the amount of land decreased to 242.7 thousand dunums, the total water demand slightly increased to about 231.2 MCM. Water usage was distributed as follows: an increase to 70% for fruit trees, a slight decrease to 10.4% for autumn vegetables, a large decrease to 9.3% for summer vegetables, and a slight increase to 10.3% for field crops. This shows that fruit trees consumed the majority of water; therefore, it is important to consider this fact in future planning for water management in the Jordan Valley. The peak demand of water in JV is during the period of April-May as shown in Figure 20.

Table 28: Total monthly crop irrigation water requirements (MCM) of major crops cultivated in JV

Crop	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1987-1990													
Fruit trees	12.2	4.4	0.2	0.5	0.8	4.2	13.5	19.9	22.7	23.2	20.8	14.3	136.6
Vegetables-Autumn	7.4	8.6	5.0	1.9	0.8	0.8	0.7	0.0	0.0	0.3	1.2	2.8	29.6
Vegetables-Summer	0.0	0.0	0.1	0.6	1.0	6.4	13.7	15.3	5.9	1.2	0.0	0.0	44.3
Field Crops	0.0	2.4	0.7	0.6	1.5	4.6	7.7	2.6	0.0	0.0	0.0	0.0	20.2
Total	**19.5**	**15.4**	**6.0**	**3.6**	**4.2**	**16.0**	**35.6**	**37.9**	**28.6**	**24.7**	**22.0**	**17.1**	**230.7**
1994-1998													
Fruit trees	14.4	5.1	0.3	0.6	1.1	5.0	16.1	23.6	26.8	27.4	24.5	16.9	161.7
Vegetables-Autumn	5.9	6.9	4.0	2.0	0.9	0.9	0.7	0.1	0.0	0.2	0.6	1.9	24.1
Vegetables-Summer	0.0	0.0	0.0	0.2	0.2	2.2	6.0	7.5	3.8	1.5	0.0	0.0	21.4
Field crops	0.0	2.5	1.0	0.9	2.4	5.7	8.7	2.8	0.0	0.0	0.0	0.0	23.9
Total	**20.3**	**14.5**	**5.4**	**3.7**	**4.7**	**13.7**	**31.5**	**34.0**	**30.6**	**29.1**	**25.1**	**18.8**	**231.2**

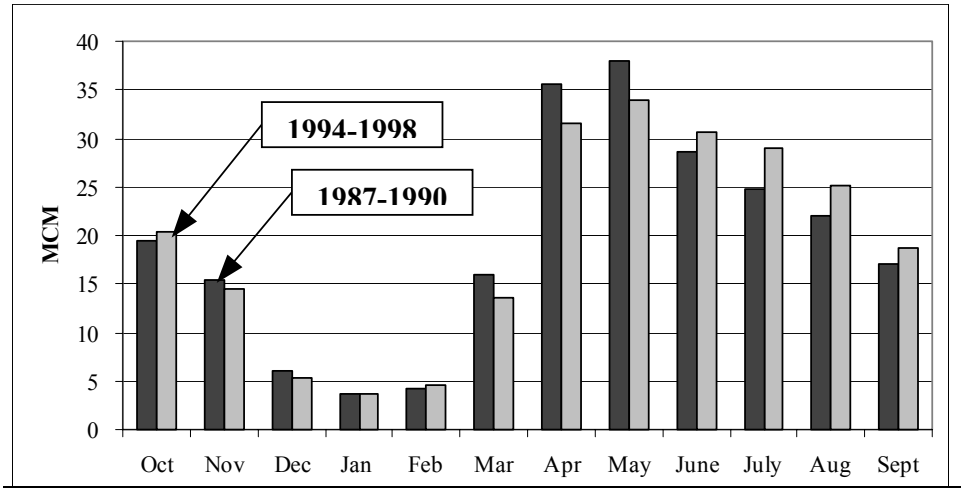


Figure 20: Monthly total crop water requirements at JV

4.4.3 International Water Conservation Projects

As Jordan is one of the world's most water deficient countries, USAID has funded a number of water conservation projects in cooperation with the Ministry of Water and Irrigation. The following were analyzed and project managers were interviewed by the Study Team, as they are quite applicable to this study:

a.) The Wadi Musa Pilot Project – Managed by PA Consultants, this study is intended to show that reclaimed water from the Petra Regional Wastewater Treatment Plant, which is located in Wadi Musa near the entrance to the World Heritage site, can provide safe and reliable irrigation for some types of agriculture. In addition to the installation of a fully functioning drip irrigation system, 60 hectares are being distributed among local farmers for cultivation using the project's water recycling methods. Through the use of training seminars, crops that are being planted and irrigated by the recycled water include alfalfa, maize, sunflowers, Sudan grass, pistachio, almond, olive, and date palms. Additionally, more than 2,000 trees and 400 shurbs and flowers have been planted, including poplars, spruce, juniper, iris, geraniums, petunias, and daisies, not all of which are Xeric plants. Using a "buy local" policy, the cut flowers are being purchased by Petra's hotels. Interestingly, the yield of maize from treated water is approximately 25% higher than for maize grown with fresh water, and the yield for sunflowers is 30% higher.

b.) The KAFA'A Project (Knowledge and Action Fostering Advances in Agriculture) – MWI and JVA began this project in the fall of 2003 with four goals. The first is widespread adoption and proper use of farm management practices including drip irrigation, fertilization, water harvesting, and changes in cropping patterns. The second goal is to engage community groups in small scale community based irrigation management and rainwater harvesting. The third goal is to educate farmers through establishment of an agricultural extension service. The fourth goal is to create an enabling policy for decision-makers through public awareness campaigns to result in conservation of water in the agricultural sector.

c.) JVA Irrigation Advisory Service (IAS) Unit - In 1993, USAID initiated the Water Quality Improvement and Conservation Project, an outcome of which was the establishment of the IAS Unit at JVA in 1997. In 1998, three irrigation engineers performed a pilot project to examine the possibility of improved water efficiency in irrigated agriculture. The 1999-2000 results from different demonstration farms show that water consumption can be reduced by an average of 20% while maintaining current production levels or increased production levels. For example, there was a 47% decrease in water use for eggplant production (drip irrigation) and a 22% increase in crop production; for squash a 39% decrease in water use but a 3% decrease in crop production; for tomatoes a 22% decrease in water use and an 11% increase in crop production. At the sector level, a 15-20% reduction could release 90-120 MCM of water annually, approximately 40% of Jordan's current municipal use.

4.5 Agriculture

There are small, medium, and large scale farmers in the Jordan Valley. Although one farm unit equals only 30 dunums, many large scale farmers own numerous units. One of the persistent requests from the focus groups was that small farmers, many of whom are not prospering, be allowed to consolidate units for larger, more efficient farm operations with higher crop yields. Another persistent request was that the JVA provide them with agricultural extension services and professional advice on crops and marketing and exporting their products.

Generally, the best agricultural land in the JV is in the Northern Study Area around Karamah, Deir Alla, and Mashara', where the land is fertile but productivity requires water supply. More saline and thus less productive is the land in the Middle Zone near South Shouneh and

Suweimah. The most unproductive land is south of Fifa near Wadi Araba in the South Study Area, where the soil is quite sandy (desert) and water resources are very limited.

Primary vegetables include many of the traditional foods of Jordan. Citrus trees and bananas accounted for 56% of the total water consumed in the Jordan Valley. Not only do they consume excessive amounts of water, but according to the FOE African diseases are hurting production. Pesticides and untreated wastewater runoff are also hurting agriculture.

In terms of water conservation and management, farmers seem amenable to using treated water to irrigate crops that are not consumed by people such as animal fodder, landscaping, or forests. Because the water of much of the Jordan Valley is very brackish or salty, the private sector has installed 20-30 small reverse osmosis desalination plants. Like tourism development and urbanization, agriculture is directly linked to the water resources of the Jordan Valley.

4.5.1 Sector Characteristics

The agriculture sector in Jordan directly contributes 4.5% to GDP, according to the Ministry of Planning and Central Bank of Jordan, 2000, but contributes 29% indirectly to the economy. The sector employs 7% of the workforce. The periodically rain-fed highlands and the irrigated Jordan Valley are the two primary areas for agricultural production. Agriculture consumes 70% of Jordan's water resources, with a total irrigated area of 84,300 hectares or 843,000 dunums, of which 30,300 hectares are in the Jordan Valley.

As detailed above under the section on water, irrigation competes with drinking water for expanding municipalities and tourism development. Irrigation also competes with water supply for other forms of industry including the large Dead Sea industry of potash production. The JVA managed irrigation system uses mostly surface and reclaimed water via Wadi Zarqa through the King Talal Reservoir and the KAC. Sources of surface water are supplemented by treated wastewater which has a high salinity level. Some crops do not grow well on saline soils, as the salt concentrations draw water away from the plant roots and towards the salts. This reduces the amounts of water the plants can take in from the soil. There are about 195 privately managed agricultural wells in the JV and Southern Ghors. Finding new supplies of water is neither technically nor financially feasible.

Recently, the Ministry of Agriculture in collaboration with the private sector launched a five-year strategy to develop the country's olive potential. According to the strategy, the olive industry will work to increase rain-fed areas with olive trees, while reducing the size of irrigated lands. Farmers will be introduced to new technologies in planting olives and in producing olive oil to international markets, a high value crop. While the world market for olive oil increased, revenue in Jordan decreased. In the 1990s, the market stood at 100 million JD, but from 2002-2004 revenues dropped by 50 percent. Across the country, 14 million olive trees are planted, including many in the Jordan Valley.

4.5.2 Cropping Patterns and Water Usage

The government has encouraged intensive fruit and vegetable production in the Jordan Valley for local and export consumption, and has encouraged cereal and fodder production in the highlands in an effort to reduce imports. The cropping pattern in the Jordan Valley is predominately vegetables (127,200 dunums) and fruit trees (81,709 dunums). Most popular vegetable crops are tomatoes, cucumbers, potatoes, squash, onions, eggplants, peppers, melokhia, and beans, and the most common fruit crops are citrus followed by bananas. Citrus farmers used 35% of the JV water, and banana farmers used 21%, for a total of 56% of the total water consumed in the Valley.

Due to lack of rainfall and fluctuations, highland farmers are one of the poorest groups in the country. In the Jordan Valley, although water is a serious constraint to future production, irrigation costs to farmers are low. Farmers who receive surface water pay only the cost of delivery. For groundwater, farmers primarily pay for pumping. Wells are permitted and metered, but enforcement of water quantity is weak. There is little incentive to employ water conserving technologies or to produce a high return per cubic meter of water. Charging farmers higher fees would increase their incentive to produce less water intensive crops, but farm expenses would be higher and initially income would decrease. Politically and socially this is a solution that requires patience and long-term vision for implementation.

Irrigation has produced relatively good crops for local markets and fruits and vegetables, most of which are from the Jordan Valley, account for 79% of total agricultural production. Agricultural exports contribute to 12.1% of total exports, of which fruits including citrus and vegetables make up 61.4% of agricultural exports. However, insufficient and ineffective marketing and an inability to meet the standards of international export markets have created overproduction and lower profits, particularly for small to medium farmers. The Jordan Exports and Producers Association for Fruits and Vegetables, a private association, identified four constraints to profitable export. These include:

1- A traditional business mentality that is resistant to change and dominated by short-term planning, including disorganization, limited promotional budgets, and no effective lobby to influence decision-makers;
2- A lack of training and information to inform producers about foreign markets and standards, that is necessary to compete internationally;
3- Unfavorable government policies that regulate prices with little interest in trade initiatives and in changing a monopolized or expensive and limited transportation network;
4- A low level of post harvest technology, limited facilities, and poor practices that diminish product quality.

Changing trade policies offers opportunities for conservation. Current protectionist tariffs on imports protect Jordanian farmers who produce citrus and bananas against international competition. Particularly bananas would probably not be grown in Jordan if it weren't for the tariffs. (The tariff rate on bananas is 30% plus JD 250 per ton, and the rate on oranges, lemons, melons, and strawberries is 35%.) Again, this is a politically difficult solution that requires not only vision, but also government guarantees that replacement crops will have definite markets. But the result could be a cropping pattern that is less water intensive, more competitive, and more sustainable and thus profitable to farmers in the long-term. Proper water usage along with proper crop selection might actually increase agriculture's contribution to the economy while decreasing water consumption.

There is ample opportunity for improved irrigation efficiency and use of less water intensive crops through training and identification of appropriate export markets. In addition, the example of Western US water banks could be utilized, i.e., farmers could be offered a payment to give up part or all of their water allocation permanently or annually. The payment would compensate for loss of income due to changes in cropping patterns. In addition, in critically dry years water could be better controlled. A prerequisite to success is a clear understanding of water rights.

12,000 years ago the Jordan Valley or Ghor was covered by meadows including wild cereals. Now almost the entire ghor is cultivated, except for the eroded high angled fans that are grass and shrub covered and the southern desert. Intensive agriculture is found on loamy, silty, and clay alluvial fans on which a range of crops and trees are grown through drip irrigation.

However, the Jordan Valley is dependent upon rainfall, which ranges between 50 and 600 mm/year, with concentration in the upland areas. Surface water resources provide 575

MCM/year, mainly from the tributaries or side wadis of the Jordan River, and the Yarmouk River, which is shared with Syria and Israel. (Jordan's share from the Yarmouk is 100 MCM/year, as is Israel's, while Syria receives 170 MCM/year.) Other small contributors include Wadi Arab Dam, Wadi Jurum, Ziglab Dam, and Wadi Yabis.

Groundwater resources from renewable springs and fossil water reserves account for 275 MCM/year. Available water resources total 850 MCM/year, but demand exceeds that amount at 1,000 MCM/year. With dwindling water resources from surface and groundwater sources, and a rainfall evaporation rate of 85% into the atmosphere, water intensive agricultural crops must be analyzed. Water quality has altered considerably during the last decade. Due to improper agricultural practices, crop and soil productivity is facing a critical environment, requiring that if agricultural land use is to remain, cropping patterns must change to less water intensive crops.

Changes to cropping patterns require technical and political support. One solution is to maintain a limited amount of the traditional water intensive crops that are important to local consumption and have high value and strong markets, such as tomatoes, melons, citrus and banana, while at the same time change to less water intensive crops and crops that are more tolerant of salt in irrigated water. Such crops include green fodders (alfalfa), wheat, mangoes, maize, avocadoes, early seedless grapes, and asparagus, as well as plants and trees (dates, olives, pistachio, almonds, sunflowers, grasses) and aquaculture or fish farms. Revised cropping pattern recommendations under the Jordan Valley Preliminary Land Use Plan are based on water quality and quantity and soils (type, salinity, topography). The study also took seasonality and market value into account (both local and import markets).

With regard to existing cropping patterns, most of the Jordan Valley's plantations are in the Northern and Middle Study Areas. The Upper Ghor in the North, which is the area below the Yarmouk River to Kraymeh, receives high quality (non-saline) water from rainfall or the Yarmouk River, and its soils are non-saline of deep, medium, and fine texture and moderate slopes. Within the first part of the Upper Ghor, from Addasiya to Ziglab Dam near the village of Wadi Rayan, citrus is the main crop, including mandarin, clementine, and lemon, some of which have replaced banana fields. Some citrus could remain for Jordanian consumption, with improved proper high efficiency drip irrigation (i.e., that puts water where it is needed and reduces evaporation). However, citrus requires a high water demand averaging 1,000 mm per growing period, while other fields could be gradually replaced with less water intensive and more climate tolerant crops. These include:

- seedless grapes (500 mm per growing period),
- olives (600 mm per growing period),
- wheat (435 mm per growing season), and
- avocadoes (650 mm per growing season), the latter being an especially high value export crop with proper marketing.

South to Kraymeh, about 17.5% of the land is used for vegetable production in open fields, and the primary traditional crop is tomato. Very little of the land is planted in eggplants, peppers, and potatoes. Some olive trees and wheat are also planted. The JVA has already limited the expansion of citrus in this area. In addition to the olive trees and wheat already planted in this area, the water intensive tomatoes should be replaced with lower water usage crops with which farmers are familiar, including potatoes or broadbean/corn or spinach/squash crop rotation patterns (to allow for year-round growing seasons) and perhaps avocadoes. Agricultural extension agents might also encourage farmers to grow less water intensive types of broadbeans, which are available:

- potatoes (can be grown year round with water demands varying between 200-650 mm depending on the season).
- broadbean/corn (400-600 mm)
- spinach/squash

- avocadoes (650 mm per growing season), high value export crop with proper marketing; and the Fuch-20 variety tolerates salinity.

The Middle Ghor has water resources that vary dramatically from the non-saline King Abdullah Canal (KAC) water to the saline water of the King Talal Dam (KTD) to an area that is fed with mixed water. At the KAC zone, vegetables under green houses (tomatoes and cucumbers) represent the primary agricultural use. From Kraymeh south to Maghtas, the water quality changes dramatically from fresh to saline due to treated wastewater from the King Talal Dam. Near Deir Alla village, the water and soil are very saline; therefore, the cropping pattern in this area is of low productivity and dominated by barley and wheat crops in addition to small greenhouse vegetables. South to Karamah village and Maghtas, the saline water of the KTD is mixed with the fresh water of the Yarmouk River to reduce salinity, and is being used to irrigate open fields of vegetables and large citrus and date palm farms owned by the Ministry of Agriculture, the University of Jordan, and the Royal Family.

Less water intensive and saline tolerant cropping patterns for the KAC zone of the Middle Ghor that could be planted in the future include:

- squash or zucchini (370-600 mm depending upon the season),
- asparagus (450 mm, also a high value export),
- artichokes (450 mm, also a high value export).

Less saline tolerant but traditional crops with strong local markets that are less water intensive if planted under greenhouses include:

- eggplant,
- onions,
- cucumbers (200-600 mm).

Suggested low water, saline tolerant crops for the KTD Zone and the Mixed Zone of the Middle Ghor include:

- barley (438 mm),
- wheat (435 mm)
- safflower (550 mm)
- date palm (water demand greatly varies – less if soil isn't saline)
- Xeric grasses, such as sudan, silver beard or others
- aquaculture or fish farming (can be quite saline tolerant)

(If the KTD water quality was improved, olives, mangoes, avocadoes, and asparagus could also be planted in this area, as they are moderately saline tolerant and of high export value.)

The Qatar, a thin strip of outcropped calcareous marls running along the Jordan River from north to the Dead Sea, has soils that are highly erosive and saline, which require extremely expensive drainage systems. Therefore, this area is recommended as a protected area for wild plants, saltgrass, barley and wheat, and nature based tourism.

Non-traditional but export friendly desert crops such as sorghum, herbs for traditional medicines, sunflowers, tomatillos, beans, chiles, and cotton might be explored by agricultural extension agents in the future.

The Zor is composed of a narrow flood plain of the Jordan River that extends for 65 square kilometers from the Yarmouk River to the northern edge of the Dead Sea. The northern part receives higher rainfall (400 mm) and there are currently olive and citrus groves in production. The soils are also suitable for rain-fed crops like wheat and barley. The middle area receives about 250 mm of rainfall annually and is more saline, and should be used for

barley, oat, sorghum, wheat, rye, ornamental grasses (salt grass and wheat grass), and fish farming.

The Middle Study Area extends from As Shuna north of the Dead Sea, encompassing the Dead Sea, and running north of Wadi Araba. To the west of the road are numerous banana fields (33.5%) and vegetable fields (37%). Those farms depend upon groundwater resources for irrigation, but this well water is becoming increasingly saline or brackish. Water is also supplied by Kafrein Dam and Wadi Hisban, and farmers pump water directly from the KAC, which receives water from Shueib Dam. Only 10% of the cropping pattern is low water usage, salt tolerant barley and wheat fields. Citrus crops are 6% and olives are 4.5%.

In terms of changing the cropping pattern, the banana fields and citrus should be replaced by date palms, figs, barley, wheat, oat and sorghum fields.

The Dead Sea area is comprised of sandstone ridges and cliffs. Rainfall is very low, and the combination of steep gradients, stony and coarse textured soils, and saline water renders most of the area unsuitable for irrigated agriculture and supports mainly Xeric and salt tolerant crops such as barley, wild rye, grasses (saltgrass and wheatgrass) and shrubs (retama, daphne, and noea). Much of the area has already been planned for tourism development, and care must be taken with nature based tourism in the erosive and sink hole dotted Lisan area.

The Ghor Safi area south of the Dead Sea, associated with Wadi Mujib, also experiences very low rainfall (50-80 cm annually) and high to moderate salinity of soil and water. Although this area is currently cultivated by a scattering of high water demand vegetables fed by groundwater and irrigated from private wells, the soils are not suitable for rain fed crops. The steep slopes and stony soils are only marginally suitable for tree crops. In terms of agriculture, acacia trees for wood production and Xeric native ornamental crops could be planted.

South of Safi in the Wadi Araba there are some fine textured and less stony saline soils. Citrus and other tree crops have been attempted with limited success, and some fields have been abandoned. Natural vegetation occurs only around springs. The most appropriate land use is nature based tourism with limited crops of low water usage oat and wheat and Xeric grasses such as saltgrass, wheatgrass, and wild rye.

Farther south the central section of Wadi Araba is called the Rischi, a Beduoin region which consists of undulated gravel hills and gently sloping alluvial fans. The soil has moderate to high salinity, and is recommended for the primary land use of nature based tourism. There are small scattered areas of ornamental grasses that grow naturally, and grass production is recommended.

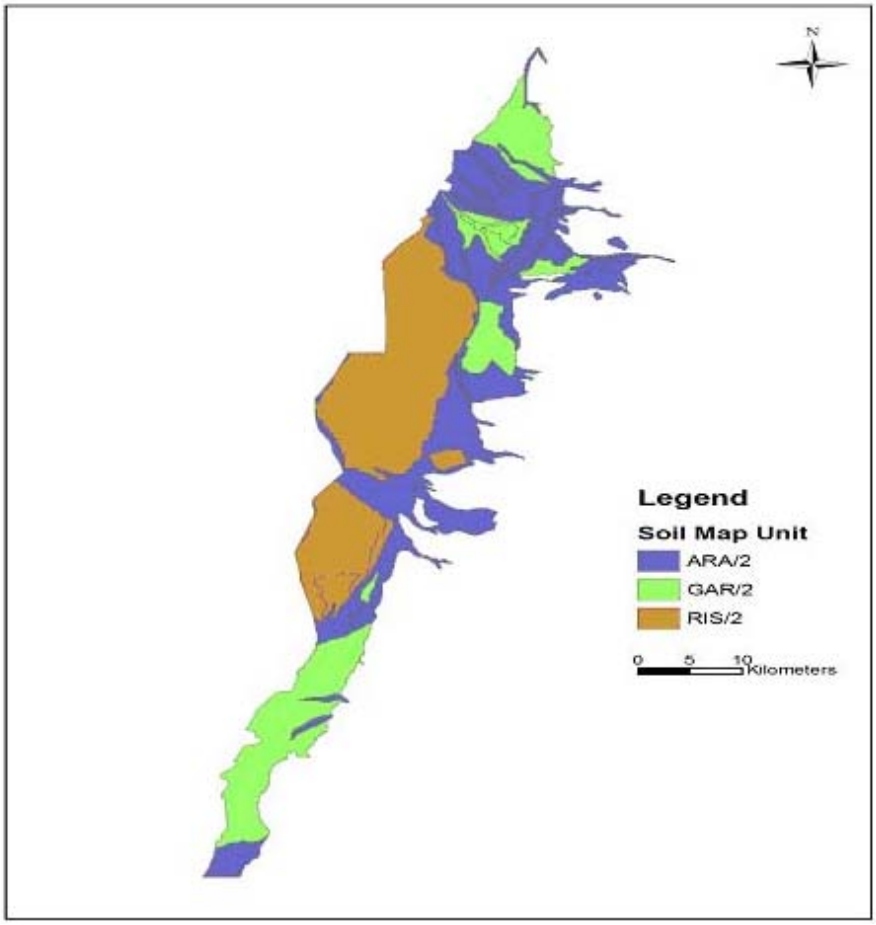


Figure 27: Soil Map Units of Wadi Araba

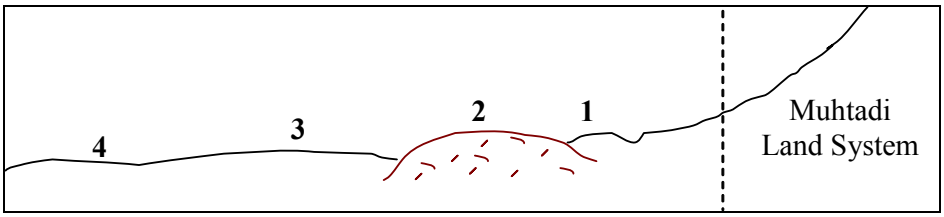


Figure 28: A Cross Section of the ARA Map Unit

Farther south to the Gharandal area, rainfall is less than 50 mm annually and vegetation is sparse. The major water resource in the area is from private wells. The area is comprised of Aeolian sands and dunes. However, the soil has low to moderate salinity and suitability for drip irrigation, and date palms could be grown as could barley, turfa, retama, and wheatgrass, if water resources are available. The primary land use should be nature based tourism.

4.6 Industry

4.6.1 Sector Characteristics

As mentioned under the stakeholder interviews, there are a number of other industries in the Jordan Valley, primarily in free zones or for mineral extraction and processing. According to the Harza Jordan Rift Valley Sector Study of 1997, a lot of land use planning has been done

on industrial plant locations in the Jordan Valley and Aqaba. For purposes of land use recommendations, it is important to understand whether those plants were actually built, are operating successfully, and are providing jobs for Jordan Valley residents, in order to make recommendations for additional industrial plant locations.

In the Jordan Valley, Harza recommended the following plant types and locations:

- Expansion of the (Jordan) Arab Potash Company (JAPC) potassium production at Safi (occurred);
- Development of a new magnesium oxide plant utilizing brine from the existing potash operation, adjacent to the APC at Safi (built);
- Development of a rubber lining plant at Safi (status unknown);
- Expansion of the Amiantit Plastics plant at Mazar (status unknown);
- Development of a specialist foundry and glassware plant using silica sand at Wadi Araba (not built);
- Development of quarry processing at Wadi Araba for ornamental and decorative stone (not built);
- Development of animal feed from tomato pulp at the AMPC tomato processing plant (built).

Although Aqaba is not in any of the Study Areas, it is close enough to impact market conditions. Development of Aqaba plants that were identified as logical by the Harza Study include the following, although the status of most is unknown:

- Potassium sulfate as a fertilizer plant with the by-product of animal feed, to be located near the Fertilizer Export Jetty in Aqaba, to be built by the Dead Sea Industries Company (built as detailed below under Kemira Arab Potash Company);
- Expansion of the Aqaba Free Zone to the north and of industrial parks (occurred);
- Plant to rewind high voltage electric motors (Asean Brown Boveri) and produce small parts;
- Fertilizer plants (Nippon Jordan Fertilizer Company);
- LNG regassification plant (Enron – shelved);
- Gypsum board plant, using waste gypsum produced by the DAP fertilizer plant (Pella Trading);
- Cold storage facilities (built);
- Engine reconditioning plant; and
- Composting plant to assist in crop production.

4.6.2 Industry Operating in the Study Areas

Middle Study Area and Dead Sea Plants

In addition to the following potash related plants, the Dead Sea Chemical Complex, the Duena Zement Batching Plant and the El Shidiya and Al Hassa phosphate mines operate in the Middle Study Area. The phosphate mines and travertine quarries are located on the maps as industrial sites.

Jordan Arab Potash Company (JAPC)

Of the industries operating in the Jordan Valley, the largest by far is the Jordan Arab Potash Company (JAPC), which operates at the southern edge of the Dead Sea at Safi. The company mines potash, magnesium, bromine, and their derivatives, using its own well water. It was established in 1956, and has two plants operating on the Dead Sea. JAPC sold 1.96 million

tons in 2002, worth approximately $200 million. India was the largest importer (521,000) tons, followed by Malaysia (157,000 tons), Indonesia, Philippines, Korea, Spain, Italy, and Finland. Staff training is an important part of the company's operations, and 1,965 employees took training courses in 2002.

JAPC is the world's fifth largest potash producer, and employed 2,195 people at the end of 2002 (see Table 29). At Safi, employees included 1,717 plant workers, 175 housing staff, and 48 medical staff. In addition, 91 staff were employed at the Aqaba terminal, and 164 staff were employed in the head office in Amman.

Table 29: Number of Employees at the Jordan Arab Potash Company

Location	Number of Employees	Percentage
Plants/Safi	1,717	78.22
Housing/Safi	175	7.97
Medical Services/Safi	48	2.19
Aqaba Terminal	91	4.15
Head Office/Amman	164	7.47
Total	**2,195**	**100.00**

Table 30: Labor Force Distribution at JAPC by Discipline and Education

Qualification	University	Community College	Tawjihi	High School	Junior High School	Total	Percentage
Doctors	6	0	0	0	0	6	0.27
Medical assistants	3	7	7	5	2	24	1.09
Engineers	212	0	0	0	0	212	9.66
Chemists	19	13	0	0	0	32	1.46
Administrative	104	53	59	46	35	297	13.53
Accountants	46	7	1	0	0	54	2.46
Technical	24	342	121	141	175	803	36.58
Semi Skilled Technicians	1	4	14	91	134	244	11.12
Unskilled Technicians	0	3	4	26	54	87	3.96
Drivers	1	3	14	50	250	318	14.49
Firemen	0	0	4	7	17	28	1.28
Guards	1	1	4	7	44	57	2.60
Daily Labor	0	0	0	2	31	33	1.5
Total	417	433	228	375	742	2,195	100.00
Total Percent	19.00	19.73	10.39	17.08	33.80		100.00

JAPC grants housing loans to its employees, and also provides housing in the company town called "Safi" **,** which is located on the slopes to the east of the potash plant.

Unfortunately, although the potash industry is a solid revenue generator and major employer, the environmental impact of the potash industries has been significant on the Dead Sea, and it is a contributor to the lowering of the water level. According to the Harza Study, the potash industry is concerned that, if the Red to Dead Sea Canal was implemented, raising the sea level could cause collapse of the dikes containing the evaporation ponds. Changes to the Dead Sea might also cause shifting of the pumping stations, but it might also reduce the cost of pumping. Mixing of Red and Dead Sea water could cause gypsum and calcium to "whiten," and a slower rate of evaporation could prolong their production cycle and reduce output.

There are five companies in the Jordan Valley and one at Aqaba with activities related to the potash industry, and JAPC owns various shares in those companies ranging from 20% to 55%. The companies include:

- **Jordan Dead Sea Industries Company (JODICO)**

  This company was established in 1994, as a holding company with share capital of 60 million JD, of which 51% was owned by Jordan Arab Potash Company.The objective was to oversee the activities of investments and the establishment of non-potash downstream Dead Sea industries. JODICO then established two plants listed below: the Jordan Safi Salt Company in 1996 and the Jordan Magnesia Company in 1997. In 1998, JODICO's holding status was changed, enabling them to participate in establishing the Jordan Bromine Company in 1999.

- **Jordan Safi Salt Company (JOSSCO)**

  Jordan Arab Potash Company (JAPC) owns 24.2% of Jordan Safi Salt Company, which was established in 1996. The company has incurred significant losses despite lending and guarantees from Arab Potash for 15 million JD. Under liquidation procedures, Arab Potash acquired JOSSCO for 8 million JD. The new company will be operated and managed by JODICO on behalf of JAPC.

- **Jordan Magnesia Company (JMC)**

  Established in 1997 with share capital of 30 million JD and 55% ownership by JAPC, the plant at Ghor Safi was constructed in 1999. It produces 50,000 tons annually of magnesium oxide, which is purchased by the fire brick industry. It also produces 10,000 tons annually of magnesium derivatives and magnesium hydroxide. Investment in this company is expected to more than double over the coming year.

- **Numeira Mixed Salts & Mud Company (NMSMC)**

  Established in 1997, the goal of the company is to package and distribute cosmetic salts and mud from the Dead Sea. Jordan Arab Potash Company owns the majority shares (52.7%) of 1.5 million JD in capital. In addition, JAPC's employee savings fund owns 32.7% of the shares.

- **Jordan Bromine Company (JBC)**

  This company was established in 1999 with share capital of 30 million JD, following the signing of a joint venture agreement with Albemarle Corporation of the US, which provides the technical and marketing expertise JAPC and Kemira Company of Denmark each own 50% of this company. In 2002, JBC increased the share capital by 19.4 million JD, for a total of nearly 50 million JD, and investment is expected to reach 89 million JD.

  The intention is that JBC will construct a plant in Ghor Safi for the production of bromine, calcium bromide, sodium bromide, and hydrogen bromide. They will also construct a plant to produce chlorine, hydrochloric acid, potassium hydroxide, and tetrobromo besphenol.

- **Kemira Arab Potash Company (Aqaba)**

  JAPC and Kemira Company of Denmark also own this plant equally, each with 50% of the shares. The joint venture was established in 1999 with share capital of 29 million JD. Capital investment is expected to reach 80 million JD. The plant commenced production in 2002, and produces 150,000 metric tons annually of potassium nitrate (fertilizer) and 75,000 metric tons of di-calcium phosphate (animal feed).

Northern Study Area

The Northern Study Area has a number of small operations. According to the photo survey, the following industries exist in the northern part of the Jordan Valley:

- the Wadi Rayyan Free Zone, between Pella and Karamah. The only operating factory within this zone is a gold/jewellery factory.
- the AMPC Tomato Paste Factory which was built with USAID funds is also idle.
- the Pella Trading Gypsum Board plant;
- the Indian Jordanian Chemical Company;
- Insustrong Polystyrene Factory south of El Arda;
- the smaller polystyrene factory between Sleikhat and Karn;
- the Jordan Plastics Factory at Facku Rama;
- and the Jordan Fertilizer Company north of Arda; and
- the Travetine Company Ltd. (TRAVCO) located in the Middle Jordan Valley at Fanoush - Ghor Damia.

Other plants include small stone quarries, cement production, pumps, tubes, pipes, textiles, leather, furniture, paper, printing, chemicals, metals, mechanical and electrical equipment, and transport.

Table 31 illustrates employment data from three of the larger plants that operate in the northern Jordan Valley. In order to be employed by any of the three, the majority of employees must be skilled laborers. Nearly 100% are Jordanians and the clear majority live in the Jordan Valley. So these plants are a good source of employment for Jordan Valley residents IF they are skilled, making vocational or other training programs important.

Table 31: Employment data from three plants representing industries within Jordan Valley

		Middle Ghor Industrial Company (Polystyrene Plant)	Travetine Company Ltd. (TRAVCO)	Agricultural Marketing and Processing Company of Jordan (AMPC)
Year of Establishment		1985	1999	1982
Area	Owned	10	24	115
	Rented	0	600	0
Employment by Skills	Management	20	9	22
	Skilled	15	53	56
	Unskilled	5	0	24
	Total	**40**	**62**	**102**
Employment by Nationality	Jordanians	40	61	102
	Non Jordanians	0	1	0
Employment by Residency	JV Residents	39	42	80
	Non-JV Residents	1	20	22

Southern Study Area

There are no known industrial plants operating in the Southern Study Area.

4.7 Tourism Resources

On a global scale, in 1950 there were 25 million tourist arrivals. Today there are more than 700 million arrivals, a figure that is projected to double by 2020, with nature based tourism as one of the fastest growing segments. According to UNEP, between 1990 and 2000, tourism has increased by more than 100% in the world's biodiversity hot spots. In countries with few natural resources, preservation and promotion of scenic assets, history, and culture can provide strong, positive impacts on development. Tourism is very labor intensive, provides foreign exchange earnings and government revenue, and produces a multiplier effect, i.e., growth of other domestic industries, such as construction, transport, agriculture, food processing, handicrafts, and financial services. Although tourism is still a key economic driver in Jordan, it continues to be negatively impacted by regional political unrest.

Jordan's increasingly diversified tourism market, and increasing image as an all-purpose destination, is an important source of foreign exchange revenue. When the region stabilizes, it is anticipated that Jordan's record of approximately one million tourists will double to two million tourists, bringing nearly $1 billion in income. Clearly, tourism can either be a very positively or negatively impacting industry, i.e., it can either provide opportunities for conservation and employment or be a threat to the country's resource base, social fabric, historic and cultural heritage, and natural landscape. The Preliminary Land Use Plan supports increased product diversification for poverty reduction and economic development to benefit JVA and local communities, hand-in-hand with human resource development and training. Through stakeholder participation and policy recommendations, it also intends to provide Jordan Valley residents with increased environmental and cultural awareness and a sense of national and local identity and pride.

Most of the residents of the Jordan Valley live under difficult economic conditions. Tourism can improve the standard of living of the local population by offering work opportunities to enhance their quality of life. Thus, it becomes important for the tourism industry to "hire and buy locally,"or to give local people top priority in filling the need for construction workers and service based employees. Local people will have an advantage if they are trained with service-related skills, and the land use plan provides institutional land to accomodate training facilities.

According to the focus groups, local people believe that tourism will generally benefit their communities. Many participants recommended training and agro-processing and handicraft centres where they can learn to produce products that will supplement their incomes. The following items were suggested to be produced and sold to tourists and visitors: agro products (jams, honey, olive oil, spices, etc.), straw or wool carpets, straw baskets and brooms, woven and knit products, and banana leave baskets. At the macro level the multiplier effect of foreign currency inflow will revive or strengthen various economic sectors, including services, transport, and agriculture.

4.7.1 Sector Characteristics

Jordan is one of the faster growing economies in the Middle East, having achieved a 5% growth rate in 2002 and a 3.5% growth rate in 2003. Massive investments in tourism, particularly in the Jordan Valley at the Dead Sea and at Aqaba, are underway, and tourism currently contributes to 10% of Jordan's GDP.

In the Jordan Valley, local picnicking, health based/spa tourism, hiking, and cultural heritage (including religious) tourism were established a few years. The existing resource base is being developed to strengthen health based tourism, including international standard hotels on the northern edge of the Dead Sea and a spa in the northern part of the Jordan Valley.

Jordan has been conscious of the fact that it makes business sense to be environmentally aware for successful tourism development, and the Royal Society for the Conservation of Nature (RSCN) is making great strides in expanding the nature based segment, including establishment of protected areas. In the Jordan Valley, those areas include reserves with visitors centers/camp sites, such as at Mujib, and IBAs running from Yarmouk to Aqaba.

MOTA and DOA have been conserving and improving Jordan's primary cultural heritage sites outside the Jordan Valley for years, including Petra (World Heritage site), Wadi Rum, Karak, Showbak, Madaba, Umm Rasas (recently nominated as a World Heritage site), Jerash, and the Desert Castles (including the World Heritage site of Quseir Amra). Inside or on the edge of the Jordan Valley, MOTA is conserving and promoting a number of sites and providing visitor facilities including the Dead Sea Panorama Complex, Jesus's Baptismal site on the Jordan River in the MJVSA (projected to receive 10,000 pilgrims), Umm Qais (just outside the border), Pella in the NJVSA, and new projects at Lot's Cave near the Dead Sea including a museum and Fidan in the SJVSA. The cultural heritage tourism segment is also being strengthened.

According to the Jordan's Export Finance Bank, "Tourism Sector Report," between 1993 and 2000, prior to 9/11, tourist arrivals in Jordan increased by 84% to reach 1.4 million in 2000. The majority of the arrivals were from the Middle East (52%). Europeans comprised 23%, while 10% were from Israel, 9% from the Americas, and 4% from Asia (primarily Indonesia and Japan), with 2% not indicated. Total tourism receipts reached $743 million in 2000 or 8.5% of GDP. From 1997-2000, US $500 million was invested in tourism projects. In 2000, the tourism industry employed 21,515 people, and of that number 40% were employed by hotels.

Despite this impressive growth, however, even prior to 9/11 Jordan's growth in arrivals was high for the Levant but low for the Middle East, with arrivals lower in Lebanon and Syria but much higher in Cyprus, Israel, Dubai, and Bahrain. Compared with other Moslem countries, while arrivals increased by 8% in Jordan, the number in Morocco increased by more than 20%. In Egypt, the number increased by 40%. Part of this is based on promotional expenditures. In 1999, Israel spent US $36 million on marketing and advertising, while Egypt spent $40 million. In comparison, Jordan spent $4.3 million.

In 2001, tourist arrivals rebounded to reach 1,477,697 visitors, and the number in 2002 was even higher than the 2000 figure at 1,586,608 visitors (see Table 32). Total revenue, however, was less than the year 2000, with receipts at $496 million in 2001 and $557 million in 2002. The average length of stay between 2001 and 2002 decreased, from 4.6 nights to 4.3 nights. Althouth there are still no hotels to speak of in the northern part of Jordan, there was a steady growth in the number of hotel rooms throughout the country from 16,885 in 2001, to 17,400 in 2002, to 19,698 in 2003 (see Table 33).

On the positive side, with regard to jobs, the number of employees in the tourism sector slightly increased from 21,515 in 2000 to 22,110 in 2003, most of whom were Jordanian and male (see Table 34).

Table 32: Tourism Supply and Demand Profile for 2002 compared to 2001

	2001	2002	% Of increase
Number of visitors	1,477,697	1,586,608	7.370
Total Revenue (JD)	496,100,000	557,030,000	12.282
Average Length of Stay (night)	4.6	4.3	(6.522)
Number of classified hotels	296	310	4.730
Number of Hotel Rooms	16,885	17,400	3.050
Number of Beds	31,948	32,658	2.222
Number of Employees	10,893	9,928	(8.859)

Table 33: Accommodation in Jordan, 2003

Classification	Number	Rooms	Beds
5 Stars	19	4,757	7,915
4 Stars	20	2,527	4,917
3 Stars	40	2,852	5,675
2 Stars	51	2,083	3,995
1 Star	65	1,529	3,089
Sub Total	195	13,748	25,591
Hotal Apart. $ Suites	115	3,845	7,444
Unclassified Hotels	144	1,890	4,384
Camping	3	203	428
Motel	1	12	12
Total	**458**	**19,698**	**37,859**

Table 34: Number of employees in tourism sector by nationality and sex, 2003

Activities	Jordanians	Non-Jordanians	Female	Male	Total
Travel Agencies	2,621		676	1,945	2,621
Tourist Restaurants	3,713	1,111	296	4,528	4,824
Night Clubs	388	266	172	482	654
Cafeteria	569	222	37	754	791
Pub Restaurant	75	23	16	82	98
Classified Hotels	8,807	507	504	8,810	9,314
Unclassified Hotels	341	54	18	377	395
Hotel Apartment & Suites	663	127	66	724	790
Horses Guides	353			353	353
Tourist Guides	547		16	531	547
Tourist Transp. Comp.	498	1	17	482	499
Tourist Shops	296		17	279	296
Rent- A-Car Co's	928			928	928
Total	**19,799**	**2,311**	**1,825**	**20,275**	**22,110**

4.7.2 Tourism Supply

As the above charts indicate, nationally, the number of hotel rooms (classified and unclassified) to currently accommodate approximately 1.6 million visitors has increased since 1997 (12,109 rooms in 1997 and 19,698 in 2003), particularly in Petra and Amman where hotels were over-built. This compares with Dubai, which has a thriving tourism industry with primarily urban, high-rise hotels. However, their total number of hotel rooms is 30,000 with 272 hotels, to accommodate five million visitors. While hotel supply has increased, at the same time the average length-of-stay to Jordan decreased (from 4.6 to 4.3 days).

In 1997, the "Jordan Rift Valley Master Plan" by The Harza JRV Group indicated that one of the primary problems in the northern part of the Jordan Valley is a lack of tourist accommodation and investment in hotels. While there is a surplus of rooms in Wadi Mousa (Petra) and Amman, there is a shortage of good hotels in northern Jordan and the north part of the Jordan Valley, which contributes to the reduced length-of-stay, as tourists must travel back and forth to Amman to visit premier sites such as Umm al Jimal, Jerash, Umm Qais, and Pella.

With regard to the Middle or Dead Sea Study Area, in 1995, a JICA Study by PADECO predicted the need for 2,200 hotel rooms at the Dead Sea by the year 2010.

Under the Harza Master Plan, development of Suweimah and Zara in terms of bed units was projected at 24,000 bed units including campsites and residential units. The figure of 12,000 per area was divided into 4,000 for hotels of mixed classifications, 4,000 for tourist villages, and 4,000 for holiday housing. Excluding 8000 units of housing, the remaining 16,000 bed

units for hotels and tourist villages would equal 8640 hotel rooms or 34 hotels at an average of 250 rooms per hotel. Harza also projected 9,700 jobs as a result of this development. In relation to this, Harza stressed the need for a Dead Sea Tourism School to employ approximately 50 local people and to train about 1,500 persons per year. (Training facilities are also recommended under the Study Team's land use plan.)

In 1998, the Sigma Master Plan for the Dead Sea estimated that 33,000-34,000 total bed units (not rooms) could be developed. There is conflicting information on whether or not this meant 24,000 hotel bed units or a lower figure of 20,000 hotel bed units. Using the above ratio of bed units to hotel rooms, the number of hotel rooms to accommodate 20,000 bed units is 10,800. Using an average of 250 rooms per international class hotel, that would be a total of 43 hotels (see Table 35). (The total number of hotel rooms in Washington, DC, which serves a vast tourism market is only 25,000.)

Table 35: International Donor Study Projections for Hotel Supply at the Dead Sea

Study	Number of Rooms by 2010	Number of Bed Units (@54% ratio)	Number of Hotels (@250 rooms/hotel)
PADECO/JICA	2,200	4,200	9
Harza/W. Bank	8,640	16,000	34
Sigma/JVA	10,800	20,000	43

In terms of actual conditions, since 1998, one hotel was existing on the Dead Sea shoreline (Dead Sea Spa) and the Jordan Valley Authority has approved the following new developments of approximately 3400 rooms including 12 hotels plus the Mujib Reserve Campsite. Interpreting the data, that means that the currently approved hotels and rooms, as of 2004, exceed JICA's projections for supply to 2010. In order to build to Harza's or Sigma's projections at 4 story hotel heights, either the entire shoreline would be covered with a dense build-out of hotels or many of the hotels would have to be placed in the rock outcroppings across the road from the Dead Sea.

In terms of built supply, by the end of 2004, there will be a total of four hotels and 1,081 hotel rooms operating on the northern end of the Dead Sea. They include:

1- 4 star Dead Sea Spa (the oldest hotel on the shoreline), operational with 100 rooms, restaurant, café, Beduoin tent for parties, Dead Sea Medical Center, fitness center, business center, outdoor pool and tennis courts;
2- 5 star Movenpick Dead Sea Resort & Spa, operational with 340 rooms designed in a two story village complex with the Sanctuary Zara Spa, three restaurants and café, pools and tennis courts;
3- 5 star Jordan Valley Marriott Resort & Spa, operational with 191 rooms, 10 meeting rooms, a spa and fitness club, and indoor/outdoor pools and tennis courts;
4- 5 star Kempinski Ishtar Resort Hotel and Spa, to be operational in 2004 with 450 rooms including long-term stay apartments for spa patients, restaurants, etc.

The Jordan Valley Authority and other entitities have contracted with other investors who plan to develop additional hotels in the area for a projected total of 1,702 more rooms, as detailed below. They include:

1- Bella Vista (or Bellvista?), a $60 million investment to be developed by a subsidiary of Wimberly Allison Tong & Goo with 250 rooms and 30 apartments, expected to be operational by 2007;
2- Sharm, to be developed by an Egyptian company, with 320 rooms;
3- Crowne Plaza, Social Security, with 420 rooms;
4- Holiday Inn, Social Security with 102 rooms;
5- Cham Palace Tourist Village (Social Security Corporation), unknown # of rooms, probable minimum of 150;
6- ACCOR/Novotel Hotel with an unknown number of rooms, 250 rooms;

7- Sunday Company Hotel with 180 rooms.

In addition, farther down the coast near Zara, a large area of land (146 dunums) has already been negotiated for $2.5 million JD to a development called Crystal City, a UAE investment by Dubai Pearl and OMNIX, which projects 600 rooms and chalets, restaurants, and pools, at a $110 million investment. MWI hopes that the job will create 500 jobs. This 12th hotel is to be built by 2007. Farther down the coast at Zara there is discussion of an additional resort. Thus, as mentioned above, a total of 12+ hotels with at least 3,383 rooms, plus the Mujib Reserve Campsite, is currently approved for the shoreline of the Dead Sea.

Also developed along the shoreline is the Amman Municipality's Beach, and a second public beach area is planned. Although the concept of a public beach offering affordable local tourism to avoid high hotel fees is an excellent one, the Amman Beach is perhaps over-developed, including the beach itself. Lighting should be set back from the water. Beaches are more attractive and more useable if in a more natural state, such as the many beaches of the Gulf states from Dubai through Oman to Kuwait, with only vegetation and thatched shade structures and removable chairs. A future beach area might look to the Gulf for a more naturalized design solution.

In addition to hotels, other aspects of tourism supply in terms of services – restaurants, travel agents, tour operators, shops, and buses – have increased by only about 5% per year, while the number of rent-a-cars and tourist guides has actually decreased. There are few cultural heritage tours or volunteer archaeological digs in which tourists can participate.

4.7.3 Tourism Demand

Taking into account the visitor "fear factor" emanating from regional instability, Jordan Valley hotels have experienced lower than anticipated occupancy levels and lowered room rates. Current web rates for rooms vary between 50 and 100 JD. After build-out of 12 hotels on the Dead Sea, in order for an off-peak occupancy rate of 30% and a peak occupancy rate of 70%, which are the current figures, tourism would have to increase from one million to eight million annual visitors.The positive aspect of this scenario is the growth of jobs from 3,444 under the current hotel development pattern to a range of 9,200 to 11,600 employees. However, that would mean that of the year 2002 estimate of a total population of 191,085 in the JV, around 3,444 would be employed by tourism and on the long-run, this number would increase to around 9,200-11,600. This would require extensive training as 8,200 to 11,300 of the range of 9,200-11,600 would need to be skilled labor, supporting institutional land uses to facilitate vocational and tourism training schools.

Current and future tourism along Dead Sea eastern shores are presented in Table 36.

Table 36: Current situation and future estimations for tourism activities on the East Shores of the Dead Sea

	Currently[1]	Coming Soon[2]	Long Run[3]
Hotels	3	9	40-50
Area (Dunum)	197.27	978.24	2,600-3,300
Number of Rooms	656	3,253	8,700-11,000
Occupancy rate (Off Peak)	0.30	0.30	0.30
Occupancy rate (Peak)	0.70	0.70	0.70
Yearly Average # of Guests	159,343.36	790,158.48	2.1-2.7million
Water consumption (m^3)	93,171.29	462,021.68	1.2-1.6 MCM
Water consumption (m^3/guest)	0.58	0.58	0.58
Number of Employees	695	3,444	9,200-11,600
Management	39	191	520-650
Skilled Labor	617	3,062	8,200-11,300
Unskilled Labor	39	191	520-650

Source: Based on a field survey
[1] Currently: already existing hotels, namely, Movenpick, Mariott and Dead Sea Spa.
[2] Coming Soon: Companies that already signed contracts with the Jordan Valley Authority
[3] Long Run: According to Sigma Study, there has been 20,000 suggested bed units. The expansion in the hotels area, the water consumption and employment were made accordingly. The long run includes the current and coming soon hotels. The largest number of hotels under SIGMA would only equal 43 for 10,800 rooms/20,000 bed units. Having mentioned that, long-run calculations were made for a range of 40 to 50 htoels.

The biggest red flag to greatly increased demand is water consumption. Water consumption, assuming a per guest rate of 0.58 cubic meters (m^3), would increase from 93,171 m^3 to 1.2-1.6 MCM. In order to meet demand, several projects are under construction to convey water. Some conveyors are using wells upstream of Kafrein (2 MCM/year), while others are planned to convey brackish water from southern wadis for desalination to be constructed north of the Dead Sea prior to distribution to the Dead Sea coast hotels and Amman. In the future, domestic needs, agricultural irrigation, tourism and industry will all have to compete, especially if tourism takes 1.2-1.6 MCM. In addition, the brackish water that wwould not reach the Dead Sea will cause it to drop further, which will in turn negatively impact tourism. The EIS for the Red Sea-Dead Sea canal to boost the water level of the Dead Sea has not been studied, and the impacts of such an expensive, high-tech solution are unknown.

Limited targeted tourism segments, not mass tourism, can improve the standard of living of the Jordan Valley's residents, through training and job opportunities, through "buy local/employ local" hotel policies, and through establishment of handicraft and agro/nature based product training centers and retail outlets for local products.

4.7.4 Competition for Water Supply

In order to meet the demands of tourism development, JVA and WAJ are working closely. They have constructed a conveyor from the wells that are upstream of Kafrein Dam to convey about 2MCM/year to the hotels area. This amount is insufficient, and therefore water, which normally discharges into the Dead Sea, is being transferred from the southern wadis to the area. This will increase the rate that the Dead Sea's water level drops, which in turn will negatively impact tourism. The water is brackish, and therefore a desalination plant will be built at the north end of the Dead Sea. Some of this water will also quench the domestic needs of Amman. In addition the hotels are supplied with water from surrounding village wells. In the future, tourism, domestic supply, agriculture, and industry will all be completing for a dwindling supply.

4.8 Public Infrastructure

4.8.1 Municipalities

The municipalities and villages that are in the study areas are listed from north to south by Study Area.

It is important to note that many of the farmers who participated in the focus groups mentioned that JVA allocated them 224 square meters of land for their homes and farms, and they were allowed to build on 80 square meters. Since in traditional families sons marry and live at home with their parents, as the family structure grew there was insufficient land to build on.

In addition, many of the municipalities requested land for expansion of their boundaries, including Al Mashare, Al Sheik Hussein, Kraymeh, and Mu'addi. These and others have been illustrated on the maps with a brown cross hatched symbol.

The villages included within the municipalities of the Jordan Valley are as follows:

1- Khaled Bin Al-Waleed Municipality:
   - Almukheibeh Alfouqa
   - Almukheibeh Altahta
   - Al Baqura

2- Mu'ath Bin Jabal Municipality:
   - Aladaseiah
   - North Shuneh
   - Al Manshiye and El-Aramshi
   - Waqqas and Qleat

3- Tabqat Fahl Municipality:
   - Tabqat Fahl
   - Zimalia
   - Mashara'

4- Sherhabil Bin Hasnah Municipality:
   - Wadi Rayyan (Al Maraza and Wadi Yabbis)
   - Abu Habeel
   - Karn
   - Suleikhat
   - Abu Sido
   - Kreymeh

5- New Deir Alla Municipality:
   - Balawna
   - Khazma
   - Dirar
   - Al Rweha
   - Deir Alla
   - North Twal Al Rabeea
   - West Twal

6- New Mu'addi Municipality:
- Abu Ezzeghan
- Mu'addi
- Al Ardah
- Damia
- Daharat Al Ramle

7- New Shuneh Municipality:
- Karamah
- New Shuneh
- South Shuneh
- Al Jofeh Al Jawasreh
- (Al Rama) Al Shaghour
- Al Rama Al Jalad
- Al Rawdah

8- Suweimah Municipality:
- Suweimah

9- Ghor Safi Municipality:
- Al Haditha
- Mazraa
- Umm Al Hasheem
- Safi-Ramleh
- Al Naqa'
- Al Sammar
- Fifa

10- Wadi Araba Municipality:
- Al Mamurah
- Alselemani
- Ain Fidan (West and East)
- Rahmeh
- Al Resheh
- Fenan
- Qureiqra
- Gharandal
- Beermathkoor
- Qatar

4.8.2 Health, Education, Protection (police and fire)

In the Jordan Valley, health centers and schools are all located in municipalities, and thus are not illustrated on the baseline maps. There are no regional hospitals or colleges and universities in the Jordan Valley, other than university related agricultural training facilities which are located on the baseline maps. There are regional police and fire stations also illustrated across from the Dead Sea shoreline.

4.8.3 Sewer and Solid Waste

From the Israeli/West Bank side of the Dead Sea, the Dead Sea Development Company's Ein Bokek sewage plant was not yet operational as of 2002. Therefore, Israel was, and probably still is, dumping 4,000 cubic meters of untreated sewage into the Dead Sea on a daily basis.

On the Jordanian side, there is the following sewage treatment facility in the JV Study Area:

- Tel el Mantah Sewage Treatment Plant (Jordan Valley Integrated Waste Management Project/CIDA funded) (only one that is operational) west of Al Arda as illustrated on the baseline map.

In addition, the following site is proposed:

- The North Shuneh Treatment Plant west of Abu Habeel.

The Dead Sea hotels operate their own package plants, and no sewerage network is planned for the SJVSA.

There are no engineered land fills in the Jordan Valley. Managed dump sites for solid waste disposal (which should be re-studied and perhaps relocated) include:

- Two dump sites in the NJVSA at North Shuneh and Deir Alla;
- One dump site in the MJVSA servicing South Shuneh and the Dead Sea hotels;
- One dump site in the SJVSA at Naqa' south of Safi.

4.8.4 Red Sea-Dead Sea Conveyor

The Dead Sea level has lowered from 392 m in 1920 to -414 m in 2000. The surface area of the Dead Sea has been halved, from 1,050 sq km in 1920 to 515 sq km in 2000. The southern half has become evaporation lagoons, created and used by the Arab Potash Company. The Red Sea-Dead Sea Canal is being touted as a $3 to $5 billion project that will save the Dead Sea from drying up and produce water for the region, by pumping water from the Gulf of Aqaba to the southern edge of the Dead Sea

According to the Friends of the Earth Middle East, hydroelectric power would be generated and used for the operation of a reverse-osmosis desalination plant. Desalinated water would then be piped to municipalities in Jordan (and with regional peace to Israel and Palestine). For the tourism industry, the goal is to maintain a water line that does not harm the hotel investments along the shore. That is balanced by the negative side to tourism development which could be damage to the coral reefs in the Gulf of Aqaba, changes to the chemical balance of the Dead Sea and its health spa industry, and landscape alterations to Wadi Araba and its strong potential for nature based tourism. Although a potential solution for a complicated problem, the Red Sea-Dead Sea Canal is a high tech, high priced concept in a seismic zone with no guarantee of the results. The preferred alignment, as currently discussed, is illustrated on the baseline maps. With the completion of an Environmental Impact Statement, this could change.

4.8.5 Transportation Services and Roads

The Ministry of Transport (MOT) has the overall statutory authority for transport planning in Jordan. Other ministries and authorities have responsibility for certain aspects of transportation. The Ministry of Planning helps set transportation priorities; and road construction and maintenance are carried out by the Ministry of Public Works and Housing (MPWH). All MPWH road projects must include EIS analysis.

A photo and visual survey of the existing major roads network was carried out as part of this study. Meetings with concerned ministries and authorities were held to discuss the on-going and planned projects within the Jordan Valley Authority (JVA) mandate area. There are three primary tourism routes in Jordan: the Desert Highway, the Kings Highway, and the Dead Sea route. The latter two are both illustrated on the land use map, although only the Dead Sea road is within the JVA mandate area.

A list of priority road projects from the Ministry of Public Works and Housing is given in Table 37. Some have higher priority than others, and implementation is dependent upon funding and other factors. All existing roadways have been illustrated on the baseline maps.

In addition, the MPWH has several ongoing projects within the study area. Those include:

- Irbid – North Shuneh Road: Upgrade of the existing two-lane road to a four-lane divided highway with a grade separation intersection.
- Al Rama - Al Qudis Intersection/Road: Upgrade the road to a four-lane divided highway.
- Al Qudis Intersection/Suweimah – Al Zara – Ma'in road: Upgrade the road to a four-lane divided highway with a service road on the Dead Sea shoreline side.
- Vehicular access to the hotels areas has been disrupted over the past year by hotel and conference center construction. However, even under the best of circumstances, access is poor. Cars from the south have been required to make a U-turn to enter the hotels area, as they can not cross the median strip. However, construction is addressing this problem by providing openings in the medians to provide more direct access.
- The promenade area or walkway that was built in 1998 is in very poor condition, with both the iron railing and the concrete requiring maintenance. If this is to be newly designed and re-built, the area is wide enough to offer both pedestrian access and a separate mountain bike trail.
- Ma'in – Dead Sea Road (Dead Sea Parkway): Construction of a new two-lane with paved shoulders highway that connects Madaba – Ma'in Hot Springs with the Dead Sea.
- Suweimah National Park Road: Construction of a two-lane, two-way road off Route 65 to Suweimah National Park.

Those projects are summarized in Table 37.

Table 37: Road projects of the Ministry of Public Works and Housing in Jordan Valley

No.	Structure (Transportation) Projects Being Implemented in Jordan Valley
1-	Road of Jerusalem-Suweimeh-Zara Ma'in Raod Crossing
2-	Road of Rama Crossing/Jerusalem Crossing
3-	Road of Irbid-North Shuneh
4-	Ma'in-Dead Sea Road
5-	Suweimeh National Park Road

The existing main roads and highways within the JVA mandate area are presented below.

Dead Sea Highway (Route 65)

This a major regional highway that crosses the JVA mandate area from north to south along the western Jordanian border and Dead Sea shoreline and has some very attractive scenic segments. All other roads leading to and leaving from the JVA connect to this road.

This highway is the major link between the northern, middle and southern ghors. It is the main road for transporting potash and other Dead Sea products to the Aqaba port. Furthermore, this highway is considered as an alternative route to the Desert Highway (Route 15), that connects Aqaba city and port with Amman and the northern parts of the Kingdom.

The Dead Sea Highway is a combination two and four-lane all purpose highway of acceptable horizontal and vertical alignment. The highway is divided into three main sections for evaluation – northern, southern, and middle.

The northern section (approximately 87 km) of Route 65 (North Shuneh – South Shuneh) is designated to become a major international highway (Development Options, 1996)[1]. This section links the villages and their local market centers. Some villages nearly merge due to sprawl and others are separated from each other by agricultural land (Figure 21).

Figure 21: Dead Sea Highway (Route 65) – North of Dead Sea

The road passes through some heavily populated urban areas where it is widened to four-lane divided with shops and buildings on both sides of the road (Figure 22).

[1] Jordan Rift Valley Integrated Development Study, by Harza JRV Group, August 1997.

Figure 22: Dead Sea Highway (Route 65) – Passing through urban area

The traffic, which is significantly higher than that of the southern section, consists of slow moving trucks carrying agricultural produce, farm vehicles, and local traffic. This segment of the road is heavily intersected by minor roads used by farmers. Most intersections with major roads are signalized. This section of the Dead Sea Highway is poorly serviced and there is an immediate need for maintenance and improvements, particularly pavement, marking and signage.

MPWH is evaluating two alternatives for this section of the road to upgrade it to international standards:

- Upgrade the existing highway to four-lanes divided;
- Construct a new highway parallel to the existing one.

The argument for constructing a new highway is stronger than that of upgrading the existing road, as upgrading entails demolition of existing village buildings and farms. In addition, increased traffic will increase noise, pollution and accidents in urban areas. Also the large number of intersections makes the existing highway unsuitable for international (through) traffic.

The middle section is the segment of Route 65 on the eastern shores of the Dead Sea. Part of this section from the Dead Sea hotels area to the Al Qudis intersection is being upgraded to a four-lane divided expressway (under construction) to serve the growing tourist and agricultural traffic. A service road on the Dead Sea shoreline side and neighboring areas will be added to serve the local traffic (Figure 23).

Figure 23: Dead Sea Highway (Route 65) – Middle section at Dead Sea

The southern section from the southern edge of the JVA mandate area (Aqaba Special Economic Zone) to Ghor Al-Safi (approximately 146 km) is very a lightly travelled, two-way, two-lane rural highway with about 8m of paved width (Figure 24).

Figure 24: Dead Sea Highway (Route 65) – South of Dead Sea

This section of the road serves mainly the southbound truck traffic carrying potash from Ghor Al-Safi to Aqaba. This segment is predominantly flat with reasonable geometric design standards over most of its length. MPHW is doing a study to evaluate the need to upgrade this highway to four-lane divided highway, based on increased traffic and accident rates, especially at urban areas bordering the highway. Intersections will most likely be upgraded. The study will also evaluate the soundness of existing drainage structures and bridges due to suphate attack.

Amman - Naur - Dead Sea (Route 40)

This is the main entrance to the Jordan Valley Authority mandate area from Amman (Figure 25).

Figure 25: Route 40. (Amman - Naur - Dead Sea)

It is a well engineered four-lane divided expressway, but there are steep inclines that slow down heavy trucks. This might necessitate some widening to allow easier passage. However, visibility is quite adequate and there is little need for improvements as an immediate priority.

The last segment of this road from Al Rama intersection to Al Qudis intersection with Route 65 has recently been upgraded to a four-lane divided highway (Figure 26).

Figure 26: Route 40. (Al Rama intersection to Al Qudis intersection)

South Shuneh – Al Salt Road

This is a two-lane, two-way undivided rural road that climbs along Wadi Shuayb up to Al Salt (approximately 24 km). The road has about 7 m of paved width over most of its length (**Figure 27**).

Figure 27: South Shuneh – Al Salt Road

As the road approaches the intersection with Route 65 (Dead Sea Highway), it is widened to a four-lane divided road with shops and buildings on both sides (South Shuneh). The intersection with route 65 is a four legged, at-grade signalized intersection. The road continues to King Hussein Bridge crossing to the West Bank.

The overall condition of this road is considered acceptable but needs upgrading to improve the horizontal and vertical curvature defects (sharp reverse & broken back curves in addition to some steep slopes).

Al Ardah – Al Salt Road (Route 24)

Route 24 connects with Route 65 approximately 32km north of South Shuneh. This road is a rural two-lane two-way road of approximately 8m wide carriageway that climbs along the wadi up to Al Salt (approximately 23 km).

The intersection with Route 65 (Muthallath Al Arada) is a signalized "T" Intersection. The road at the intersection is widened to four-lanes, with shops and buildings on both sides.

The road has some very sharp reverse and broken back curves and steep grades. The surface of the road needs some rehabilitation work to repair pavement cracks and pot holes. In addition, some protection from falling rocks (guard rails and barriers) and drainage works are needed (Figure 28).

Figure 28: Al Ardah – Al Salt Road (Route 24)

Kufranja – Ajlun Road

Continuing north (approximately 15 km) along Route 65 from Muthallath Al Arada intersection is the intersection of the Kufranja – Ajlun Road. This is a two-lane, two-way undivided rural road that runs for about 24 km to Kufranja and Ajlun. This road has approximately 6m of paved width (Figure 29). The road climbs up the hills and mountains towards Ajlun. The width, horizontal and vertical curvatures are below standards.

Figure 29: Kufranja – Ajlun Road

Qalat ar Rabad – Ajlun Road

This road climbs along Wadi Al Yabis passing Qalat (Castle) ar Rabad on to Ajlun (approximately 40 km). The road intersects Route 65 approximately 12 km north of Kufranja – Ajlun Road. This two-lane road features approximately a 7m wide paved carriageway (Figure 30).

Figure 30: Qalat ar Rabad – Ajlun Road

Abu Saeed – Irbid Road

Further north (approximately 16 km) along Route 65 is the intersection with Abu Saeed – Irbid Road. This two-lane, two-way road climbs about 34 km up to Irbid city.

Ash Shuneh (North) – Irbid (Route 16)

The existing, two-lane two-way road is being upgraded to a four-lane divided rural highway with shoulders (Figure 31).

Figure 31: Ash Shuneh – Irbid (Route 16)

A new grade separated intersection approximately 2 km from the existing "T" intersection is being constructed (Figure 32). After completion this road will be the main link to the JV from the north, while Route 40 (Amman – Naur – Dead Sea) will be the main link to the middle, and Route 65 will be the main link to the south.

Figure 32: Ash Shuneh – Irbid (Route 16) – New grade separated intersection

Dead Sea Parkway

This new road is under construction to connect the Madaba – Ma'in Hot Springs Road to Route 65. This new road is a two-lane, two-way rural highway with paved shoulders and is approximately 11.6 km (Figure 33).

Figure 33: Typical section of Dead Sea Parkway

Route 65 will be upgraded to a four lane divided road from Al Qudis intersection up to this intersection as mentioned before (Figure 34).

Figure 34: Future Intersection Route 65 – Dead Sea Parkway

This road holds two major bridges and was recently designed to international standards regarding design speeds, horizontal and vertical alignments, protection and drainage works. The road is a major component of a Tourism Development Project funded by JICA.

Other components of the above project within the vicinity of this road are the Panoramic Complex and its access road (Figure 35).

Figure 35: Panoramic Complex

The above components are now under construction to enhance and improve tourist movements between Madaba (including nearby Mukawir) and Mount Nebo, the Dead Sea Panorama Complex, Ma'in Hot Springs, and the Baptism Site and Dead Sea, continuing south to Petra and Aqaba.

Dead Sea – Karak Road

This road intersects Route 65 near Potash City south of the Dead Sea and climbs the hills toward the main city of Karak (Figure 36 and Figure 37). It is a two-lane highway without paved shoulders with about 7 m paved width over most of its length. The road is the major transport route for agricultural produce as it connects the Southern Ghors (valleys) with Karak. As in other connecting roads, this road suffers from sharp curves and steep grades.

MPWH is studying an additional route that would connect Kuthrubba (south of Karak) with the Jordan Valley. This road would be about 37 km long.

Figure 36: Dead Sea – Karak road

Figure 37: Intersection Route 65 – Karak road

Ghor Fifa – Tafila road

Continuing south along Route 65 approximately 30 km is the "T" intersection with the Ghor Fifa –Tafila road. This two-lane two-way rural road climbs the mountains up to Tafila City. This is the road that most tourists take to access Dana Nature Reserve and Village (Figure 38 and Figure 39).

Figure 38: Ghor Fifa - Tafila Road

Figure 39: Intersection of Route 65 with Ghor Fifa - Tafila Road

Dalagha – Wadi Musa – Ma'an Road

Further south along Route 65 is the intersection with the Dalagha – Wadi Musa – Ma,an Road (Figure 40).

Figure 40: Intersection Route 65 Dlagha – Ma'an Road

This two-lane, two-way road (track) is not paved but has surface dressing. The road climbs up to an intersection with the King's Highway (Rt. 49) to Wadi Musa and Petra. The road's vertical alignment has reasonable grades and very scenic mountains. The road has some very sharp horizontal curves, but there is space for widening with reasonable cuts.

The road lacks proper drainage works (i.e. culverts, ditches), and was washed out by flash floods in two different locations (Figure 41). Also some protective works (i.e. guard rails, barriers) are needed.

Figure 41: Dlagha – Ma'an road

In summary, the above roads with the suggested improvements are sufficient to accommodate the projected traffic related to increased tourism and population growth. Further detailed

studies are needed for specific tourist routes, where the need may arise to widen some roads from two to four lanes.

Public Transport (Bus Routes)

Providing highways and adequate public transport including an effective bus system is an integral part of providing a higher quality of life. The JV focus groups stressed that public transport and bus service was not adequate.

Public transport is the responsibility of the Public Transport Regulatory Commission (PTRC), which has recently invited consultants to tender for "The Study of Public Transport Needs in Jordan." The study is divided into two major categories:

- Evaluate existing public transport routes and need for improvement.
- Identify and study new required public transport routes.

A list of public transport routes, number and classification of transport are presented in Table 38.

Table 38: Public Transport within the JVA Mandate Area – Year Bus Route Established & Classification

Governorate: Al-Balqa	Municipality: Middle Shuneh		
Route Name	**Route Description**	**Year Route Estab.**	**Classification**
Dirar/Al-Karama/Al-Mashari	Dirar / Dayr Alla/Al-Sawalha / Mu'addi / Damiya / Al-Karama / Al-Mashari	1983	Medium Public
Abu-Obaida/Al-Mashari	Abu-Obaida / North Shouna / Abu-Seido / Wadi-Al-Yabis / Abu-Obaida Hospital/Al-mashari	1997	Medium Public
Dirar/Al-Karama	Dirar/Al-Karama	1996	Medium Public
Dirar/Al-Karama	Dirar/Al-Karama	1996	Medium Public
Dirar/Al-Karama	Dirar/Al-Karama	1984	Medium Public
Dirar/Al-Karama	Dirar/Al-Karama	1985	Medium Public
Dirar/Al-Karama	Dirar/Al-Karama	1981	Medium Public
Al-Karama /Al-Mashari	Al-Karama/Al-Mashari	1993	Medium Public
Um-Za'aroura/Al-Baq'a	Um-Za'aroura/Mubis/Abu-Nusayr/Secondry School / Al-Baq'a	1997	Medium Public
Al-Ruman/Al-Ba'aqa	Al-Ruman/Abu-Thuab/Nuaim/Salhoub/Al-Baq'a	1982	Medium Public
South Shouna/Al-kufrain	South Shouna/Al-kufrain/Al-Rama/Al-Roda/Al-Jofa	1983	Medium Public
Dirar/Al-Karama	Dirar/Dayr Alla/Damia/Al-Karama	1984	Medium Public
Inside North Shouna	Inside North Shouna	1996	Medium Public
Inside North Shouna	Inside North Shouna	1986	Medium Public
Inside North Shouna	Inside North Shouna	1987	Medium Public
South Shouna/Al-Karama	South Shouna/Al-Karama	1983	Medium Public
South Shouna/Al-Karama	South Shouna/Al-Karama	1996	Medium Public

Governorate: Al-Balqa	Municipality: Middle Shuneh		
Route Name	**Route Description**	**Year Route Estab.**	**Classification**
South Shouna/Al-Karama	South Shouna/Al-Karama	1998	Medium Public
South Shouna/Al-Jofa	South Shouna/Al-kufrain/Al-Rama/Al-Roda/Al-Jofa	1983	Medium Public
Al-M'amoura/Al-Safi	Al-M'amoura/Ghor Al-Safi/Al-Mazr'aa	1992	Medium Public
Al-Rameh/Madaba	Al-Rameh/Salieh/Al-Msherfeh/Thyban/Madaba	1989	Medium Public
Al-Rameh/Madaba	Al-Rameh/Salieh/Al-Msherfeh/Thyban/Madaba	1988	Medium Public
North Shouna/Irbid	North Shouna/Wadi Al-Ryan/Irbid	1998	Medium Public
Al-Karak/Ghor Al-Safi	Ghor Al-Safi/Al-Karak	1987	Medium Public
North Shouna/Wadi Al-Yabis	North Shouna/Wadi Al-Yabis/ Irbid	1996	Medium Public
Kuzmeh/Amman	Kuzmeh / Dirar / Dayr Alla / Al-Sawalha / M'adi / Al-Arda / Suwaylih/Amman	1986	Medium Public
Al-Sawalha/Rodet Al-Kufrain	Al-Sawalha/Al-Karama/South Shouna/Al-Jofa/Rodet Al-Kufrain	1984	Medium Public
North Shouna/Irbid	North Shouna/Irbid	1989	Medium Public
Al-Jeld/Al-Roda	Al-Jeld/Plastic Company/South Shouna/Al-Jofa/Al-Roda	1984	Medium Public
South Shouna/Al-Roda	South Shouna/Al-Jofa/Al-kufrain/Al-Rama/Al-Roda	1996	Medium Public
South Shouna/Al-Roda	South Shouna/Al-Jofa/Al-kufrain/Al-Rama/Al-Roda	1983	Medium Public
North Shouna/Kurayyima	North Shouna/Slakat/Abu-Seido/Kurayyima	1998	Medium Public
Al-'Adasieh/South Shouna	Al-'Adasieh/North Shouna/South Shouna	1985	Medium Public
Al-'Adasieh/South Shouna	Al-'Adasieh/North Shouna/South Shouna	1986	Medium Public
Al-Karama/Amman	Al-Karama/Shouna/Al-Salt/Amman	2000	Medium Public
South Shouna/ Kufrain Dam	South Shouna/Al-Joasra/Al-Msherfeh/Al-Kufrain Dam	1999	Medium Public
North Shouna/Al-medraj /Al-Baqora	North Shouna/Al-medraj/Al-Baqora	1985	Medium Public
Al-'Adasieh/Amman	Al-'Adasieh/North Shouna/Al-Karama/Al-Kufrain/Amman	1980	Medium Public
Al-Sukneh Industrial school/South Shouna	Al-Sukneh Industrial school/Al-Sukneh Agriculture Shopping Center/South Shouna	1993	Medium Public
North Shouna/Al-Fadein	North Shouna/Al-Manfieh/Al-'Aramsheh/Al-Fadein	1985	Medium Public
South Shouna/Al-Karama	South Shouna/Unknown Soldier/Al-Sukneh/Al-Karama	1980	Medium Public
Shouna/North Shouna	North Shouna/Abu-Habil/Al-Mbeira	1994	Medium Public
Khuzmeh/Amman	Khuzmeh/Dayr 'Alla/Amman	2001	Medium Public
South Shouna/Dead Sea	South Shouna/Al-Jofa/Al-Rama/Al-Jeld/Suwaimeh/Dead Sea	1983	Medium Public
North Shouna/Amman	North Shouna/Al-'Arda/Amman	2000	Medium Public

Governorate: Al-Balqa	Municipality: Middle Shuneh		
Route Name	**Route Description**	**Year Route Estab.**	**Classification**
Ghor Al-Safi/Al-Zarka	Ghor Al-Safi/Al-Karak/Al-Zarka	1992	Medium Public
South Shouna/Al-Karama	South Shouna/Al-Karama	1998	Medium Public
South Shouna/Al-Karama	South Shouna/Al-Karama	1999	Medium Public
South Shouna/Al-Karama	South Shouna/Al-Karama	1996	Medium Public
South Shouna/Al-Karama	South Shouna/Al-Karama	1999	Medium Public
South Shouna/Al-Karama	South Shouna/Al-Karama	1984	Medium Public
South Shouna/Al-Karama	South Shouna/Al-Karama	1999	Medium Public
North Shouna/Kurayyima	North Shouna/Al-Rayan Valley/Kurayyima	2001	Medium Public
North Shouna/Kurayyima	North Shouna/Al-Rayan Valley/Kurayyima	1988	Medium Public
North Shouna/Kurayyima	North Shouna/Al-Rayan Valley/Kurayyima	1989	Medium Public
Byouda/Jordan University	Byouda/Syhan/Allan/Zay/Suwaylih/Jordan University	1985	Medium Public
Byouda/Jordan University	Byouda/Syhan/Allan/Zay/Suwaylih/Jordan University	1985	Medium Public
South Shouna/Al-Karama	South Shouna/Al-Karama	1984	Medium Public
Total No of Routes : 59			
Governorate: Al-Balqa	**Municipality: New Deir Alla**		
Route Name	**Route**	**Model**	**Classification**
Fanoush Workshop/Al-Swalha	Fanoush Workshop/Mo'adi/Al-Swalha	1989	Medium Public
Dayr Alla/Amman	Dayr Alla/Amman	1993	Medium Public
Dayr Alla/Amman	Dayr Alla/Amman	1999	Medium Public
Dayr Alla/Kurayyma	Dayr Alla/Kuzma/Kurayyma	1993	Medium Public
Khuzma/Amman	Khuzma/Dirar/Dayr Alla/Al-Swalha / Mo'adi / Amman	2003	Medium Public
Dayr Alla/Al-Balawneh Residential Compound	Dayr Alla/Abu-Obaida/Um-Aiash/Al-Rajab Pump Station/Al-Balawneh Residential Compound	1996	Medium Public
Al-Balawneh Residential Compound/Al-Swalha	Al-Balawneh Residential Compound/Dayr Alla/Al-Swalha	1998	Medium Public
Dayr Alla/Al-Zarqa	Dayr Alla/Suwaylih (Yajouz Road)/Al-Zarqa	1999	Medium Public
Dayr Alla/Fatoush	Dayr Alla/Al-Swalha/Mo'adi/Arda/Fatoush	1985	Medium Public
Dayr Alla/Dahret Al-Ramel	Dayr Alla/Al-Swalha/Arda/Dahret Al-Ramel	1995	Medium Public
Fanoush Workshop / Al-Balawneh Residential	Fanoush Workshop/Al-Swalha/Um Ayash/Al-Balawneh Residential	1998	Medium Public
Dayr Alla/Jordan University	Dayr Alla/Jordan University	1992	Medium Public
Dayr Alla/Tal Al-Mentah	Dayr Alla/Al-Malaha/Tal Al-Mentah	1997	Medium Public

Governorate: Al-Balqa	Municipality: New Deir Alla		
Route Name	**Route**	**Model**	**Classification**
Dayr Alla/Dahret Al-Ramel	Dayr Alla/Al-Rwaiha/Dahret Al-Ramel	1991	Medium Public
Dayr Alla/Kurayyma	Dayr Alla/Al-Balawneh Residential Compoun/Kurayyma	1999	Medium Public
Al-Rweiha/Al-Debab/Al-Swalha	Al-Rweiha/Al-Debab/Al-Swalha	1980	Medium Public
Dayr Alla/South Twal	Dayr Alla/North Twal/South Twal	1992	Medium Public
Dayr Alla/Fanoush Workshop	Dayr Alla/Al-Swalha/Mo'adi/Arda/Fanoush Workshop	1995	Medium Public
	Total No of Routes : 18		

The Study Team has identified locations for bus stops and a centralized Transit Station at Sweimeh. The location of bus stops is intended to meet focus group needs, and in some cases stops might already exist. The Transit Station is a conceptual idea that requires further study. However, it could well serve both local Jordan Valley residents and tourists coming from Amman, particularly nature based tourists who appreciate travelling with local people and paying less for transportation.

4.8.6 Electricity and Telecommunications

Electrical lines are disbursed throughout the Jordan Valley. Because of their frequency, it was unnecessary to locate the lines on the baseline maps. Telecommunication lines require further study, although for investment purposes it would be positive for JVA to illustrate areas of either undergrounded cable or satellite frequency on future maps.

5.0 Proposed Peliminary Land Use Recommendations

Every land use plan has a legend that illustrates proposed land uses and baseline conditions. The Study Team's proposed legend uses symbols to identify existing infrastructure, text to identify names of cities, municipalities, and villages and important places like reserves, rivers, and roads, and colors to identify proposed land uses. For example, the reader can quickly glance at the plan, and by seeing "blue," he or she immediately realizes that water is involved (wells, rivers, seas, etc.).

The symbols are illustrated below, and they are based on international symbols and logical perceptions. Symbols illustrate a wide variety of things, including different types of boundaries, IBAs, potash salt flats, sinkholes, fish farms, various water and sewer related assets, wetlands, fish farms, archaeological sites and museums, information centers, hotels, hiking and biking trails, a nature based tourism route with cultural heritage stops, and bus stops/transit station.

The land uses are color coded, and if an area is hatched, the land use already exists. For example, "green" is used to depict the environment or agriculture, a lighter shade for agriculture, including fish farms, and a darker shade for protected areas. Protected areas are a combination of color and symbol, i.e., tan with archaeology symbol for a protected cultural heritage zone and dark green with a plant symbol for a protected environmental zone with passive recreation, such as reserves, park land, or picnicking areas.

Various shades of orange indicate human habitat. Rust indicates villages and municipalities, while lighter peach indicates larger cities linked by tourism to the Jordan Valley. A municipality's proposed expansion area is cross-hatched in brown. Red is used to illustrate a tourism overlay, including areas for hotels, campsites, and commercial support activities such as restaurants, fish farm tourism facilities, art galleries, gift shops, etc. Gray indicates industrial land use, while pink illustrates institutional, including educational facilities. Institutional use includes public or semi-public facilities, such as training centers, schools, colleges, cultural heritage centers or museums, conference facilities, public piers, and cemeteries.

Yellow illustrates land proposed to be mixed use or planned communities including residential, office, retail, restaurants, and health facilities. Purple designates an area for active recreation such as a sports city.

Navy blue illustrates border zones with Israel/Palestine with security, customs, and supporting service facilities for travelers crossing the border. Olive green illustrates those lands in the SJVSA that have been set aside for future study, and this area also accommodates the right-of-way for the Red Sea-Dead Sea Canal.

Lastly, dotted green indicates open space that is land JVA proposes to return to the government or Treasury (Department of Lands and Survey).

5.1 Legend

Lighter Green	Agricultural Area to include grazing, animal farms, cropping, and fish farms
Hatched Lighter Green	Existing Farm Units
Dark Green	Protected Environmentally Sensitive Areas – to include reserves, park land, buffer zones, picnic area, hiking trails, etc.
	Important Bird Area
Tan	Protected Cultural Heritage area (archaeological sites, historical or vernacular villages)
Red	Tourism (includes hotels and associated commercial activities such as restaurants, retail, etc.)
Hatched Red	Existing Tourism Investment Area
Gray	Industrial (to include mineral extraction and any type of light industrial plant – should discourage heavy industry due to community health concerns, tourism investments, and environmentally sensitive areas)
Hatched Gray	Existing Industrial Area
Spotted Gray	Potash Region
Pink	Institutional/Educational (could include any public facility for infrastructure or a training center, vocational school, cultural heritage center, handicapped center, conference facilities, public pier, cemeteries)
Peach	Major City
Lighter Peach	Village (Groups of Villages are municipalities)
Hatched Brown	Village Expansion Area
Yellow	Mixed Use (Residential and supporting commercial services including office, retail, restaurants, veterinary centers, medical centers, etc…)
Light Purple	Recreational Area (active recreation including Sports Cities)
Navy Blue	Border Zones (security, customs and supporting services for travelers crossing the borders)
Olive Green	Lands Set Aside for Future Study (within the Southern Jordan Valley Study Area including the proposed Red Sea-Dead Sea Canal right-of-way)

Dotted Green		Open Space - Lands to be returned to the DLS (Department of Lands and Survey)
		JVA Mandate Region
		Governorates
		Jordan Boundary
		Sea/Lake
		Dam
		Desalination Plant
		Roads
		Preliminary Red-Dead Sea Conveyor Alignment
		River
		Wadis
		Sink Holes Corridor
	→	Tourism Linkage
	p	Hiking Trail
	ö / Ý	Religious Site
	y	Information Center
	x	Hotel
	p	Camp Site
	£	Transit Station

B	Bus Stop
&	Archaeological/Historic Site
¡	Museum
í	Police Station
ö	Civil Defense
\	Wetland
O	Wastewater Treatment Plant
D	Fish Farm
?	Sinkhole
W	Well
B	Quarry
I	Existing Industry
E	Electricity Power Station
S	Satellite Receiving Station
(	Waste Dumping Site

5.2 Functional Relationships Analysis

The land use plan focuses on vacant or under-utilized land, as well as inappropriately planned land. Generally, each of the three Study Areas was analyzed as the color coded legend indicates: for natural and cultural areas and investments that required protection, improved

farm units and/or expanded agricultural uses including fish farms, existing and expanded industry, mixed use areas including residential and supportive commercial facilities, infrastructure needs as expressed by the focus groups including institutional/educational land uses and sports or passive recreation areas, and new or improved tourism opportunities through tourism linkages.

One of the irreplaceable characteristics of the Jordan Valley, important to local and international tourists, is its natural beauty and environmental and cultural significance, so those areas and sites were highly recommended as protected areas. They run from north to south, and include critical areas like Suweimah National Park, perhaps to be renamed for improved tourism allure to the Dead Sea National Park, and a number of IBAs and unaltered Dead Sea beachfront at Zara, as well as a recommended Great Rift Valley Badia Nature Park in the south. In addition, local parkland for picnicking and other recreational activities is recommended intermittently in the NJVSA, and public beaches are recommended in the MJVSA.

Agricultural, industrial, and hotel investments have increased in the past few years based on legal agreements and ownership issues. Thus, areas that were already built were protected under the land use recommendations. However, this does not mean that those land uses couldn't evolve over time. It simply recognizes economic realities of existing conditions.

Although agricultural land uses remained, changes to cropping patterns over time and water conservation strategies were strongly advocated by the Study Team. In addition, new types of agriculture, such as high value crops like avocado, mango, and date palms, and fish farms at dam sites were advocated in the northern part of the Valley, and plants that form the basis for traditional medicines and pharmaceuticals and Xeric nurseries were advocated in the middle and the southern study areas.

Some industrial zones were added to the land use plan, strategically located to not interfere with tourism development or communities' quality of life, but to draw investment in light industry, particularly in support of agro-processing. Examples of activities that are advocated include olive oil processing plants and date and spice production, packaging, and marketing. Mixed use (integrated villages) and tourism areas are planned to include residential, office, hotel, restaurants, retail, and medical centers.

Large swaths of mixed use land for single family residential development, which could be either detached or attached townhouse housing but not high-rise residential were recommended. Most of the land of the Jordan Valley shall never be intensely developed, nor should it be. Residential is always considered as one of the less impacting land uses, which can be re-planned and upgraded to more intense land uses if market conditions warrant. But with the information that the Study Team has acquired with the input of JVA on topography and lack of public services, such as sewer and water, residential is a careful and economically sound land use decision without immediate environmental impacts.

Apart from the issue of water and other services, much of the land is hilly, rocky, and difficult to build upon. Those areas were specifically planned as open space or land that shall be returned to the Treasury.

A common problem in highly successful tourism areas is insufficiently planned land for staff housing. This exacerbates traffic problems and decreases the staff pool available to hotels and restaurants. In the Middle Study Area there will be a strong need for residential housing to support the tourism industry employees, including local people who would prefer to spend less time commuting to their homes in the northern or southern parts of the JVA, and outside international managers who prefer not to live at the hotels or commute to Amman. There is also housing demand to accommodate local teachers, doctors, and other residents of expanding municipalities.

In addition to housing for younger or middle aged people, the weather in the Jordan Valley is very inviting in the winter time. Nicaragua, Costa Rica, Mexico, and other temperate areas with reduced costs of living are all becoming winter retirement areas, and the northern and middle JV could be developed into clusters of second homes or retirement villages, with related assisted living and medical services (for military or non-military purchasers). New and improved infrastructure, such as regional medical facilities, could be shared with local people.

Tourism is either developed for local tourists or international tourists or both. Local tourism is a critical market in politically unstable regions, as it weathers the burden of tourism during strongly impacting events such as 9/11 and the Iraq War, and is a continuous additional benefit during stable periods. It is clear that fish farms can draw local tourism in Jordan. Fish farming is universally seen as a field of tremendous opportunity, with environmental risks that can be avoided. The JVA has special potential, with its dams, such as Karamah, Wadi Arab, and Shuieb, to develop hybrid local and international tourism recreation areas, with fish farms that are linked to broader recreational areas for picnics, non-motorized boating such as canoeing and kayaking, and nature based mountain biking and hiking trails. The land use plans illustrate opportunity for these hybrid activities, as a combined commercial/tourism overlay zone for the farms within a broader context of protected areas.

There are other tourism opportunities that have been encouraged through the land use plan recommendations. Nature reserves and IBAs will facilitate bird watching and hiking, and JVA could work with RSCN to just slightly develop these areas with limited visitor services such as a trails system along migratory routes with bathroom and information facilities and in some cases campgrounds. Area for a local youth camp with recreational sports facilities is also suggested, near Suweimah, away from the hotels district but well located to be accessible to communities, school children and organizations. This area is not identified on the plan.

The land use plan preserves cultural heritage sites as recommended by DOA. DOA might wish to add other sites in the future. JVA could work with DOA and MOTA to link these sites to "heritage villages" or villages with tourism potential due to their historic character or vernacular architecture, and to other municipalities. The land use plan facilitates strategic placement of tourism related commercial activities, such as cafes, visitors centers, and handicraft centers.

JVA and MOTA/JTB should work with tour operators to establish specialized geology tours and volunteer archaeological digs (Can You Dig It Program), wherein they would stay in rural gite (French concept for small agro or community lodging in adaptively reused farm buildings)or local Bed and Breakfast accommodations, and eat with local families, while spending a week or two on dig sites paying to volunteer their time (similar to Crow Canyon's and Earthwatch's programs). This could be organized and managed by JVA with DOA. The plan also identifies religious sites, including the tombs of the Companions of the Prophet, recommends a route for pilgrims.

New training and tourism facilities are advocated through strategic locations for institutional/educational zones, including a cluster of activities near the Dead Sea that allow a "public edge" or public access to the Sea. These are within an area identified on the baseline maps as Existing Tourism Investment Area which reflects the boundaries of the Sigma Plan. However, the Study Team recommends that this area be re-studied. Those areas that are already built or legally promised would remain the same. However, there are numerous parcels without any recommended land uses; thus, the Study Team has arrived at parcel by parcel recommendations, to facilitate the following recommended activities or institutional and private sector facilities, in which JVA could be involved for revenue generation. These include a World of Salt Museum and Dead Sea Heritage Center, a Mediterranean Culinary Institute adjacent to a commercial night souk and boat pier, a Dead Sea National Park and Nature Guide Training Institute (Suweimah National Park, Maghtas Reserve and IBA, and Dead Sea Altitude Training Center all carefully integrated into an eco-village plan), and a

King Abdullah Middle East Center for Conservation of Hydrology. All of these could be either Build Operate Transfer operations or Build Operate Manage , with training and jobs created for JVA staff.

Globally, water is the next big issue and the Dead Sea is very symbolic. King Abdullah is seen as a creative, forward thinking leader. A King Abdullah Middle East Center for Conservation of Hydrology on the shores of the Dead Sea could include world class laboratories, GIS, meeting rooms, and other facilities for training and research that would draw scientists from around the world. This center would also be very attractive to tourists with its state-of-the-art educational facilities and water conserving activities. In turn, the center would link to other water conserving activities, such as nature based tourism, interpreted Xeric gardens, water conserving agricultural cropping experiments, etc. The proposed location of the Center is purposeful to functionally relate to the existing convention center and hotels and proposed culinary institute.

Infrastructure needs fall within a few different types of land uses, including veterinary and medical centers under mixed use zones, schools, colleges, training and cemeteries under institutional/educational zones, and active play areas or sports cities under recreational zones, whereas passive recreation such as parkland and picnic areas falls under protected areas. Although it is recognized that there might not be funds available at this time to develop many of the land uses and associated activities or facilities, identifying locations might help to facilitate future budgeting or draw investors.

Municipal expansion at the immediate edges of villages is encouraged by the land use plan, as a way to promote growth within existing village centers. The plan attempts to prevent sprawl, and encouarages village agricultural belts and gateways.

Table 39 presents the land use recommendations and Figure 42 shows the Dead Sea parcels for which recommendations are presented within Table 39.

Table 39: Land Use Map Revisions and Recommendations*

Area	Current Land Use	Recommended Land Use	Rationale (Market Decides)
Map 01			
Al-Wehdah	Dam Site	Recreation and Tourism Fish Farming (Residential not included as originally proposed by land use planner due to topography and lack of services)	Economic Development Link to IBA and reserve
Yarmouk River	Undeveloped Security Zone	Yarmouk River Reserve and IBA (trails/campsite)	RSCN recommendation Nature tourism potential
Khaled Bin Al-Waleed Dam	Proposed Dam	Proposed Dam	Focus group recommendation land be returned but still proposed as dam
Almukheibah Alfouqa	Village Yarmouk Battle site	Tourism Also bus stop Protected area to the west and south	Tourism related economic development
Almukheibeh Al-Tahta adjacent to Umm Qais	Village Archaeological Site	Cultural Heritage area with special development guidelines Bus stop	Tourism related links nature and culture Linked to Umm Qais Visitor Center and Handicraft Center

Area	Current Land Use	Recommended Land Use	Rationale (Market Decides)
Al Adaseiah	Village Existing Farm Units	Expansion area to East Mixed use to North, East and South including residential Agriculture Bus stop Schools and playgrounds should be improved within the municipality.	Retirement Housing Potential market
Al Baqura	Village	Agriculture/farm units surrounded by IBA Protected area to west	RSCN N. Ghor IBA Nature based tourism
North Shuneh	Village	Expansion to north Agriculture to west Mixed use to east Bus stop IBA to west	F. Group recommended Housing market adjacent to scenic Wadi Arab Road to Irbid connects North Ghor IBA ties to nature based tourism
Mu'ath Bin Jabal	Village	Not on map/tiny	Focus Group recommendation farm road
Wadi Arab	Dam site	Tourism overlay surrounded by Protected Area	Nature based potential with hiking trail; picnics Road being built from Irbid to N. Shuneh will facilitate tourism
Al Manshiye	Municipality	Light industrial Bus stop Mixed use to east Agriculture to west	Cold storage facility Olive processing plant
El Aramshi	Village	Agricultural to North, West, South East mixed use Open space to east	Focus group recommendation Residential growth Steep topography
Waqqas and Cleat	Village Farm units west	No expansion Agriculture North East and South East	 Pilots for Xeric crops based on soils/topography
Amir Bin Abi Waqqas Tomb	Religious Site	In Waqqas and Qleat	Religious tourism Companions of the Prophet Trail
Shurhabil Bin Hasna	Dam Site	Tourism and protected area Open space further east Mixed use/residential Further east	Nature based tourism North Ghor IBA west Hilly topography Flatter areas and scenic along Wadi Ziglab
Tal Al Arbain	Village and Site	Protected Cultural Heritage site Surrounded by Agrciculture North Ghor IBA to West and South West Sheik Hussein Bridge Border Zone	Significant Archaeology

Area	Current Land Use	Recommended Land Use	Rationale (Market Decides)
Zimalia	Village	Village expansion to East; farm units North, South, East	Focus Group recommnedation experimental crop land/agriculture improved efficiency tomato to more Xeric Cattle grazing area Focus group regional pool Might be built in village expansion area
JVA "finger" lands from south of Umm Qais to Wadi Al Rayyan are recommended as Open Space or Lands to be returned to the Treasury.			
Mashara	Municipality Farm Units	Expansion to East Expansion agriculture to north	Focus Group recommendation Area for agro tourism Xeric grasses medians Reccommended regional crafts Production in municipality Focus Group said $10 mm allocated
Tabqat Fahl (Pella)	Archaeological Area	Protected Cultural Heritage	Tourism potential as Pella has a Visitor Center/important site
		Open Space to E.Open Space to east Bus Stop	Recommended sign from north to Pella Archaeological Site
MAP 02			
Wadi Al Rayyan (was Al Maraza)	Municipality Farm Units Undeveloped Undeveloped	Expand/connect south to Wadi Al Rayyan (was Wadi Al Yabis) Retain agriculture to west Institutional to South Mixed Use Bus Stop	Focus Group recommendation More water efficient crops Focus Group cemetery request Residential to East
Wadi Rayyan	North Ghor Industrial Estate	Industrial	Existing Need dairy and cold storage engine recondit.
Wadi Yabis	Dam Site	Tourism Overlay Protected Area east	Fish Farm Recreation Linked for nature tourism Protect wadis
Kurkuma	Village Mixed Use Agriculture	Cultural Heritage Protected with development restrictions Residential etc. to west to south	Cultural tourism Linked to Nature Integrated and Scenic
Abu Habeel	Village	Expansion south to Karn Nearby WWTP Agriculture to East	Focus Group Focus Group – Productive Land
Tel Sherhabil	Archaeological Site	Preserved Cutlrual Heritage	Significant site (Cluster of 10 archaeological sites that could be linked from Wadi Rayyan to Kraymeh)
Tell Abu En-N'aj	Archaeological Site	Protected Cutlrual Heritage	Significant tombs

Area	Current Land Use	Recommended Land Use	Rationale (Market Decides)
Tell El-Kharaz	Archaeological Site	Protected Cutlrual Heritage	Significant sites
Karn	Village	Agriculture	Surrounding Focus Group recommended center for Disabled
Tell El-Maqbara Tell Abu Hamid Tell El-Handaquq	Archaeological Sites	Protected Cutlrual Heritage	Significant sites
Sleikhat	Village	Protected Cutlrual Heritage Tourism Open Space to east Protected area to south	Vernacular village Economic opportunities Famous old fig tree Recreation
Abu Sido and Kreymeh	Village	No expansion Agriculture to west and south of Kraymeh Open space to east Mixed use further east Protected area along road	Pilots non-citrus Residential near dam
Wadi Kufranjeh	Suggested Dam	Tourism and Protected Area Residential Protected Area	Nature tourism Parkland/picnics Protected wadis Low density potential Wadi Kufranjah Dam – Potential for regional Parkland?
Tell Es-Saidiyeh	Archaeological Site	Protected Cutlrual Heritage	Significant site
Balawna	Village Farm Units west	No expansion Mixed use to North and South Agriculture to east Protected area to east	Residential Focus Group Protect wadi
Abu Obeidah	Religious	Protected Cultural Heritage	TourismArea. Needs café/visitor information, pilgrimage housing
Tell El-Maza	Archaeological Site	Protected Cultural Heritage	Significant Site
Khazma and Dirar	Municipalities Farm units to west	Expansion to east Agriculture	Focus Group Recommend pilot for new cropping patterns (date, palm, olive) Alfalfa?
Dirar Tomb (Tomb of the Venerable Companion Dirar Bin Al-Azwar)	Religious Site	Protected Cultural Heritage	Religious Tourism
Al-Rweha	Village	Expansion east	Focus Group Connects to large protected area
King Talal Dam	Dam	Proetcted Area Tourism Overlay	Opportunity for linear hiking trails, nature based tourism, biking trail linking to Jarash all along Zarqa River and parkland. Could be farming in future if pollution cleaned up.
Tell Deir Alla	Archaeological Site	Protected Cultural Heritage	Significant site/lovely with limited visitor facilities

Area	Current Land Use	Recommended Land Use	Rationale (Market Decides)
Deir Alla	Municipality Farm Units	No Expansion	Potential for improved tourism as tourism village with nice downtown and Deir Alla site; signage with interpretation well located for guest house, café catering to JV tourists with handicraft center/women workshop. Min of Agriculture Extension Station in village Existing farm growing roses with recycled water volcanic mulch –pilot
Tell El-Fukhar	Arcahaeological Site	Protected Cultural Heritage	Significant Site
North Twal	Village Farm Units	No expansion Agriculture	Productive agricultural land
West Twal	Village Farm Units	No expansion Agriculture	Productive agricultural land Near Deir Alla dump Needs maintenance (smell, insects)
Mu'addi	Village	Expanded East and South	Focus Group Recommended Export Marketing Center in village
	Undeveloped	East Open Space	
	Industry in farm units (Agricultural Markting and Processing Co. of Jordan)	Industrial	Existing assets
Al Ardhah	Municipality	Expansion east	Focus Group WWTP to west Tourism in village Handicrafts Center To be coordinated with womens cooperative Vernacular arch. Of adobe and stone stacked wall. Mechanics Train Center expand to Vocational School/comprehensive
	Undeveloped	Open space east	Hilly land
	Undeveloped	Protected Area south	Focus Group park and picnic area
	Farm Units	Agriculture west	Existis, productive zone of greenhouses and date palms
	Industry/Polystyrene	Industrial	Existing
El Twal	Archaeological Site	Cultural Heritage	Significant site
Damia	Municipality Mixed Use	No municipal expansion Surrounding village	Near Prince Mohammad Bridge Economic Development Potential
	Farm Units	Industrial	FG need for plastic recycling, organic fertilizer, agricultural packaging, textiles, furniture, equipment for handicapped, existing marble quarry
	Farm Units	Agriculture to South	

Area	Current Land Use	Recommended Land Use	Rationale (Market Decides)
Tell Umm Hamad El Sharqi	Archaeological Site	Protected Cultural Heritage	Significant site
Tell El-Mantah	Archaeological Site	Protected Cultural Heritage	Significant site
Tell Umm Hamad El-Gharbi	Archaeological Site	Protected Cultural Heritage	Significant site
Tell Damieh	Archaeological Site	Protected Cultural Heritage	Significant site
Dahrat Al Ramleh	Municipality Undeveloped Farm Units	No expansion Sports City to North Mixed Use to North Open space to East Agriculture to West	 Regional need for active recreation JVA request Existing, tomatoes Might be area for cropping pilot
MAP NO. 3			
Karamah	Dam Site Undeveloped Farm Units Undeveloped	Commercial Tourism Light Industry southwest Recreation adjacent Protected area Agriculture west, east, south Open Space west	Fish Farming Pilot with a Training Center and Restaurant – Local Tourism Integrated development plan with industry/design controls Bird watching is doubtful Production of aerators and nets/support fish Regional active recreation. Could include regional swimming pool Picnic sites Cattle feed lot (Focus Group) Hilly topography, no services
Karamah	Municipality Undeveloped Farm Units Undeveloped	No expansion Institutional Bus stop Agriculture west Mixed Use east Open Space east	Against Focus Group request North for agricultural and vocational training center Focus Group regional veterinary center
New Shuneh	Municipality	Expansion all directions	Focus Group request
South Shuneh	Municipality	Expand into one Bus stop	Integrated plan with Shueib Dam area Visitor services Handicraft training
Shueib	Dam site	Protected Area with Tourism overlay	Nature tourism with picnic/hiking Focus Group request Link to Salt, Fuheis if road built
Cluster of 3 Tells: 1. Tell Edh Dhahab 3. Tell Ghrubba 4. Tell El Charas	Archaeological Site	Protected Cultural Heritage	Link between Wadi Shueib and Jordan River Signifant Sites Link Maghtas IBA and proposed reserve plant

Area	Current Land Use	Recommended Land Use	Rationale (Market Decides)
Jordan River	Security Zone	Nature Tourism	Jordan River Trail Hiking/Biking Corridor Links north to Dead Sea Winter Low Altitude Training Center
King Hussein	Bridge Farm Units Undeveloped	Border Zone Tourism overlay Protected Area	Security and tourism King Hussein Khan Caravanserai for Pilgrims and Cultural Heritage tourism Corridor north and south Nature tourism
Al Jofeh Al Jawasreh	Municipality Undeveloped	No expansion Protected Area	Link to Kafrein Dam protect dam/wadi Local recreation
Kafrein	Dam site	Tourism Overlay Commercial Open Space to east down to Dead Sea	Scenic area; potential for fishfarm/canoeing surrounded by Cultural Heritage sites and Al Jafar Ostrich Farm Link to Jordan Valley Fish Farm
El Hammam	Archaeology	Protected Cultural Heritage	Significant sites
Al Shaghour	Village	Expansion to North	Need for residential housing for Dead Sea tourism employees
Al Rawdah	Municipality Undeveloped	Expansion to west Open space to east	Housing Dead Sea Hilly Topography
Hisban	Dam	Protected with tourism overlay	Fish farming Well located as regional parkland, picnic area
Tell Er Rama	Archaoelogical Site	Protected Cultural Heritage	Significant site
Es Sadd El Gharbi	Archaoelogical Site	Protected Cultural Heritage	Significant site Should be linked to the Baptism site for tourism
Tuleilat el Ghassul	Archaoelogical Site	Protected Cultural Heritage	Significant site
Al Jalad Al Nahda	Village Undeveloped	Expansion Open Space	Important area for housing for Dead Sea employees Hilly topography
Map. No. 3 / INVESTMENT LANDS (Sigma Study Area)			
Baptism Site	Tourism Reserve Undeveloped King Abdullah Bridge	Cultural/Religious Protected Area	Tourism/visitor services RSCN Jordan River Reserve Maghtas IBA Important tourism link
Suweimah	Municipality	Sports or Recreation Open Space to east	Regional “sports city” Could be protected area For youth camp Need regional health facility Focus Group and housing for Dead Sea employees

Area	Current Land Use	Recommended Land Use	Rationale (Market Decides)
Maps No. 3,4 and 5 / DEAD SEA PARCELS			
Parcels 25	River Path	Protected Land	Link to Jordan River Trail for hiking and biking
Parcel 26	Katar Land	Protected Land	Suweimah National Park JVA gave Ministry of Tourism and Archaeology 1,000 Dunums for park
Parcel 28	Undeveloped	Protected Land	Integrate into park
Parcel 29	Undeveloped	Protected Land	Suweimah National Park
Parcel 31	Some residential	Protected Land	Integrate into park (Dead Sea National Park and Nature Guide Training Institute with camping facilities and Dead Sea Low Altitude Winter Training Center (for Olympic atheletes) Protect IBA
	** It is important to design this area as an integrated nature reserve/training area, which would have tremendous appeal to visitors.* ** JVA , MOTA, and RSCN could jointly build, operate, and manage this area for significant revenue generation and training* ** Although I realize they are revenue generators, with the water conservation thrust of this master plan and the local disinterest in golf, I do not recommend a golf course, unless it was the type that has been developed in the Dominican Republic, i.e., Punta Cana Resort has golf course grass that is drought and salt tolerant, irrigated with gray water from dishes/laundry, organically grown fruits and vegetables, bird tourism, zoning to maintain small human footprint, 2000 acre ecological reserve that includes a 10 acre biodiversity lab and field station, drawing researchers from all over the world.*		
Parcel 27	Undeveloped Undeveloped (private)	Sports/Recreational Mixed Use	Regional sports city Commercial - Medical regional facility
Parcel 30	Developed	Tourism/Hotel	Dead Sea Spa
Parcel 32	Undeveloped	Municipal	Expansion of Suweimah will be critical to providing housing for Dead Sea hotel employees in the future
Floating	Within Suweimah	JV Bus Transit Station	Locate along road
Parcel 30	Developed	Tourism/Hotel	Dead Sea Spa
Parcel 33	Jordan Intelligence	Institutional or Commercial	JVA Planned Resort for employees Could include training facilities
Parcel 34	Social Security leased (JVA tore down old rest house)	Commercial	Restaurants area needed not hotel to give a more public edge to this end of the Dead Sea and to support the Convention Center
Parcel 35	JVA leased to Social Security	Commercial	Retail and office area including art galleries, sports rental shops (biking), retail shops, etc.
Parcel 36	Wadi	Protected Land	Water run-off
Parcel 37	Undeveloped (plan shows youth camp)	Mixed/Residential (luxury apartments)	Managerial staff housing Long term rental income for JVA
Parcel 38	JVA Employee Housing	Residential	Whteher for JVA or other, this is a good land use

Area	Current Land Use	Recommended Land Use	Rationale (Market Decides)
Parcel 39	Military Land	Protected Area	Suweimah Public Beach
Parcel 40	Army checkpoint	Protected Area	Suweimah Public Beach
Parcel 41	Undeveloped (15 dunums)	Institutional	Mediterranean Culinary Institute (training)
Parcel 42	JVA		
** This could stay under JVA's ownership through a lease; allows training for tourism and operational support for catering of the Convention Center and planned KH ME Hydrology Center. Could work jointly with farmers and Hydrology Center to create public awareness of foods/menus related to less water intensive crops. Gives these parcels a semi-public edge to the sea.* ** Recommend conservation of archaeological site across road from parcel 42*			
Parcels 43-47	Undevelope (now public beach and camel rides)d	Institutional	King Abdullah Middle East Hydrology Center (Owned by His Majesty) Could be operated by MWI, JVA, WAJ, and provide state-of-the-art training and research facilities
** Water will be the primary issue in the decades ahead. The Dead Sea is very symbolic of our international loss of water, and Jordan could become a leader in water conservation and management. Facilities would include international standard water and energy conserving building design, research facilities, laboratories, GIS/computer labs, office space, storage space, breakfast café, and training. The Centre can use the convention centre for international meetings, and can house visitors in the surrounding hotels. The Mediterranean Culinary Institute can cater meetings at both. This could be a good revenue generator for JVA, and a teaching facility for MWI's staff.*			
Parcel 48	Undeveloped	Mixed Use	Tourism Village (both parcels)
Parcel 49	Undeveloped	Residential and Commercial	
** It will be imperative that there be a safe pedestrian crosswalk for this already planned project. Could incorporate a Red Rocks Amphitheatre for musical performances, festivals, etc., through which JVA could create significant revenue.*			
Parcel 50 Parcel 51	Undeveloped (leased to Bank currently) Consolidate with private owner	Mixed Use/Commercial	Boat dock and souk Create night-time entertainment to avoid problem at Petra Facilitate non-motorized water boating/sea taxi system. All 3 could be Significant revenue Generators for JVA
Parcel 52	Undeveloped (leased to Sunday Co.)	Tourism/Commercial	Hotel
Parcel 53	Unknown		
Parcel 54	Convention Center	Institutional	Conferences and meetings
Parcel 55	Undeveloped (leased to ACCOR)	Tourism/Commercial	Hotel
Parcel 56	Marriott	Tourism/Commercial	Hotel existing
Parcel 57	Movenpick	Tourism/Commercial	Hotel/Spa existing
Parcel 58	Kempinski	Tourism/Commercial	Hotel, Apartments, Spa (Under Construction)
Parcel 59	Dead Sea Spa	Tourism/Commercial	Hotel and Spa existing
Parcel 60	Undeveloped (across road - planned for JVA employee housing)	Mixed Use/Residential	Well designed housing or other residential use, e.g., assisted living
Parcel 61	Undeveloped (JVA leased to Bella Vista)	Tourism/Commercial	Hotel planned
Parcel 62	Power Station (across road from beach)	Institutional	Power Station built
Parcel 63	Undeveloped (JVA leased to Sharm)	Tourism/Commercial	Hotel planned

Area	Current Land Use	Recommended Land Use	Rationale (Market Decides)
Parcel 64	Undeveloped (JVA leased to Crowne Plaza)	Tourism/Commercial	Hotel planned
Parcel 65	Undeveloped (Treasury land) Police Tower	Institutional	Dead Sea Heritage Center with World of Salt Museum – could include cultural heritage training facilities
** JVA could also retain this under its authority and operate it jointly with DOA/MOTA. It would promote CH and provide a significant day-time educational activity for travelers passing through and local school children, as well as hotel/spa guests and local residents. Training facilities would promote standards of cultural heritage authenticity and cultural value. Its gift shop would promote local handicrafts and agro-products. A design studio would provide local residents and hotels with assistance on following Dead Sea design regulations, and provide information on vernacular architecture. It could also assist with preservation of cultural heritage villages and cultural landscapes, and training for village museum design. It would compliment the Lowest Museum on Earth and provide a valuable resource for all Jordanians.*			
Parcel 66	Undeveloped beachfront (JVA & Amman Mun.)	Protected Area	Public beach needed (*Please provide naturalized beachfront, unlike existing Amman Beach; lighting and visitor services should be set back)*
Parcel 67	Water Treatment Plant (beautiful wadi with palms)	Institutional	Water Treatment Plant (infrastructure exists underground – need to build plant)
Parcel 68	Consolidated with parcel 67	Institutional	Wastewater Treatment
Parcel 69	Satellite Receiving Station (existing)	Institutional	Satellite Receiving Station
Parcel 70	Electrical Company (existing)	Institutional	Power Station
Parcel 71	Developed	Tourism/Visitor Information (linked to Dead Sea and Mujib)	Dead Sea Panorama
Parcel 72	Undeveloped beachfront	Tourism/Commercial if lease maintained Protected Land if lease broken	(146 dunums/Crystal City/Dubai Pearl tourism) Across from Dead Sea Panorama road access point
This appears to be the best land along the Dead Sea, which the developer recognized. However, my belief is that the best land should always be under the purview of the government of the country, and therefore I am recommending protected area with limited camping and facilities and relatively undeveloped shoreline. The Amman Beach is wedged into an infrastructure area, and it could be relocated here. *It would allow the Dead Sea a long public edge for local and international nature based tourism, allowing people to experience the Dead Sea as it has been seen for thousands of years without hotels. It is a very scenic area that could be tied into the Archaeological Park, and provide more long-term income to JVA and the GOJ than a hotel lease or sale will.*			
No Parcel #	Archaeology	Protected Cultural Heritage area	Zara sites
Zara is a well excavated site on the shoreline that links through Roman period to Callirhoe excavated but abandoned site across road – both Roman medium significance sites. Both could be interpreted and become significant cultural heritage sites on the tourism circuit. For revenue generation, could include a small gift shop with archaeological reproduction jewelry, books, maps, tshirts, etc., and a fruit juice kiosk and shwarma stand – very little fast food available along the Dead Sea.			
Parcel 73	Undeveloped beachfront	Protected Area (Parcel 72 and 73 would be integrated)	Public beach

Area	Current Land Use	Recommended Land Use	Rationale (Market Decides)
Parcel 74	Developed with restaurant (lease should be discontinued due to litter, example of negative architectural style)	Tourism/Commercial	Shoreline needs some non-hotel refreshments area; area has hot springs that need preservation could draw nature based tourism
Parcel 75	Agriculture and Res.	Protected area	Recommend that this be a combined tourism/institutional area, linked to Mujib and Zara CH and featuring agricultural pilot Xeric nursery and interpretive garden, perhaps with higher up campsite; this could be a good revenue generator for JVA and land owners. Note: This would also link to the Dead Sea Trail (walking/nature and geology
Parcel 76	(Princess Basma/Zara)	Institutional	
Mujib	Reserve and IBA	Protected area	Nature based tourism
Mujib	Dam site	Tourism overlay	Fish farm potential and link tourism to Mujib
Parcel 77	Developed (owned by Intelligence Department)	Institutional	Police Station
Parcel 78	Developed	Institutional	JVA Directorate Offices
Parcel 79	Developed	Institutional	2nd Police Station built
Parcel 80	Developed	Institutional	Fire Station built
Parcel 81	Developed	Institutional	Power Station
Parcel 82 Parcel 83	Undeveloped	Mixed/Residential	Area very rocky Limited high end housing. Could do a small commercial tourism attraction like the Arabic World of Tea and Coffee
Note: Rarely are the Arab world's strong ties to tea and coffee used for tourism purposes, other than drinking. There is ample opportunity to use these common products, tied to the JV's agro potential as a tourism asset. This idea is taken from an existing tourism attraction in Colorado called Celestial Seasonings. This company simply packages tea, but they have used their imaginations to make it into a very successful tourism attraction in Boulder. Included are guest tours through an art gallery of illustrations for their tea boxes, a Tea Sampling Bar with 50 varieties, a Celestial Herb Garden tour, a Mint Room, gift shop, café, and a factory tour to show how they produce the tea bags.			
Parcel 84	Developed	Institutional	Telephone exchange building
Parcel 85	Developed	Institutional	Power Station built
Parcel 86	Undeveloped	Institutional	Parking currently- Could be a staging area for hiking/climbing
Parcel 87 and 88	Undeveloped	Mixed/Residential	High end low density retirement housing
Parcel 89	Undeveloped	Institutional	Military zone across from power station
Wadi Ibn Hammad	Agriculture	Agricultur and protected	Wadi Ibn Hammad IBA

Area	Current Land Use	Recommended Land Use	Rationale (Market Decides)
Ibn Hammad	Proposed Dam	Tourism overlay Prtoected Area	Fish farming/picnic and parkland in protected area with Dead Sea (geological) trail running along edge of site Birdwatching
Wadi Karak	Proposed Dam	Tourism overlay Protected Area	Fish farm/picnic area within IBA Birdwatching
Mazraa and Mazraa Madineh	Villages	Expansion	Along Dead Sea trail – can provide- can provide services
	Undeveloped	Residential to south and east Farm Units to West and East	
		Agriculture to west	They are already growing sunflowers, date palms, bananas here; opportunity for Xeric plants-pilot.
	Salt Flats	Open Space to west	Housing exists pt of area
	Industry/mechanics	Industrial to south Mixed Use along road located in this area buffering industrial	Arab Potash industries
Recommendation is to move garages away from road front and create a nicer commercial presence for locals and tourists buffering the industrial development.			
El Qasr	Archaeological Site	Protected Cultural Heritage	Significant site – tie into Cultural Heritage/ nature based tourism Xeric grasses, oats, alfalfa
Khirbet Esal	Archaeological Site	Protected Cultural Heritage	Significant sites
Rujm Numeira	Archaeological Site	Protected Cultural Heritage	Significant site
Umm Halasheem	Village	Expansion to southwest Tourism overlay Institutional South	Focus Group recommendation Linkages to Lots Cave and Lowest Point. Museum JVA offices
Safi Ramleh	Village	Expansion to northwest	Focus Group recommended cold storage; food processing
Note: Wadi Hasa, the traditional border between Moab and Edom (on St. George's map in Madaba), is just south of Safi Ramleh. This could be exploited as a religious/CH site with a marker and interpretation and be linked to nature based tourism, as quite picturesque.			
		Protected Area	Wadi Al Hasa
Map No. 6			
Tannour	Dam site	Tourism overlay Protected Area	Fish farming and nature based tourism
Al Naqa	Village	Expansion to north Mixed use to south	Focus Group Housing needed
Al Sammar	Village	No expansion but Mixed/Residential to East Agriculture to West IBA area Protected area Institutional Under Development Area	Housing for industry Fifa Reserve Opportunity for nature and agro tourism South of Fifa Reserve For Muatah University (experimental farm) JVA needs to study land

Area	Current Land Use	Recommended Land Use	Rationale (Market Decides)
Al Selemani	Village	No expansion recommended	Nature based area – could Link community to Bird tourism/IBA Dana reserve to east
Fedan	Dam site	Tourism overlay	Fish and nature based
Map No. 7			
Ain Fedan West and East	Villages	No expansion	Nature based tourism
Fidan	Archaeological site	Cultural Heritage site	Ancient copper mines Byzantine church
Fenan	Village	No expansion	Nature based tourism. Nearby is RSCN's new campsite/visitor facilities within IBA – halfway between Dead Sea and Petra – good caravanserai stop
Beemathkor	Village	No expansion Under Development Area	 JVA needs to study
Wadi Musa	Dam suggested	Tourism overlay Protected Area	Fish/nature based Fifa Reserve(proposed)
Map No. 8			
Al Resheh	Village	No expansion Under Dev. Area to North, West, East IBA to south Cultural Heritage	 Campsite/Bedouin. Living heritage opportunity Roman fort with one tower visible
Wadi Abu Barqa	Dam	Tourism Overlay	Fish/nature based
		Fifa IBA surrounds dam site	Birding Links outside mandate to Jabal Masuda Proposed reserve. Tourism links to Southern sites: Showbek, Petra, Wadi Rum, Aqaba
Map No. 9			
Rahmeh	Villag	No expansion IBA surrounds area Institutional Cultural Heritage	Nature based tourism Birding/Beduoin living heritage Opportunity for Great Rift Valley Badia Nature Center Roman fort
** Great Rift Valley Badia Nature Center – to promote environmental awareness about the desert, training, visitor facilties including youth campsites, hiking trails, café with local traditional foods, camel and jeep tours, Wadi Araba Spring Desert Bloom Festival.*			
Wadi Rahmeh	Dam proposed	Tourism Overlay	Fish farming/nature Based tourism
Qatar	Village	No expansion	Nature based tourism

*Please note that Tourism is intended as an overlay zone with limited commercial in support of tourism needs; dam sites are also part of greater environmentally protected areas to promote nature based tourism.

Figure 42: Dead Sea Parcels

Figure 42: Dead Sea Parcels (contd.)

5.3 Land Use Selection Criteria

Land use criteria presented in Table 40 were discussed and agreed upon by the Study Team. The chart is very comprehensive and includes all the issues related to judging land use. However, the numbering system could be simplified to 1-4 if it becomes unwieldy to use. These criteria were submitted to the Jordan Valley Authority for their review. Under Phase Two of this project, the Land Use Planner recommends that JVA use the criteria in discussing land uses with the recommended task forces.

Table 40: Land use evaluation criteria for a sustainable Jordan Valley preliminary land use plan

Category	Criteria	Scoring	Impact Score
1. Economic Development Benefit to Community	1.1 Creation of Jobs	* High * Moderate * Low * None * Low * Moderate * High	+3 +2 +1 0 -1 -2 -3
	1.2 Generation of Income	* High * Moderate * Low * None * Low * Moderate * High	+3 +2 +1 0 -1 -2 -3
	1.3 Development of New Economic Opportunities for Women and Youth	* High * Moderate * Low * None * Low * Moderate * High	+3 +2 +1 0 -1 -2 -3
	1.4 Development Infrastructure	* High * Moderate * Low * None * Low * Moderate * High	+3 +2 +1 0 -1 -2 -3
2. Social Development Benefit to Community	2.1 Poverty Alleviation	* High * Moderate * Low * None * Low * Moderate * High	+3 +2 +1 0 -1 -2 -3
	2.2 Strengthening of Cultural Heritage and Values	* High * Moderate * Low * None * Low * Moderate * High	+3 +2 +1 0 -1 -2 -3

Category	Criteria	Scoring	Impact Score
3. Environmental Preservation	3.1 Improvement to Existing Conditions	* High * Moderate * Low * None * Low * Moderate * High	+3 +2 +1 0 -1 -2 -3
	3.2 Environmental Awareness and Promotion Community Stewardship	* High * Moderate * Low * None * Low * Moderate * High	+3 +2 +1 0 -1 -2 -3
4. Historic Conservation	4.1 Site Protection	* High * Moderate * Low * None * Low * Moderate * High	+3 +2 +1 0 -1 -2 -3
	4.2 Improved Conservation Management	* High * Moderate * Low * None * Low * Moderate * High	+3 +2 +1 0 -1 -2 -3
5. Tourism Development	5.1 Infrastructure Enhanced	* High * Moderate * Low * None * Low * Moderate * High	+3 +2 +1 0 -1 -2 -3
	5.2 Sustainable Tourism Promoted	* High * Moderate * Low * None * Low * Moderate * High	+3 +2 +1 0 -1 -2 -3
6. JVA Benefited	6.1 Improved Land Use Planning	* High * Moderate * Low * None * Low * Moderate * High	+3 +2 +1 0 -1 -2 -3

Category	Criteria	Scoring	Impact Score
	6.2 Revenue Generated for Operations	* High * Moderate * Low * None * Low * Moderate * High	+3 +2 +1 0 -1 -2 -3
7. Water Constraints	7.1 Return per cubic meter	* High * Moderate * Low * None * Low * Moderate * High	+3 +2 +1 0 -1 -2 -3
	7.2 Marginal Water Used	* High * Moderate * Low * None * Low * Moderate * High	+3 +2 +1 0 -1 -2 -3
	7.3 Conveyance System Availability	* High * Moderate * Low * None * Low * Moderate * High	+3 +2 +1 0 -1 -2 -3

Explanation of Weighting Scores:

* High Positive Impact	+3	* Low Negative Impact	- 1
* Moderate Positive Impact	+2	* Moderate Negative Impact	- 2
* Low Positive Impact	+1	* High Negative Impact	- 3
* No Impact	0		

5.4 Sustainable Environment and Economy

Just as land use planning should be based on existing conditions, the definition of economic development should always be based on local assets including human, natural, locational, and cultural. The English words "ecology" and "economy" are derived from the same root, the Greek word oikos, which means "house." What is necessary to keep our economic house in order is to maintain our ecological house, and that is the basis for sustainability. The Jordan Valley will also need to maintain a level of diversity in order to be competitive, with affordable housing for agricultural and industry employees and a better quality of life for their families, including protected areas for picnics and walking and active recreational areas.. This improved quality of life will also include good quality schools and public safety, as well as affordable housing. Jordan Valley's private and public sectors will need to be interdependent with a sense of community, to share diminishing resources and to create new resources with a strong ethic of cultural and natural preservation to promote tourism.

5.4.1 Training Needs

The key to sustainability through new cropping patterns, improved water management and tourism development, as well as to new occupations or alternative livelihoods, is training. Although this is not part of land use planning, we have included the following indication of

training needs, as provided by the Focus Groups. This might become a more formalized Training Assessment, as a tool for understanding how to transform from a primarily agricultural economy to a more diversified agricultural, industrial, tourism based economy.

The Focus Group participants strongly expressed their needs for the training presented in Table 41.

Table 41: Training needed

No.	Training	South Ghor	Middle Ghor	North Ghor
1-	Training in Carpentry, Mechanics and others	X	X	X
2-	Computer Training	X	X	X
3-	Other (packing of agricultural produce)	-	X	X
4-	Training in Tourism , Agriculture and Industrial Fields	-	X	X
5-	Training in establishing small projects	X	-	-

The respondents from north to south expressed the need for vocational training such as training in carpentry, mechanics, computer skills, agro-processing, tourism development, and others. Training in the field of packing agricultural products was expressed strongly in the North and Middle Ghor, while training in establishing small projects was highly expressed in the South Ghor.

5.4.2 Environment

On the baseline maps, the land use of "Protected Environmentally Sensitive Areas," which includes reserves, park land, picnic areas, walking trails, and buffer zones, are color coded dark green with plant symbols. Important Bird Areas or IBAs (migratory routes and habitats) sometimes fall within this land use, and on the baseline maps they are rust colored with a bird pattern. The rationale for this land use includes prevention of habitat degradation and species loss, protection of the wadis, and promotion of and linkages to nature based tourism.

Specific areas that are color coded as protected areas are:

Northern Study Area

1- Yarmouk IBA
2- Yarmouk Nature Reserve (proposed)
3- North Ghor IBA
4- Maghtas Protected Area (proposed)

Middle Study Area

5- Maghtas IBA
6- Suweimah National Park. This study proposes that a number of parcels merge to become one protected area called the Dead Sea National Park.
7- Mujib Nature Reserve (Existing)
8- Mujib IBA

Southern Study Area

9- Wadi Bin Hammad IBA
10- Fifa Proposed Nature Reserve (proposed)
11- Fifa IBA
12- Dana Nature Reserve (existing)
13- Dana IBA
14- Jabal Masu'da Protected Area (proposed)
15- Wadi Araba IBA
16- Qatar Protected Area (proposed – mud flats)

5.4.3 Agriculture

Existing agricultural land area (color coded lighter green) was not decreased on the maps, as the Jordan Valley is part of Jordan's "breadbasket," agriculture is the traditional way of making a living in the Jordan Valley. Instead within the existing agricultural land uses, changes to cropping patterns and water conservation strategies were recommended. Limited agricultural bands were placed around a few communities at the request of the focus groups as part of their expansion. Agricultural land is often planned as a method for preserving viewsheds close to primary highways to facilitiate tourism development.

5.4.3.1 Changes to Cropping Patterns and Water Usage

From the Study Team's research, it appears that the primary issue is not one of land being planned or zoned for agricultural use, but rather the types of agricultural activities that occur on that land, i.e., cropping patterns and water management. The next step for JVA should be to focus in on specific agricultural lands, per this report's analysis, and work with farmers to change their crops from water intensive to much less water intensive with access to training for improved farm management and realistic markets. Most traditional foods in Jordan are not very water intensive, and can be maintained. Crops that should be almost totally restricted include banana and citrus, which are not economically viable with brackish water.

Replacement crops that should be encouraged include maize, mango, avocado, artichoke, seedless grapes, sunflowers, olives, figs, barley, wheat, alfalfa, and Xeric grasses and plants, but they should be encouraged within a framework of understanding market conditions and access. Xeric plant nurseries would be a good business in the JV. The concept is not new to Jordanians. For example, Al Beit University is using Xeric grasses in its landscaping.

Although focus groups indicated that date palms had been overplanted during the past season, the price for dates in Amman is heady. Desert Delights/Medjool Dates sells 500 grams for 8.5 JD in Amman's five star hotels. Besides other areas, there is a large and seemingly well managed and successful date palm plantation below the JVA Resthouse at Deir Alla.

As USAID Lebanon has learned from extensive work with SRI, olive oil and Middle Eastern herbs and spices have a strong market potential for export to the European Union (EU) and the US. With regard to spices, Germany alone imports $158 million per year in spieces, followed by Spain at $114 million, then France, the Netherlands, Sweden, Belgium, Denmark, Finland, and the UK. Competitors would be India, Brazil, Spain, China, Morocco, Turkey, Iran, Tunisia, Egypt, Morocco, and Lebanon. The best prospects are bulk, high quality whole spices, and dried and frozen herbs. Of particular interest for potential in the JV are distinctive Middle Eastern spice mixtures.

With the rising popularity of ethnic food, organic food, and prepared food, there is a growing demand on the world market with rising prices for spices including oregano, anise, badran, fennel, caraway, coriander, cumin, thyme, sage, parsley and mint, rosemary, and mixes. One of Jordan's most traditional but novel mixes is za'atar or sumac and oregano.

In the short term, there is potential for Jordan Valley farmers to focus their efforts on growing organic high quality spices and herbs, which could be dried and sold whole in bulk for Middle East spice mixtures to the primary centers of Rotterdam, Hamburg, and London, where the spices are ground, processed, and re-packaged. They are then exported to the big spice companies like Burns, Phillip and McCormick, and Daregal.

In the longer term there would be higher profits for farmers in grinding, processing, packaging and marketing themselves, and in attracting EU investors to tap markets and distribution channels. The focus needs to be on quality and timely delivery, and products

would have to comply with strict export standards. The tariff situation would have to be explored, but the EU was willing to reduce Lebanon's tariffs by 100% in 2003.

This new industry could fall under agricultural land use and JVA's mandate to create revenue generating activity. It would require training in organic architecture and new crop patterns, marketing to key trade shows (Paris and Koln), and positioning within the region. Constraints include production costs (labor and land), organic certification, transportation, quality control standards, but the Jordan Valley through its traditional cuisine is well positioned to enter this market.

5.4.4 Tourism

Tourism has tremendous growth potential in the Jordan Valley, particularly nature based tourism with a strong market of regional expatriates and Europeans, as well as a growing local interest. Cultural heritage, including religious, and health or spa based tourism, is already well established, but also has room for additional tourism sites and linkages. The proposed land use plan follows the five guiding principles to Sustainable Cultural Heritage Tourism, according to the National Trust for Historic Preservation: preserve and protect resources, find the fit between community and tourism, collaborate, make sites and programs come alive, focus on quality and authenticity. There is also room to expand sports tourism, such as the existing 50 km Dead Sea Ultra Marathon.

Macro issues, which have been studied outside this land use plan, will always impact the success of tourism in the JV, including insufficient marketing and promotion to overcome a negative regional image, too few trained and skilled workers, an aging airport and visa system that needs improvement (particularly a change to the two week policy that requires registration with the police or a daily fine), lack of a film commission office that could draw directors to the Valley, additional infrastructure such as sewer and telecom networks, and perhaps most important a dwindling water supply. However, on the positive side, the Jordan Valley boasts incredible natural beauty, extraordinary geology, internationally known named sites (Dead Sea), a growing diversity of tourism products and services, and good roads.

Under Jordan's "National Tourism Strategy Initiative" (NTSI), 2004-2010, the Dead Sea was included as one of six Primary Tourism Centers in Jordan, with Irbid, Amman, Petra, Wadi Rum, and Aqaba. Azraq, Dana, and Karak were viewed as Secondary Tourism Centers.

The industry leaders who participated with AMIR in the strategy made a number of recommendations that are reflected in this proposed Jordan Valley Preliminary Land Use Plan. Environmental standards were a major concern, and appropriate policy recommendations included:

- strengthened protected areas with improved trained nature guides and international standard signage and brochures (as most visitors can not understand the significance of sites without professional interpretation);
- improved handicraft development with increased promotion and reduced pricing with a special center to develop Jordanian traditional and contemporary handicrafts and agro-products;
- development of "green hotel" standards wherein hotels are encouraged, and in some cases mandated, to conserve water and energy through conservation and recycling;
- stronger agency coordination among MOTA, MOE, RSCN, JVA, MOA, with local communities playing a much larger role through training in environmental awareness and micro-enterprise opportunities related to nature based tourism;
- recycled water and increased use of solar in agriculture and fish farming;
- an improved public bus system;
- appropriate landscape and architectural design standards that include the local culture and character to strengthen the Jordan Valley's image; and

- development of a circular flow of income from tourism to protected areas to enhance sustainability.

Specific activities that the Strategy recommended, which the Land Use Plan facilitates, include information centers with rest stop facilities; nature based hiking, biking, camping, bird watching, geology/rock climbing, desert safaris, and non-motorized boating; culture based preservation and presentation of archaeological sites (and development of cultural heritage tours); development of smaller lodging facilities related to community benefit (such as rural gite or bed and breakfast through adaptive reuse of old buildings with character); health spas; business activities in support of the hotels and convention center at the Dead Sea (meetings, conferences, scientific research); night-time activities including shopping and dining (important to note that like Petra, the Dead Sea received a "0" for activities to do after 6 pm, which is a tremendous problem for increased length-of-stay; day time activities including local museums and agro processing as community based micro-enterprise; religious routes; preserved beaches; local picnic and recreational areas. The Land Use Plan does not encourage golfing in the Jordan Valley, unless it was an experimental course of sand and Xeric grasses, similar to those being tested in Australia.

The Jordan Valley Authority has the opportunity through good land use planning to encourage hotel development in the north ghor where hotels are at a minimum, and to encourage nature based tourism throughout the JV and particularly in the south ghor with its sensitive landscape. In the central Dead Sea area, the JVA has the opportunity to stop the mistake of hotel over-development, while at the same time to preserve the desirable natural characteristics of the Dead Sea area. The carrying capacity of the Dead Sea needs to be finally determined, perhaps by the RSCN study that is to follow this JVA study.

Once the region stabilizes, development of a regional integrated master plan, involving Jordanians, Palestinians, and Israelis, under the framework of a UNESCO Biosphere and World Heritage site, should be undertaken, as has been recommended by FOEME.

5.4.4.1 Conservation Strategies

In order to promote tourism, areas of natural beauty and biodiversity that require protection, are detailed on the land use map. These cultural landscapes anchor people, and give them a sense of who they are.

Conservation of archaeological sites throughout the Jordan Valley is key to a land use plan that results in cultural heritage tourism. Working with DOA, the Study Team identified 52 sites on the baseline maps that should be protected due to their significance, and they are listed under Section 4, Cultural Resources. On the maps, the sites that are recommended for land use preservation are color coded tan with an internationally recognized museum symbol.

Most are called "Tells," although many have much more recognizable common names which should be added to the land use maps for tourism linkages. Few have visitor improvements at this stage, other than at Umm Qais, Pella, Deir Alla (limited but promising), and the Baptismal Site. The maps do not include sites that are outside the Study Area, such as Jerash, the mosaics of Umm Rassas, Showback and Karak Castles, or Petra, but these are obviously linked through tourism routes.

Many of the sites could be better presented for tourism, including Zara the Roman port along the Dead Sea; Et Twal, the Bronze age site near Al Ardah; Khirbet Issa, a multi-layered site from Nabataean to Islamic ruins that could tell a very strong story without much to actually visualize; Bir Mathkur, the copper and caravan route from Petra; Fifa, another early Bronze to Islamic site; Qasr Al Riashi, and Gharandal.

Some that are particularly important and already protected and presented include the Baptismal Site, Lut's Cave near the southern end of the Dead Sea; and Fidan which is receiving support from JVA for tourism interpretive facilities.

The central Zara part of the Dead Sea should be preserved as a natural shoreline between the northern hotel zone and the southern potash zone, with and archaeological park and undeveloped public beach area for local and international tourism. This would preserve the historic, authentic character of the Dead Sea in an undisturbed linear pattern to the west and along the Wadi Mujib Nature Reserve. Preservation is essential to nature based tourism, which with its high international growth rate, particularly in regard to Jordan's regional expatriate and EU based markets, has perhaps the strongest potential of all tourism segments.

5.4.4.2 Tourism Linkages and Trails/Routes

Jordan offers multiple layers of civilization, including Neolithic, Nabataean, Roman, Byzantine, Islamic, Crusader, Ottoman, and British Mandate periods. Tourism linkages and tours highlighting those periods of history and targeting the Jordan Valley include the following. The land use plan identifies a generic nature based trail or route sprinkled with educational and interesting cultural heritage stops. Providing this type of marketing material for tour operators can increase visitor length of stay and spending patterns in the Jordan Valley.

The stops along this route, which runs from the NJVSA to Wadi Araba in the SJVSA, and might be called the *Great Rift Valley Nature Tour and Animal Safari,* include- protected areas and IBAs, camp sites, and visitors information. Specific stops from north to south in the Jordan Valley are:

- Stop 1 – Al Webdeh Dam (hiking, fish farm, café, canoeing, related tourist facilities)
- Stop 2 – Yarmouk River Reserve and IBA (camping, birdwatching, hiking)
- Stop 3 – Al Mukheiba Al Fouqa (tourism related facilities including Zara Hotel, hot springs, restaurant, handicrafts, shopping)
- Stop 4 – Umm Qais/Al Mukheiba CH (archaeological site visit, handicrafts, vernacular architecture, café option, etc.)
- Stop 5 – Wadi Arab Dam (tourism facilities including canoeing, swimming, hiking; very scenic area)
- Stop 6 – Beginning of the Jordan River Trail to the Dead Sea (hiking, protected wildlife)
- Stop 7 – N Ghor IBA (birding)
- Stop 8 – Mashara/Tabqat Fahel (Pella – Decapolis city/linked CH archaeological sites)
- Stop 9 - Sleikat CH village (vernacular architecture, ancient tree, living heritage economic opportunities including handicrafts, music, dance, and ties to agro tourism products)
- Stop 10 – Deir Alla (village and archaeological stop; very pleasant area; opportunity for stronger tourism related facilities including café and festival)
- Stop 11 – Zarqa River/King Talal Dam Protected Area (hiking on a linear trail linked through North Ghor IBA to Jordan River Trail
- Stop 12 – Karameh Dam (fish farm restaurant, fishing, hiking on adjacent Jordan River Trail)
- Stop 13 – Shuneh and Shueib Dam – hiking
- Stop 14 – Baptism Site
- Stop 15 – Dead Sea National Park and Maghtas IBA (camping, birdwatching)
- Stop 16 – Dead Sea World of Salt Museum and Heritage Center

- Stops17a and 17 B – Mujib Reserve Visitors Center and Campsite (IBA bird watching)
- Stop 18 – Hiking the Dead Sea (geological) Trail and Wadi bin Hammad IBA
- Stops 19a and 19b – Luts Cave and the Lowest Museum on Earth
- Stop 20 – Fifa Reserve (Beduoin living heritage, camping, camel rides, jeep rides)
- Stop 21 – Dana Reserve (CH village visit, hiking into canyon, camping or stay at visitors facilities above the ridgeline; gift shop)
- Stop 22 – Finan Visitors Center and Campsite (CH archaeological site – ancient copper)
- Stop 23 – Fifa IBA (birding, camping option for those who didn't stay at Finan)
- Stop 24 – Wadi Araba Badia Center (north of Qatar)

Other types of tourism linkages or trails, which could be developed with MOTA or JTB, include the following:

(a) *Pilgrim's Path of the Companions and Prophets* (local and international interest – 48 tombs, mosques, and shrines are open to visitors), -Linkages outside the Jordan Valley include Prophet Dawud/David's Shrine in Mazar Al-Shamali, Prophet Hud's Shrine near Jerash, Prophet Yosha/Joshua's Tomb and Prophet Ayyub/Job's Tomb near Salt, Prophet Yahya/John's Death at Mukawir, Prophet Musa/Moses at Mt. Nebo, Prophet Noah's Shrine, and Prophet Harun/Aaron's Tomb in Petra.

Sites inside the JV include the Yarmouk Battle Site, Tomb of Venerated Prophet Mu'ath Bin Jabal, Mosque and Tomb of the Venerable Companion and Guardian of the Islamic Nation Abu 'Ubaydah 'Amir ibn Al-Jarrah; Tomb of the Venerable Companion Dirar bin Al-Azwar, Battle of Fahel and Pella, Tomb of 'Amir bin Abi Waqqas, Prophet Isa/Jesus' Baptism Site and Gedara Cave, and Lut's Cave at Ghor Safi.

(b) *On the Hajj Trail* - forts route from Damascus to Aqaba; could do partial re-enactment of a 16th C. 34 day journey from Damascus to Makkah;

(c) *Journey In the Footsteps of Moses, John, and Jesus or Land of Moab* - linking to Madaba and Mt. Nebo/Siyagha, as well as Mukawir/Palace of Herod, Hammamat Main or Baths of Moses, Dead Sea Panorama, Wadi Kharrar/Jesus's Baptism Site, Luts Cave, Petra/Jebel Haroun or Aaron's Tomb,

(d) *Conserving the Most Precious Resource - Water* - mini-tour for biologists and hydrologists focused on the Dead Sea, including National Park/Field Institute (could model after the Grand Canyon Field Institute), King Abdullah Center for Sustainable Hydrology,

(e) *Spice or Nabataean Trade Route* - Wadi Rum, Petra, King's Highway along the Dead Sea, north to Damascus with regional linkages;

(f) *Decapolis Cities (Jerash, Umm Qais, Pella) to Vernacular Villages of the Jordan Valley* (requires a survey but would include the CH villages on the land use plan as well as Dana and Sila in the south);

(g) *Those Dam Tours are for the Birds* - utilizing the Jordan Valley dam sites at Wadi Arab, King Talal, Shueib, Mujib, perhaps Karamah;

Friends of the Earth Middle East have promoted the concept of a Free Tourism Area (FTA) along the northern shore of the Dead Sea, where tourism would be concentrated, and tourists could freely cross international borders. Assuming that regional stability will occur, this is an excellent concept and one that should eventually be considered in terms of land uses.

5.4.4.3 Handicrafts and Agro or Geo Products

JVA could work with the Ministry of Social Affairs to better organize the myriad of NGOs (Al Aydi, Jordan River Foundation, Queen Noor Foundation, and Queen Alia Foundation) involved in handicraft training and production, and create larger and more sustainable programs. The Study Team has identified the programs that link to tourism on the baseline maps.

Like Mexico, JVA might want to work with USAID, UNESCO, and American Express Foundation to involve international organizations that are highly skilled at training in folk art and pottery, such as Mexico's National Development of Folk Art NGO, to create alliances of handcrafters and artisans in the Jordan Valley. (The goal of the USAID funded project in Mexico is to include 10,000 potters.)

Currently in the Jordan Valley, banana fibers are used to make trays and other products. At a larger scale, if banana remains a crop for some time into the future, a training program to include export furniture design should be established. The natural fibers of the banana tree can be woven into relatively light, high end accessories and furniture, such as small cubed tables. Palm tree fibers can be woven into expensive journals and photo albums.

Other agro products should reflect traditional Middle Eastern cuisine. The Bear River Heritage Area of Utah, an area also arid but picturesque and without many resources, has been quite successful in producing heritage products with local villagers ("Blessed by Water, Worked by Hand"). At a reasonable cost, they have worked with local resources and strengths to develop village museums, historical farms and farm stays, fruit and vegetable markets along scenic drives with historical markers, small bed and breakfasts and campgrounds, fishing, handicrafts such as rug and wheat weaving, pottery, and specialties in local agricultural products (ice cream, cheese, soaps, bakeries, jams, and festivals). This is a good example of what can be done with limited resources, and resources that are very similar to those of the Jordan Valley.

Geo products that could strongly reflect the Dead Sea's memorable geology include jewelry (earrings and bracelets) made of local rock, glass, resin, and silver. Such high value products are labor intensive and easy for tourists to carry home – the key to success is in the design.

5.4.4.4 Promotion and Marketing

JVA should coordinate its efforts to promote tourism with DOA, MOTA, JTB, RSCN, and the Ministry of Religion as the primary players in cultural heritage, including religious and archaeological/historical, health/spa, and nature based tourism. JTB should coordinate with the private sector, to be sure that there is a comprehensive framework in the Jordan Valley for promoting tourism at every opportunity (visitor's centers, information kiosks, hotels, museums, municipalities, etc.).

There are a number of handicraft development projects scattered throughout the Jordan Valley, but products are not available to tourists along the long route from the northern tip to Aqaba, except at a limited number of five star hotels. RSCN presents their own products at Dana, and will probably offer them at the Mujib Visitors Center and at Fenan. Normally, a tourist must purchase local Jordan Valley products in Amman. It is anticipated that the renovated Zara hot springs hotel in the north will link to local handcrafters and present their products.

However, local people need more access to tourism markets. Handicraft training will be encouraged through actual sales and visitor expenditures. Each NGO that develops a handicraft project should also assist and train local people in establishing a kiosk or small handicrafts center that is very visible to tourists along the main road (either under the land use

of commercial or institutional). In addition, there could be well presented small shops at Umm Qais, Pella, Deir Alla, Dead Sea Heritage Center, Shuna, Suweimah, Fifa, and Fenan.

JVA should also create a "buy local" policy with the private sector, so that local people are hired, and foods, plants, flowers, art, handicrafts, etc. are all purchased and promoted by the tourism sector, particularly the Dead Sea hotels.

5.4.4.5 Investment and AMIR Projects

In 1998, the AMIR Program developed Jordan's first investor targeting strategy, entitled the "Investor Promotion Strategic Plan." The goal was to identify those sectors and industries that were most appropriate for promotion by the Jordan Investment Board (JIB). The plan recommended that the JIB focus on six areas, most of which include the Jordan Valley. They include downstream potash and phosphates, textiles and apparel, Dead Sea cosmetics, information technology, tourism, and pharmaceuticals. In early 2003, AMIR worked with JIB to update the strategy. Currently, the AMIR Program is working with the Jordan Investment Board and the Jordan Tourism Board and its Jordan National Tourism Strategy 2004-2010 on the Investment Promotion Sectoral Strategy for tourism. It is strongly recommended that this three year investment promotion strategy be closely coordinated with JVA's Preliminary Land Use Plan for the Jordan Valley.

5.4.5 Industry Recommendations

Industrial developments have a strong impact on the growth of municipalities and the value of residential and tourism properties. Light or non-polluting industry, when properly located and screened as necessary, can enhance communities by providing jobs without negative health effects. The costs of mitigating the impacts of heavy or polluting industry, which normally require sizeable chunks of land and infrastructure, can out-weigh the benefits.

This land use plan recommends very little traditional industry infrastructure, as a significant number of plants already exist in Zarqa, at the southern end of the Dead Sea, and in Aqaba. Seemingly other industrial adventures in the NJVSA have tried and failed, as plants were closed. It is clear that there is not much water available for industry, but it is also apparent that local people would like to work in various enterprises. What is less clear is how successful (profit and loss) local industries currently are, and what types of industry could succeed in the Jordan Valley with the existing population and resources. Before encouraging much additional industrial land use, this should be better understood.

However, some industrial activities that tie to improved agricultural practices and international demand are encouraged, such as olive oil and other types of agro-processing. Farmers could continue to plant olives in cooler areas of the north and some orchards in the JV, but an international standard olive oil processing center could be established in one or two of the industrial land use areas of the JV. Today sunflowers are used primarily for wind breaks or local consumption. They could be processed into sunflower oil. Small industrial enterprises for mixed spices and herb processing, such as lavender products, might also be encouraged by small scale, light industrial land uses.

5.4.6 Municipalities

5.4.6.1 Boundary Expansion

Municipalities provided with expansion:

- Al-Mukheiba Al-Tahta
- Al-Adasieh
- Baqura
- North Shuneh
- Zimalia
- Mashara'
- Abu Habeel and Karn
- Khazma and Dirar
- Al-Rweha
- Mu'addi
- New Shuneh
- South Shuneh
- Al-Rawdah and Al-Shaghour
- Al-Jalad and Al-Nahda
- Suweimah
- Mazra'a
- Umm Hasheem
- Safi Ramleh
- Al Naqa'

5.4.6.2 Services and Facilities

The focus group participants concentrated their requests for additional services under a few main infrastructure areas, including water and sewer networks, dump sites, bus service, more comfortable schools, vocational training centers, tourism training, handicrafts development, agro food processing plants, and regional medical centers.

In addition to those requests being identified as possible activities within proposed land use zones on the maps, the Study Team recommends regional reading centers under institutional land uses (or a mobile library bus could be implemented to travel north to south) and adaptive reuse of village architecture as cultural heritage amenities including small museums and visitors centers.

5.4.6.3 Zoning Enforcement

The Study Team observed many municipal problems along the road side, including littering and informal solid waste disposal, buildings that were built in the road right-of-way, lack of gateways and physical identity, lack of sidewalks or walking trails, few shaded bus stops, etc. Many of these are municipal issues that fall under their zoning enforcement and responsibility, but perhaps a pilot project with the municipalities would encourage better zoning and development.

6.0 Framework for a Fish Farming Pilot Project

6.1 Global Aquaculture

The global fish catch has been declining since the 1980s, and it is estimated that 75% of global fish stocks are depleted. At the same time, the world-wide demand for fish has increased (with average per person consumption doubling in the past half a century), fueled in some countries by personal income growth and changed eating habits. While supply of seafood declined and governments increased their efforts to preserve stocks, the price become more expensive, as there is still not enough farmed fish to stem the price rise. This is very different than the declining prices of animal products, such as chicken, beef, and milk, which have plummeted in real terms over the past 30 years.

For thousands of years people have raised fish for food on a small scale, mainly in ponds. Science has allowed this to expand to large farms. Now aquaculture or producing fish for profit is one of the fastest growing industries in the world. Already 25% of seafood consumed globally is produced through aquaculture. According to the United Nations Food and Agriculture Organization, this percentage is projected to rise to 40% by the year 2010.

China is the world's largest producer of farmed fish, and its goal is to alleviate nutritional deficiencies in rural areas. The value of aquaculture production in Australia reached over $600 million in 1999 – 26% of the total value of Australia's fisheries production – and aquaculture is expected to increase four-fold to $2.5 billion over this decade. In the US, the fastest growing segment of agriculture is aquaculture, and centers for aquaculture technology are springing up at universities to provide research and management expertise on design, operations, and pollution control. The major fish farms are in Mississippi, Georgia, and Alabama. America imports about $10 billion dollars worth of farmed seafood each year.

Many countries are getting on the band wagon. Malaysia has identified 442,000 hectares of land as Aquaculture Industrial Zones which have the potential to produce 790,000 metric tons of fish per year. This is an enormous number. In the Middle East, fish farms are quite common in Israel, Saudi Arabia, Kuwait, UAE, Lebanon, Syria and Egypt.

6.2 Jordanian Aquaculture

The capture of fish in the Gulf of Aqaba has been rapidly declining over the years, from 125 tons in 1985 to only 15 tons in 2000. Last year Jordan imported 1000 tons of sea fish and 16,000 tons of frozen fish, for a total of 17,500 tons in the existing market. The local aquaculture industry projected that if fresh fish from aquaculture was priced competitively with frozen fish (from 1.8-2.2 JD per kilogram) and public awareness campaigns occurred, the annual aquaculture market could increase to 2000 tons, plus exports to Europe and elsewhere.

Jordan also needs to create strict governmental controls to prevent disease and pollution. New South Wales' sustainable aquaculture strategy, which applies to estuarine pond, freshwater pond, and tank based recirculation saline or fresh water aquaculture, offers a good example of strong regulation and a clean growing environment. The strategy is comprised of two interlinked components: a best management practice (BMP) and an integrated approvals process. The BMP encompasses business planning, site selection and design, facility operations, and performance requirements to meet strict environmental regulations. The integrated approvals process includes an up-front preliminary assessment of risk to the environment from a fish farming proposal. Those that are rated lower risk only require a Statement of Environmental Effect to demonstrate compliance with a BMP. Those identified as high risk require an environmental impact assessment (EIS) to be licensed to operate. The strategy is designed to ensure environmental protection, but at the same time to encourage well managed start-up operations to not be held back by the approvals process.

In Jordan's government, the Department of Animal Wealth is supposedly responsible for aquaculture, but they could not supply any information to the Study Team. The Aqaba Marine Science Station is also involved in aquaculture. An agency should be identified to actively participate in the industry, and JVA could be that agency.

On the NGO-side, the Near East Foundation (NEF) has long been involved in the aquaculture industry, dating back to a USAID funded project in 1986. Most of their work has involved simple, low-tech projects to assist farmers in the JV to set up small fish farming operations. In interviews, NEF stated that there are six fish farms operating in Jordan. In the Jordan Valley there are four, including the Arab Fish in the Northern Study Area. In the Middle Study Area, the Jordan Valley Fish Farm or Taloubia operates as detailed below, plus Al-Natoor Fisheries and Al-Taba'a Fisheries. The two fish farms outside the Jordan Valley are Al-Jafari fisheries in North Azraq and the Jardaneh Fisheries in Sukhneh-Zarqa. NEF is working with KAFA'A on a project to take fish farming to a higher level in Ghor Safi. Under that project, small farmers will receive micro-loans to buy fingerlings, fish feed, and technical assistance.

NEF has an extensive amount of research and information on fish farming, and this should be coordinated with JVA and utilized through training and a simple publication in Arabic. NEF and the KAFAA project are working to stimulate interest and lend credibility to fish farming, to eliminate past problems of improper facility design and inexperienced farmers.

In the private sector, two interviews were held with the Jordan Valley "Taloubi" Fish Farm, the largest fish farm in Jordan and the most successful aquaculture operation. The farm was established on 274 dunums in 1996, and is well located at 50 km from Amman and .5 km from the Baptism site. The initial investment was $10 million through local investors, with technical expertise supplied by Solar Aqua Farm in California. The plant is designed and equipped to conform to the latest US and EU hygienic food processing standards.

Taloubi produces tilapia, a hardy and disease resistant fish that thrives in brackish water, and contains 18% protein and 1% fat. Compared to catfish, tilapia reaches market size of 500 grams within six months from the fingerling stage, as compared with 18 months for catfish. In addition, tilapia's shelf life (fresh quality between distribution and purchase) is more than 14 days, while many fish have a shelf life of only 6-8 days. With a controlled environment including steady warm temperatures and consistent water quality, Talapia can be grown all year round. Jordan Valley Fish Farm produces 600 tons annually and sells 450 tons to the local market. Due to insufficient local demand, it operates at only about 40% of capacity, which is 1500 tons of fish per year.

The operation is a closed greenhouse system that uses saline or brackish water. Facilities include hatcheries with breathing tanks that produce ½ mm fish eggs per month. Each tank holds 7000 fish or 3.5 tons per tank at ½ kilo each. The hatching period is nine months, with maximum production from August – December.

At nine months, the fish are moved from ponds to cages through an underground, 300 meter long fiberglass tunnel. Their destination is a fasting tank where they are deprived of nutrients for three days to eliminate a negative smell. The fish are then put on ice where the temperature shock firms the meat. The final stage is processing, where the fish are either sold in Taloubi's restaurant or packed as filets or whole fish, and put on refrigerated trucks. The restaurant was opened with 100 chairs, and has been serving 1000 patrons on Fridays.

6.3 Karamah Fish Farm RFP and Pilot Project

The JVA has published a Request for Proposal (RFP) that encourages implementation of a fish farming pilot project using brackish water at the Karamah Dam. There are already three types of fish present at the dam: tilapia, carp, and catfish.

In terms of economics, tilapia is the primary market for saline fish farm production; the carp market is small with exports primarily to Israel and the US. It takes approximately six to seven hours to cross from Karamah to Israel's Tanova and Malysia companies where most Jordanian fish are exported. Catfish is quite a popular fish in the US, and it could be sold to tourists at Jordan Valley hotels and perhaps to local people.

The RFP covers farming "alpha alpha" to be used as animal feed, fish and fishing equipment industries, and tourism activities (bird hides, boating, and a restaurant). This obviously holds potential for socio-economic benefit, and both its economic cost/benefits and environmental impacts and management plan should be adequately studied. According to a Jordanian fish farm expert, 300 dunums could produce 300,000 fingerlings. In addition to exports, 2000 fingerlings could be sold to smaller local fish farms. The brackish wastewater could be used to irrigate salt-resistant alfalfa fields or other animal feed crops for which there is high local demand. Such an operation might employ up to 50 people, with the primary cost being feed. Profits could be shared with the dam's owner, the Ministry of Water, and this is another opportunity for JVA to create operating revenue.

Sustainable facilities should include organic agriculture and renewable energy. Wind turbines should be analyzed. In addition to serving fish creatively and in a variety of different ways, Xeric agricultural products could be grown with wastewater and served in the restaurant. Solar powered cells could provide either primary or backup operational power for filtering and consistent water temperature and oxygenation; and recycled wastewater. Fish waste could be processed into feed as a commercially viable by-product.

Jordan Valley focus groups stressed that farmers with large irrigation ponds are interested in using them for fish production. As was mentioned during the interview with NEF, in Ghor Safi, small farmers already produce 300 kg or ½ ton annually of tilapia in the warm months, stopping operations in the winter. Training is the key to encourage smaller operations. If a farm is small scale, an open system is more cost effective (less than 1 JD to produce 1 kg that is sold for 1.55-2.3 JD), but nets would have to be used to keep out predatory birds. Therefore, smaller fish farms should not be located in migratory bird routes. At the pilot project, local farmers could be educated through courses and facility operations, and they could be brought to the restaurant on "fam" or familiarization trips to learn about organic, Xeric crops.

A training center could also benefit the commercial enterprise's long-term profit margins through providing a ready supply of interns and apprentices. Such programs could be organized through Jordanian universities with international universities and aquaculture organizations, such as the Harbor Branch Oceanographic Institute in the US which specializes in short-term workshops (e.g., Small-scale Recirculating Aquaculture Systems to produce a healthy tilapia culture and Aquaculture Marketing and Sales), the Virginia Tech's Aquaculture Center and Department of Fisheries and Wildlife Sciences with its BS, MD and PhD programs and state-of-the-art aquaculture laboratory, or the Virginia Institute of Marine Science at the College of William and Mary which offers an MS and a PhD. Areas of specialization include hatchery or fishery technicians who do not require a college degree, biologists and quality controllers, operational managers, and fish veterinarians.

In addition to being commercially profitable, the pilot should be set up to include training areas with wet and dry laboratories to improve or help to create Jordanian university fish farming programs or vocational programs to provide students with real life training through commercial production. The Near East Foundation has indicated that the main impediment to

fish farming in Jordan is the lack of training of human resources and another impediment is marketing.

In terms of other facilities, as indicated in describing Taloubia, a pilot fish farm includes a fish hatchery where eggs are incubated. This should be able to produce live feed including micro algae. A nursery or pond could produce fingerlings, to be sold to other fish farms or to grow to maturity to be sold to the public. Other facilities include a place for fish packaging and storage areas. Nearby, a second fish related industry could be established to produce aerators and feeders and fish nets, all of which are currently imported into Jordan but are easy to manufacture.

For tourism development, the project should include commercial activities such as a restaurant that educationally incorporates local but relatively unknown Xeric agricultural products, including artichokes and avocadoes into the menu with free recipe cars, to promote and create public awareness. It should also include a visitor's center with a conference room and educational publications explaining farming techniques and illustrating that farmed fish does not have to be fatty, dyed, or filled with antibiotics. From the visitor's centers, local and international visitors should be able to participate in "behind-the-scenes" educational tours and demonstrations on fish farming and water recycling, and a walking tour of an interpreted landscape of Xeric plants that are watered with recycled brackish or saline water.

The facility might also include non-motorized boating, and could host an annual Fish Farm Festival with JVA, a family style event for local and international tourists with traditional live oud and drum musicians, hands-on demonstrations such as "How to grow fish in your backyard" and "How to fillet a fish," and booths set up for local handcrafters to display their products.

In terms of operations, strategies to meet the following challenges should be clear:

- maintaining the health of the fish to avoid crippling global diseases,
- feed with sufficient nutrients,
- hatchery productivity,
- farming systems that generate less effluent,
- rigorous standards for food safety,
- local acceptability of farmed fish as either replacement for fresh fish or a new addition to a traditional diet.

Environmental concerns include:

- The project site and design – closed or open system and the implications,
- Water quantity and quality required (including the sources of water and the exploitation of saline water – water recycling systems should be used,
- Surrounding land uses,
- Pollution (including prevention and control activities),
- Fish nutrition, feeding, use of fertilizers, hormones and chemicals,
- The impact of attracting birds to the site and the impact of control techniques (hunting, nets) on the biological environment,
- Introduction of alien species,
- Methods of disposing of the pond water and waste, and
- Fish diseases.

There are also opportunities for JVA to expand fish farming into other dam sites, as identified on the land use plan, and perhaps into the brackish water from the King Talal channel and the King Abdullah Canal, with strict environmental protection standards and management. It is

believed that if the Red Sea Dead Sea project is implemented, there is an opportunity for fish farming in its lagoons.

Table 42 below illustrates costs associated with small fish farms, as provided by NEF:

Table 42: Costs associated with small fish farms

Costs	JD	Returns	Unit
Feed	400	Average production	600 kg/pond
Assistance	40	Average price	2 JD/kg
Fingerlings (2,100)	130		
Total cost	570	Total Returns	1,200 JD
Net Returns per pond = 1200 – 570 = JD 630			

7.0 Policy Recommendations

7.1 Conservation and Promotion within the Government

(a) Work with RSCN to establish a management plan and carrying capacity for the Dead Sea basin, based on resource conservation and visitor experience. This should include stakeholder involvement. It might include review of a UNESCO Biosphere Reserve or WH site. It might also include a boundary field survey and ecological resource survey;
(b) Work with the Ministry of Environment to improve environmental review of all projects in the Jordan Valley,
(c) Work with WAJ to improve and increase water conservation, reduce fluctuation of water and groundwater aquifer depletion, and reduce use of water by industry, tourism, and agriculture,
(d) Work with the Ministry of Education, NGOs, and private industry to create effective vocational training programs with appropriate equipment, facilities, and instructors,
(e) Work with the Ministry of Agriculture which is responsible for extension services, the National Center for Agricultural Research and Technology Transfer (NCARTT), NGOs, and farm associations to educate MOA's engineers in sustainable agriculture, i.e., to decrease the number of non-productive or water intensive farms and to improve the size and efficiency of small and medium agricultural holdings; improve access to micro-credit, and create effective training programs to meet export standards and related marketing;
(f) Work with local communities to design and implement public awareness programs and alternative sustainable economic development programs to stop looting and other forms of destruction on archaeological sites.

7.2 Architectural and Design Guidelines

The design guidelines presented herein are intended to guide the decision-making of the Jordan Valley Authority regarding exterior design of structures. Guidelines also address landscape. It might be useful for the JVA to organize an Architectural Commission, or decision-making body to, based on the strength of the legislation and its compliance requirements, either review and recommend or review and approve applications for new construction.

With regard to existing construction, other than archaeological sites, there are few historic structures in the Jordan Valley. However, those vernacular villages that exist should be preserved to promote the integrity of the cultural landscape, i.e., the buildings or village can be recognized as belonging to a particular time and place in the Jordan Valley's history, a physical record of time, place, and use.

Preservation is the act or process of applying measures to sustain the existing form, materials, detail and setting, to include stabilization and repair work. Rehabilitation is the process of returning a property to a good use, while still preserving its original features, including the decorative features, position, proportion, and materials of doors and windows, masonry and mortar characteristics, roof form and materials, and historic landscape. Another objective would be to minimize the visual impacts of new mechanical systems and equipment and to place additions at the rear of the building.

Rehabilitation includes adaptive re-use of a structure. Adaptive re-use entails conversion from a building's original use to a new use while retaining historic features. This should be encouraged as a tool for economic development. A compatible use is one that requires minimal alteration, e.g., residential to a small house museum, restaurant, or handicrafts shop.

Elements of integrity and distinctive features might include overall massing, form and materials, architectural details, any other example of craftsmanship, and the relationship of the building(s) to the surrounding landscape. When possible, deteriorated original features should be repaired rather than replaced. When the severity of the deterioration requires replacement, the new features shall match the old in design, color, texture, materials, and other visual qualities. New additions shall be differentiated from the old, but shall be compatible to protect the historic integrity of the property and its environment.

With regard to the Northern Zone of the Jordan Valley, there are few if any design standards. Villages and municipalities are responsible for zoning and building regulations within their borders, but they have not enforced their own zoning regulations. Thus, communities have little character or boundary definition. It will be important in the future for the JVA to work with municipalities to either create different enforceable regulations or to enforce those that already exist. For those government buildings that are outside the municipal boundaries, JVA and the ministries should look to the SOS Villages in Amman and Aqaba for guidance, with their vernacular but contemporary stone facades.

An interesting prototype for community awareness and tourism development that JVA might implement with USAID and US Department of Energy/National Renewable Energy Laboratory funds, is a 'zero-energy house,' similar to one that was recently built in Tucson, Arizona, with its similar climate, as part of a nationwide demonstration program to conserve energy and water. This could include adobe construction, which was typical to the Jordan Valley until the 1950s, solar space and water heating, energy saving lighting, low flow plumbing fixtures, and windows with awnings and wooden shutters to minimize heat gain during the summer.

With regard to the Dead Sea area, JVA began design regulations under the Sigma plan in 1997. New hotels have quite distinctive characteristics, which have begun to create an attractive Dead Sea style. The following recommended standards incorporate the 1997 recommendations and expand upon them, taking into account water and landscape conservation. They address not only hotel development but all types of development in the Middle Zone of the study area.

As is true in other Arab countries, such as Oman, Tunisia, Morocco and Egypt, architectural and landscape guidelines can protect existing resources and create a better living environment for local people and tourists. The Dead Sea's extraordinary geological formations should serve as a source of design inspiration, and natural landscapes should be only minimally disrupted for development.

Primary goals, which are based on a sympathetic relationship between the environment and architecture, and sensitive responses to context – climate, water, vegetation, and traditional building form – include water conservation, buildings that reflect their surrounding landscape in colour palette, buildings that incorporate traditional materials and designs, and tourism villages that reflect a vernacular character, similar to Dana, Sila, or other traditional villages in the area. Development should be phased to coincide with public infrastructure development, and developers should "proffer" or pay fees for infrastructure that supports their developments.

- **Primary Standards:**
    - Building height – maximum two stories for residential to prevent negative impacts on view-sheds,
    - Buildings and landform – stepped in response to the geology and wadis with careful preservation of the rock outcroppings,
    - Building roofs – flat rather than pitched,

- Building colors – to reflect the Jordan Valley desert and geology with traditional brighter accent colors (such as shades of blue and green) allowed, stone should not be painted,
- Building surfaces – mud brick, natural stone with traditional joints, or plaster with smooth not textured finish, and concrete to be used with discretion,
- Public Walkways – covered to provide shade,
- Windows – openings with vertical proportions and of wood fabrication - no reflective glazing and operable windows,
- Doors – wood rather than aluminum or metal,
- Screening – use of traditional mousharabia or similar wooden form to screen window AC units and satellite discs, particularly rooftop, and screening of service areas required,
- Building roofs – no corrugated metal, plastic, or fiberglass, clay and concrete allowed if in earthen colors,
- Fencing and Retaining Walls – Faced with natural materials, not metal, including grasses, adobe, plaster, or stone, depending upon the materials of adjacent buildings, both limited to a maximum height of 2 meters above grade,
- Signage – building identificational signs should be unobtrusive and of appropriate scale and materials without cluttering, no neon allowed; directional and community signs should be posted at gateways with legible lettering on the right-had side of the roadway facing on-coming traffic and should not be hidden from view, allowing time for appropriate approach and decision
- Lighting – limited, low level lighting; ground rather than pole lights for public buildings with no hanging fluorescent tubes,
- Water conservation and recycling – Water holding tanks or cisterns to capture rainwater, and native plantings or Xeriscaping to save water are mandated for all buildings, and water recycling is mandated for commercial/tourism facilities,
- Landscaping – that which respects the Dead Sea's unique and indigenous landscape, with utilization of native and non-invasive plant materials with low maintenance and low irrigation requirements (e.g., acacia, ficus, agave, aloe, artemesia, and native grasses), non-intrusive root systems near or on archaeological sites, naturalized beach areas with only palm trees or grasses and thatched shade – no artificial materials, and shaded parking lots,
- Sidewalks – 1.5 meters wide and uninterrupted by tree plantings, native shade trees to be planted outside the public walkway area to provide comfortable passage,
- Pedestrian Access (commercial and tourism developments) – Walkways or compacted soil pedestrian paths between buildings required to be built to discourage vehicular use,
- Infrastructure – designed to protect the environment – surrounding land form to be returned to its original state post-construction.

- **Secondary Standards – Encouraged:**
  - Traditional wood or stone lintels,
  - Traditional Bedouin tents,
  - Traditional wrought iron designed security bars,
  - Traditional courtyards,
  - Adobe architecture and its thermal advantages,
  - Energy conservation – wind tunnels for ventilation rather than air conditioning and solar panels and hot water heaters,

- Awnings to reduce solar glare,
- Eco-lodges with solar showers,
- Handicapped access where reasonable and feasible,
- Buildings sited for views of the Dead Sea or other natural amenities where possible,
- Adaptive reuse of buildings with cultural or historic significance with training for local people.

8.0 Phase III – JVA Recommended Action Items

(a) Preliminary Master Plan Completion – As a way to verify the land use plan recommendations with stakeholders, the Study Team recommends that JVA move to Phase 2, to include coordination of three task forces. Through a series of discussions the preliminary land use maps would be presented. The first would be a local government task force with JVA field staff and Jordan Valley local governates and municipalities to discuss preliminary land use maps and significant impacts on their socio-economic structure, such as income generation/jobs, safety, congestion, public health and safety services, and recreation.

The second task force would be a task force of associations and NGOs with representatives of the following: the Jordan Valley Farmers Association, the Union for Jordanian Farmers, the Jordan Exporters and Producers Association for Fruits and Vegetables, and the six universities that have Schools of Agriculture, to specifically focus on agricultural issues related to the land use maps.

The third task force would be a preliminary scoping session with DOA/MOTA/MOE and a group of environmental and cultural/social NGOs including RSCN (which is also doing a land use study of the Jordan Valley through GEF), the Water Conservation Association (WCA), the Jordan Environment Society (JES), the Friends of Environment Middle East (FOEME), the Jordan Society for Desertification Control and Badia Development (JSDCBD), the Center for the Study of the Built Environment (which has implemented a program on desert landscaping), and social NGOs such as Jordan River, Queen Noor Foundation, and Al-Aydi This final task force would discuss the linkages between the natural and cultural environment and local economic development related to tourism. It would focus on impacts to the natural environment, such as water, waste, erosion, visual aesthetics, and reserve/environmental management. It would also discuss impacts on the cultural heritage to include cultural resource management, archaeological resources, vernacular villages, and handicrafts development.

Once all the comments and recommendations were collected from both task forces, the Preliminary Land Use Plan would be re-discussed by JVA and revised appropriately to become the Final Land Use Plan that is presented to the Council of Ministers.

(b) Master Plan Approval and Implementation - Have the completed preliminary master plan approved by the government as the holistic and sustainable baseline survey and vision for the Jordan Valley. Implement an annual review policy to annually analyze the land use plan per market and other changes and update it with input from stakeholders.

(c) Monitoring and Evaluation System – After the Master Plan is implemented, organize monitoring and evaluation system of JVA field and Amman-based employees to create an on-going system through field reports, physical observation and verification, questionnaires, focus groups, training memos, progress reports on pilot projects, financial reporting, and analytical research for future improvements to the Land Use Plan.

Key performance indicators could include:

- resource deterioration averted and flora and fauna is conserved,
- sanitary and environmental conditions improved,
- increase in local employment and income levels in some sectors including new non-polluting industry,

- increase in training and skill improvement in all sectors including diversity of well designed and locally produced handicraft and agro-products,
- cropping patterns and farming systems increase water conservation,
- agricultural exports increased to EU and other countries,
- tourism number of visitors increased along with associated income to MOTA, DOA, RSCN, and JVA,
- visitor length-of-stay increased and associated improved occupancy rates and revenue to hotels, other tourism facilities, and communities,
- community access to public services and infrastructure improved,
- new building designs reflect communities' cultural values and energy and water conservation needs. This might include revival of traditional masonry, wood-carving, or other techniques, resulting in more jobs,
- new building typologies and housing are affordable for Jordanians and well appreciated by the culture.

(d) Pilots for Operating Income - Implement three to five pilot projects, one in each of the study zones, as sources of operational income for JVA, involving the private sector in operations (JVA Build, Transfer via Lease, Private Operation with JVA as lease-holder):

North Zone - Select and develop a fish farming or aquaculture site to serve as an example for future development (Karamah Dam under existing RFP); create a national park at Wadi Arab Dam for local tourism;

Middle Zone – Working with other agencies and in some cases the private sector, select and develop one of the many activities identified in this report (Dead Sea Heritage Center, Dead Sea Tourism Center; Sports Complex above the Dead Sea, Mediterranean Culinary Institute, King Abdullah Middle East Hydrology Center, Dead Sea National Park and Low Altitude Training Center);

Southern Zone - Select and develop a community driven cultural heritage tourism initiative and work with MOTA to implement it, e.g. pilot with Bedouin encampments and agro/traditional food growing, to include awareness sessions for herders and nature guide training, and to create a Great Rift Valley Badia Information Center in Wadi Araba;

(e) Water Conservation and Agricultural Strategies – Sustainable water resource management is the goal of the Preliminary Land Use Plan for the Jordan Valley. JVA's Irrigation Advisory Service field engineers have concluded that poor design and maintenance of irrigation systems contribute to loss of water and low value per cubic meter. Therefore, the JVA should rehabilitate irrigation networks, including drip and open field trickle systems, for water conservation and provide improved service to farmers, including fixing damaged water flow meters, clogged emitters, leaks, algae and organic slime and calcified pipes. In addition, it is our understanding that some of the agricultural engineers at MWI and JVA are underutilized. Therefore, MWI with the JVA could work with the Water User Associations to create programs to provide farmers with agricultural extension services to train them on water conservation techniques and proper crop selection including the use of Xeric native species; price water according to its true cost with short-term "grandfathering" or exclusion for small farmers, to give those who will suffer most from the removal of the subsidy time to change their habits; and include all industries in water conservation strategies. A certain percentage of revenue from higher pricing should be used to provide technical assistance to improved farm management for conservation and organic crop programs and to promote local community stakeholder involvement. It is critical that cropping patterns change to higher valued crops based on water conservation and market demand and access;

(f) Municipal Improvement Strategies – Work with local municipalities to create a pilot project that physically shows the result of implementation of appropriate zoning and building regulations.

ANNEXES

ANNEX 1
LIST OF INVITEES, INVITATION LETTER AND FOCUS GROUPS QUESTIONNAIRE

Annex 1: List of Invitees, Invitation Letter and Focus Groups Questionnaire

1 LIST OF INVITEES TO THREE FOCUS GROUPS SESSIONS

Table 1: Invitees to Zone 3 Gocus Gorup

No.	Focus Group Participants/Name of Institution	Participants Name	Phone Numbers	Number of Invited Individuals
1	Al-Hashimeyah University	Dr. Mohammad Waheeb	Fax: 05-3826613 05-3826823	1
2	Aqaba Governorate	The Governor of Aqaba: Mr. Khalid Abu Jaid	Fax: 03-2013964	1
3	Aqaba Water Authority	Assistant to Secretary General Mr. Bilal Al-A'asi	Fax: 03-2015982	1
4	ASEZA - Directorate of Environmental Planning - Division of Permitting & EIA	Dr. Bilal Al-Basheer	Fax: 03-2091021	1
5	Department of Antiquities	Director General of DoA Abd Sameea' Abu Dieh		2
6	Farmers Association	Representative	Fax: 06-5656834	1
7	Friends of Earth - Middle East (FOEME)	Abd Rahman Tamimi	Tel:06-5866602/3 Fax:06-5866604	1
8	German Technical Cooperation (GTZ)	Dr. Andreas Kuck	Tel: 06-5359726 Fax: 06-5350421	1
9	Ghor As-Safi Municipality: -Haditha -Mazra'a -Thera' -Umm Al-Hasheem -As-Safi -Noqa' -Summar -Fifa -Ma'moura -Ghwaybeh	Eng. Maher A'ksheh	Tel: 03-2302413/17 Fax: 03-2302417	11
10	Japan International Cooperation Agency (JICA)	Kobayashi Tsutomu	Fax: 06-5858924	1
11	Jordan Environment Society	Representative	Tel: 06-5699844 Fax: 06-5695857	1
12	Jordan River Foundation	Ms Maha Khateeb Eng. Ghaleb Qudah	Tel: 06-5932730 Fax: 06-5933210 / 5922652 Mobile (Eng. Ghaleb Qudah): 077-774840	3
13	Jordan Valley Authority	Secretary General - Eng. Zafer Alem Assistant Secretary General for Southern JV- Eng. Khaled Qsous	Eng. Khaled Qsous Mobile: 079-5571256	2
14	Karak Governorate	Governor of Karak	Tel: 03-2341001 Fax: 03-2341006 / 03-2341010	1
15	Karak Water Authority	Eng. Malik Al-Rawashdeh	Fax: 03-2351260 Mobile: 077-695783	1
16	Kreditanstalt für Wiederaubfbau (KfW)	Mr. Schmidt	Tel: 06-5674083 Fax: 06-5683402	1
17	Ministry of Agriculture	Representative		1

No.	Focus Group Participants/Name of Institution	Participants Name	Phone Numbers	Number of Invited Individuals
18	Ministry of Education	Representative	Fax: 06-5666019	1
19	Ministry of Environment	Representative		1
20	Ministry of Health	Representative		1
21	Ministry of Planning	Representative		1
22	Ministry of Religious Affairs	Representative		1
23	Ministry of Tourism and Antiquities	Representative		1
24	Ministry of Water and Irrigation	Representative		1
25	Motasaref of Southern Jordan Valley	Nayef Al-Hadayat	TeleFax: 03-2302808 Mobile: 077-391764	1
26	Noor El Hussein Foundation	Mr Mahmoud Hadid	Tel: 06-5607460 06-5606993 Fax: 06-5620864	1
27	Qada' Wadi Araba		Fax: 03-2062671	1
28	Qureiqra Municipality: -Qureiqera -Ain Fedan East -Ain Fedan West -Finan	Eng. Mashour Harb	Tel:03-2064179 Mobile: 079-5495357 Fax: 03-2302700	5
29	Tafilah Governorate	The Governor of Tafilah	Fax: 03-2242770 Tel: 03-2242800	1
30	Tafileh Water Authority	Eng. Khaled Al-Abddine	Fax: 03-2241188 Tel: 03-2242429	1
31	The Royal Society for the Conservation of Nature	Omar Abu Eid Yehya Khaled Chris Johnson	Tel: 06-5337931/2 Fax: 06-5347411	3
32	United Nations Development Programme (UNDP)	Boualem Aktouf	Fax: 06-5676582 06-5676582	1
33	United States Agency for International Development (USAID)	Mr. James Frankiewicz	Fax: 06-5920143	1
34	Wadi Araba Municipality -Be'r Mazkour Reesheh	Eng. Wajdi Al-Thalaeen	Tel: 03-2062588	2
35	Water Authority for Southern Regions	Secretary General Eng. Jihad Al-Sakrat	Tel: 03-2354249 Fax: 03-2351260	1
			Total # of Invitees	**56**

Table 2: Invitees to Zone 2 Gocus Gorup

No.	Focus Group Participants/Name of Institution	Participants Name	Phone Numbers	Number of Invited Individuals
1	Ministry of Water and Irrigation	Representative		1
2	Ministry of Environment	Representative		1
3	Ministry of Agriculture	Representative		1
4	Ministry of Planning	Representative		1
5	Ministry of Religious Affairs	Representative		1
6	Ministry of Education	Representative	Fax: 06-5666019	1
7	Ministry of Health	Representative		1
8	Ministry of Tourism and Antiquities	Representative		1
9	Department of Antiquities	Director General of DoA Abd Sameea' Abu Dieh		1

No.	Focus Group Participants/Name of Institution	Participants Name	Phone Numbers	Number of Invited Individuals
10	Jordan Environment Society	Representative	Tel: 06-5699844 Fax: 06-5695857	1
11	Friends of Earth - Middle East (FOEME)	Abd Rahman Tamimi	Tel:06-5866602/3 Fax:06-5866604	1
12	Farmers Association	Representative	Fax: 06-5656834	1
13	Kreditanstalt für Wiederaubfbau (KfW)	Mr. Schmidt	Tel: 06-5674083 Fax: 06-5683402	1
14	United States Agency for International Development (USAID)	Mr. James Frankiewicz	Fax: 06-5920143	1
15	United Nations Development Programme (UNDP)	Boualem Aktouf	Fax: 06-5676582 06-5676582	1
16	German Technical Cooperation (GTZ)	Dr. Andreas Kuck	Fax: 06-5350421 Tel: 06-5359726	1
17	Japan International Cooperation Agency (JICA)	Kobayashi Tsutomu	Fax: 06-5858924	1
18	Najwa Sha'sha'a	A local from the Area		1
19	The Arab Potash Company Limited	Representative	Tel: 06-5674376 Fax: 06-5674416	1
20	Magnesia Jordan Company	Representative	Tel: 06-5691201 Fax: 06-5691156	1
21	Crowne Plaza Hotel	Mr Osama Dabbas		1
22	Dead Sea SPA Hotel	Mr Nader Amr Mr Ramzi Nader Mr Akram Al-Shami		1
23	La Cure Dead Sea Products			1
24	AnsoStrong for Insulating Material			1
25	Rivage Dead Sea Products			1
26	Zara Dead Sea Products			1
27	Jordan Valley Fish Farm	Mr Ziad Atallah Sales and Marketing Manager	Tel: Mobile: 079-5714308 Fax: 06-4744190	1
28	Mariotte Hotel	Mr Philip Papatopoulos		1
29	Movenpick Hotel	Mr Edgar Sollenthaler		1
30	Jordanian Mineral Himmeh Company	Ahmad Al-Salihi	Tel: 06-4651228	1
31	Zara Hotel Group	Mr. Saleh Rifai General Manager		1
32	Jordan Hotels Association	Mr Michel Nazzal		1
33	Water Authority for the Northern Region			1
34	Motasaref of Northern Jordan Valley			1
35	Suweimeh Municipality	Eng. Adel Khatatbeh		1
36	Jordanian Compnay for the Manufacturing and Marketting of Agricultural Products			1
37	Al-Hashimeyah University	Dr. Mohammad Waheeb	Fax: 05-3826613 05-3826823	1
38	Jordan Valley Authority	Secretary General - Eng. Zafer Alem Assistant Secretary General for Northern and Middle JV-Eng. Tayseer Ghzawi	Eng. Tayseer Ghzawi Mobile: 079-5651077	2

No.	Focus Group Participants/Name of Institution	Participants Name	Phone Numbers	Number of Invited Individuals
39	Jordan River Foundation	Ms Maha Khateeb Eng. Ghaleb Qudah	Fax: 06-5933210 / 5922652 Tel: 06-5932730 Mobile (Eng. Ghaleb Qudah): 077-774840	2
40	Noor El Hussein Foundation	Mr Mahmoud Hadeed	Fax: 06-5620864 Tel: 06-5607460 06-5606993	2
41	Ministry of Public Works and Housing	Secretary General Eng. Sami Halaseh		2
42	The Royal Society for the Conservation of Nature	Omar Abu Eid Yehya Lhaled Chris Johnson	Tel: 06-5337931/2 Fax: 06-5347411	3
43	Investment Encouragement Coproration	Representative		1
			Total # of Invitees	**49**

Table 3: Invitees to Zone 1 Gocus Gorup

No.	Focus Group Participants/Name of Institution	Participants Name	Phone Numbers	Number of Invited Individuals
1	Al-Hashimeyah University	Dr. Mohammad Waheeb	Fax: 05-3826613 05-3826823	1
2	Deir Alla Municipality -Ruweiha -Dirar -Khazma -Deir Alla -Balawneh -Northern Twal	Eng. Munther El-Bkheet	Tel: 05-3573029 Fax: 05-3573019	7
3	Department of Antiquities	Director General of DoA Abd Sameea' Abu Dieh		2
4	Farmers Association	Representative	Fax: 06-5656834	1
5	Friends of Earth - Middle East (FOEME)	Abd Rahman Tamimi	Tel:06-5866602/3 Fax:06-5866604	1
6	German Technical Cooperation (GTZ)	Dr. Andreas Kuck	Fax: 06-5350421 Tel: 06-5359726	1
7	Japan International Cooperation Agency (JICA)	Kobayashi Tsutomu	Fax: 06-5858924	1
8	Jordan Environment Society	Representative	Tel: 06-5699844 Fax: 06-5695857	1
9	Jordan River Foundation	Ms Maha Khateeb Eng. Ghaleb Qudah	Fax: 06-5933210 / 5922652 Tel: 06-5932730 Mobile (Eng. Ghaleb Qudah): 077-774840	1
10	Jordan Valley Authority	Secretary General - Eng. Zafer Alem Assistant Secretary General for Northern and Middle JV- Eng. Tayseer Ghzawi	Eng. Tayseer Ghzawi Mobile: 079-5651077	2
11	Kreditanstalt für Wiederaubfbau	Mr. Schmidt	Tel: 06-5674083 Fax: 06-5683402	1

No.	Focus Group Participants/Name of Institution	Participants Name	Phone Numbers	Number of Invited Individuals
	(KfW)			
12	Mamdouh Bsharat	A local from the Area	Tel: 06-4775804	1
13	Ministry of Agriculture	Representative		1
14	Ministry of Education	Representative	Fax: 06-5666019	1
15	Ministry of Environment	Representative		1
16	Ministry of Health	Representative		1
17	Ministry of Planning	Representative		1
18	Ministry of Religious Affairs	Representative		1
19	Ministry of Tourism and Antiquities	Representative		1
20	Ministry of Water and Irrigation	Representative		1
21	Mouath Bin Jabal Municipality -Baqura -Northern Shuneh -Southern Shuneh -Mansheya	Eng. Mahmoud Abu Jaber	Tel: 02-6587177 Fax: 02-6587177	5
22	Movenpick Hotel	Mr Edgar Sollenthaler		1
23	Muadi Municipality -Muadi -Thahrat Ramel -Al-Arda -Abu Zeeghan -Damia	Eng. AbdulKareem Abu Zneimeh	Tel:05-3571706/5 Mobile: 079-5938751 Fax: 05-3572607	6
24	New Northern Shuneh Municipality -New Shuneh -Jalad -Rawda -Karama -Al-Shaghor -Jufeh -Al-Jawasreh -Kafrein	Eng. Thaer Al-Adwan	Tel: 05-3581019 Fax: 05-3581475	9
25	Noor El Hussein Foundation	Mr Mahmoud Hadid	Fax: 06-5620864 Tel: 06-5607460 06-5606993	1
26	Omar Abdullah Dahkan	A local from the Area		1
27	Sharhabeil Ben Hasna Municipality -Muadi -Dahret Al-Ramla -Arda -Abu Zeeghan -Damia	Eng. Khaled A'nab	Tel: 02-6575011 Fax: 02-6575062	6
28	Tabqat Fahel Municipality -Aramshi -Masharea -Waqas -Qleia't -Tal Al-Arbeean -Zamalia	Eng. Wajdi Masa'da	Tel: 02-6550610 Fax: 02-6560064	6

No.	Focus Group Participants/Name of Institution	Participants Name	Phone Numbers	Number of Invited Individuals
29	The Arab Potash Company Limited	Representative	Tel: 06-5674376 Fax: 06-5674416	1
30	The Royal Society for the Conservation of Nature	Omar Abu Eid Yehya Lhaled Chris Johnson	Tel: 06-5337931/2 Fax: 06-5347411	3
31	United Nations Development Programme (UNDP)	Boualem Aktouf	Fax: 06-5676582 06-5676582	1
32	United States Agency for International Development (USAID)	Mr. James Frankiewicz	Fax: 06-5920143	1
33	Wadi Khaled Organization	Mr Saleem Sobeh Bshara	Tel: 02-7500595 Mobile: 079-5190325	5
			Total # of Invitees	**74**

2 FOCUS GROUP QUESTIONNAIRE

Jordan Valley Preliminary Land Use Planning

Questionnaire

Questionnaire Objectives:
The objective of this questionnaire is to identify the views and needs of the communities in the Jordan Valley regarding land use development in the area.

Section 1:

Sex: ☒ Female ☒ Male

Occupation: _____

Place of Work: _____

Place of Residency: _____

Governorate: _____

Municipality: _____

Section 2: General

1- What are the main environmental problems facing your area?

_____
_____
_____
_____

2- What types of economic activities (agriculture, industrial, tourism) would you like to see in your area?

_____
_____
_____
_____

3- Is there a recreational centre in your area? ☒ Yes ☒ No

If the answer is no, what is the type of recreational centre that you would like to have?

_____
_____
_____
_____

4- Would you like to have special areas for picnics and children activities? ☒ Yes ☒ No

5- Do you think that the living conditions in your area are:

☒ Comfortable ☒ Uncomfortable

If living conditions are not comfortable, then please specify why?

_____
_____
_____
_____

6- Do you think that people in your area wish to move to other places? ☒ Yes ☒ No

If yes, what are the areas that they wish to move to?

_____
_____
_____
_____

Section 3: Economic Conditions

7- What type of work you do to support your family? (You may choose more than one answer)

1 Cattle raising
2 Agriculture
3 Mechanics / Garage
4 Grocery
5 Clothing Stores
6 Food industry
7 Education
8 Handicrafts
9 Restaurant
10 Hotel
11 Other Tourism
12 Government (including army) Employment
13 Other, please specify: _____

8- If your economic activity is in agriculture, do you:

☒ Own the land ☒ Work at the land ☒ Lease the land

9- If you grow crops that use a lot of water, would you like to replace them with crops that use less water? ☒ Yes ☒ No

10- A. What is the type of work you would like to have?

_____
_____

B. Would you like to work in tourism? ☒ Yes ☒ No

11- What do you think would solve the problem of unemployment in your area?
   1 Education
   2 Training
   3 Having a job in:
      ☒ Government
      ☒ Army
      ☒ Tourism
      ☒ Private Sector
      ☒ Other, please specify: _____
   4 Immigrate

Section 4: Education

12- Are there elementary schools for girls in your area? ☒ Yes ☒ No

13- Are there elementary schools for boys in your area? ☒ Yes ☒ No

14- Are there secondary schools for girls in your area? ☒ Yes ☒ No

15- Are there secondary schools for boys in your area? ☒ Yes ☒ No

16- Are there high schools in your area? ☒ Yes ☒ No
   If yes, are these schools for: ☒ Boys ☒ Girls

17- Are there training centers for the following skills:
   - Organic farming ☒ Yes ☒ No
   - Handicrafts ☒ Yes ☒ No
   - Tourism ☒ Yes ☒ No
   - Other, please specify: _____

18- What type of training do you think is required to develop the skills of the residents in your area?

   _____

   _____

19- Are your children taught water conservation in school? ☒ Yes ☒ No

Section 5: Health

20- Are there enough health clinics in your area? ☒ Yes ☒ No

21- Are there hospitals in your area? ☒ Yes ☒ No

22- Do you have health centers for mothers and children? ☒ Yes ☒ No

23- Are there fire stations in your area? ☒ Yes ☒ No

Section 6: Housing Conditions

24- What is the type of your house? (You can choose more than one answer)

1 Apartment
2 Tent
3 Separate House
4 Villa
5 Other, please specify: _____

25- Is your house:

1 Owned
2 Rented
3 In exchange for work
4 Other, please specify: _____

26- What do you pay to rent each month? _____ _(JD)

27- Do you have a kitchen in your house? ☒ Yes ☒ No

28- What is the total number of rooms in your house? _____ _

29- What is the number of bedrooms in your house? _____

30- Do you have enough water? ☒ Yes ☒ No

31- What are the sources of water for your house? (You may choose more than one answer)

1 Public water supply network
2 Public faucet
3 Tanks
4 Water collection reservoir (rain water collection)
5 Water well
6 Water canal, dam, or pond
7 Spring water
8 Mineral water
9 Other, please specify: _____

32- How do you save water?

- Do you reuse water? ☒ Yes ☒ No
- Do you fix your pipes if there are leaks? ☒ Yes ☒ No

- Do you close the tap to use less water? ☒ Yes ☒ No

33- What is the main source of water for irrigation in your area?
1 Irrigation pipes
2 Water collection reservoir (rain water collection)
3 Water well
4 Water canal, dam, or pond
5 Spring water
6 Other, please specify: _____

34- What is the main source of power in your house?
1 Public Electricity
2 Private Generator
3 Gas/Propane
4 Kerosene
5 Diesel
6 Other, please specify: _____

35- What is the main source of energy for the kitchen cooking?
1 Gas
2 Kerosene
3 Electricity
4 Wood/coal
5 Other, please specify: _____

36- Do you have an indoor toilet in your house? ☒ Yes ☒ No

If the answer is yes, is it connected to:
1 Wastewater network
2 Septic Tank (collects wastewater and is usually emptied)
3 Cesspit (collects the wastewater without being emptied since the wastewater is absorbed)
4 Other, please specify: _____

37- How do you dispose of your solid waste?
1 Open container
2 Closed container
3 Burning
4 Burying
5 Informal dumping
6 Solid waste municipality collection
7 Other, please specify: _____

38- Does the municipality collect solid waste in your area? ☒ Yes ☒ No

If the answer is yes, how often do they collect it?
1 Once a week
2 Every two weeks
3 Other, please specify: _____

Section 7: Transportation

39- How do you set from one community to another?

1 Bus
2 Private car
3 Taxi
4 Commute by walking
5 Other, please specify: _____

40- What is the condition of your roads? ☒ Good ☒ Bad

3 INVITATION LETTERS

3.1 Invitation to Focus Group for Zone 3

Dear Sir,

Project: Jordan Valley Preliminary Land Use Planning

Purpose: Focus Groups Sessions

Subject: Invitation for the Focus Groups Sessions

The United States Agency for International Development (USAID) has retained Consolidated Consultants for Engineering and Environment to conduct the study for the Jordan Valley Preliminary Land Use Planning.

As part of this project, the Consultant is conducting three focus group sessions to discuss the land use related issues with the project stakeholders. The session will take place on on Thursday March 18th, 2004 at Southern Jordan Valley Directorate Hall, Ghor As-Safi, at 10:30 a.m.

Participants will include representatives from Ministries, government organizations, funding agencies affected parties, agricultural companies, industries and municipalities of the project area.

Consolidated Consultant Engineering and Environment extends its invitation to your agency and appreciates your participation in this focus group session.

Telephone Number: 06-4612377
Fax Number: 06-4612380

Yours Sincerely,

Eng. Khaled Murad
Consolidated Consultant Engineering and Environment

3.2 Invitation to Focus Group for Zone 2

Dear Sir,

Project: Jordan Valley Preliminary Land Use Planning

Purpose: Focus Groups Sessions

Subject: Invitation for the Focus Groups Sessions

The United States Agency for International Development (USAID) has retained Consolidated Consultants for Engineering and Environment to conduct the study for the Jordan Valley Preliminary Land Use Planning.

As part of this project, the Consultant is conducting a focus group session to discuss the land use related issues with the project stakeholders. The session will take place on Saturday March 20th, 2004 at Jordan Valley Guest House at 10:30 a.m.

Participants will include representatives from Ministries, government organizations, funding agencies affected parties, agricultural companies, industries, hotels and municipalities of the project area.

Consolidated Consultant Engineering and Environment extends its invitation to your agency and appreciates your participation in this focus group session.

Telephone Number: 06-4612377
Fax Number: 06-4612380

Yours Sincerely,

Eng. Khaled Murad
Consolidated Consultant Engineering and Environment

3.3 Invitation to Focus Group for Zone 1

Dear Sir,

Project: Jordan Valley Preliminary Land Use Planning

Purpose: Focus Groups Sessions

Subject: Invitation for the Focus Groups Sessions

The United States Agency for International Development (USAID) has retained Consolidated Consultants for Engineering and Environment to conduct the study for the Jordan Valley Preliminary Land Use Planning.

As part of this project, the Consultant is conducting a focus group session to discuss the land use related issues with the project stakeholders. The session will take place on Wednesday March 24th, 2004 at Jordan Valley Guest House at 10:30 a.m.

Participants will include representatives from Ministries, government organizations, funding agencies affected parties, agricultural companies, industries, hotels and municipalities of the project area.

Consolidated Consultant Engineering and Environment extends its invitation to your agency and appreciates your participation in this focus group session.

Telephone Number: 06-4612377
Fax Number: 06-4612380

Yours Sincerely,

Eng. Khaled Murad
Consolidated Consultant Engineering and Environment

ANNEX 2
LIST OF PARTICIPANTS AND CONCLUSIONS AT THE THREE FOCUS GROUPS SESSIONS

Annex 2: List of Participants and Conclusions at the Three Focus Groups Sessions

1 LIST OF PARTICIPANTS AT THREE FOCUS GROUPS SESSIONS

Table 1: Participants at Zone 3 Gocus Gorup

No.	Participants Name	Instituion	Phone Number	Number of Participating Individuals
1	Yousef Ramadan Khleifat	Al-Dastour Newspaper		1
2	Emad Al-Qarsa	Antiquities of South Jordan Valley		1
3	Darwish Talyouni	Awqaf		1
4	Eng. Sahem Al-Tarawneh	Center for Advancement of Production - ARADA		1
5	Dr. Nasser Al-Masarweh	Center for Advancement of Production - ARADA		1
6	Abed Alsamee Ali Abu-Dieh	Department of Antiquities		1
7	Nawras Al-Majali	Farmer and Head of the Cooperative Organization		1
8	Nayfeh Ali Al-Nawara	Ghor As-Safi Women Organization		1
9	Saleh Al-Ghawat	Head of Islamic Centre		1
10	Falah Al-Talaleh	Head of Karak Awqaf		1
11	Salman Al-Dugheimat	Jordan Environment Society		1
12	Yehya Khalil Mohammad	Jordan Valley Authority- South Jordan Valley		1
13	Suleiman Al-Marwat	Jordanian Hashemite Fund		1
14	Suleiman Al-Bawaq	Journalist		1
15	Fathi Al-Huwaymel	Journalist and Head of the Local Committee for the Rehabilitation Program and Member of the Ghor Mazra'a Social Development Organization		1
16	Eng. Malek Yasseen Al-Drawsheh	Karak Water Authority		1
17	Eng. Yousef Ahmad Mustafa A'babneh	Ministry of Education- Aqaba Directorate		1
18	Eng. Aktham Mdanat	Ministry of Agriculture		1
19	Mohammad Khaled Al-A'badeh	Ministry of Agriculture		1
20	Dr. Reem Kharouf	Ministry of Education		1
21	Abdullah Sayal Al-Ouneh	Ministry of Interior- Motasarfiat of South Jordan Valley		1

No.	Participants Name	Instituion	Phone Number	Number of Participating Individuals
22	Eng. Samir Jaradat	Ministry of Tourism and Antiquities		1
23	Eng. Marah Al-Khayat	Project Manager at the Ministry of Tourism and Antiquities		1
24	Salem Salim Al-Kutayeb	Qatar - Wadi Araba		1
25	Oudeh SalamehAl-Kutayeb	Qatar - Wadi Araba		1
26	Faraj Hameed Suleiman Al-Kyees	Qatar - Wadi Araba		1
27	Dr. Laith Al-Moghrabi	Royal Society for Conservation of Nature (RSCN)		1
28	Mohammad Yousef	Royal Society for Conservation of Nature (RSCN)		1
29	Eng. Hamad Al-Maska	South Ghor Municpality- Head of Municipality		1
30	Barq Al-Majali	South Ghor Municipality-Member		1
31	Eng. Issam Al-Adayla	South Jordan Valley Education Directorate		1
32	Eng. Jihad Al-Sakarat	Water Authority		1
33	Sandi Chesrown	AMIR Program		1
34	Eng. Khaled Murad	Consolidated Consultant	06-4612377	1
35	Dr. Sawsan Himmo	Consolidated Consultant	06-4612377	1
36	Dr. Adnan Al-Salihi	Consolidated Consultant	06-4612378	1
37	Dr. Raoul Nasr	Consolidated Consultant	06-4612379	1
38	Dr. Fawzi Sahawneh	Consolidated Consultant	06-4612380	1
39	Dr. Munir Rusan	Consolidated Consultant	06-4612381	1
40	Majdi Salameh	Consolidated Consultant	06-4612382	1
41	Mahmoud Hishmeh	Consolidated Consultant	06-4612383	1
42	Lama Awad	Consolidated Consultant	06-4612384	1
43	Majd Tukan	Consolidated Consultant	06-4612385	1
44	Abd Rahman Jaber	Consolidated Consultant	06-4612386	1
45	Rola Quba'a	Consolidated Consultant	06-4612387	1
			Total # of Invitees	**45**

Table 2: Participants at Zone 3 Gocus Gorup

	Participants Name	Instituion	Phone Number	Number of Participating Individuals
1	Eng. Tayseer Ghzawi	Assistant Secretary General - Jordan valley Authority		1
2	Mohammad Abd AlHAdi Wreikat	Awqaf Directorate of Balqa' Governorate	3555751	1
3	Nazeer Mohammad Attiat	Awqaf of Balqa'	3555751	1
4	Eng. Ahmad Al-Abedallat	Deir Alla Educaion Directorate	079-5401914	1
5	Abed AlSamee Abu Dieh	Department of Antiquities	06-3644336	1
6	Hussein Al-Jarah	Department of Antiquities	05-3570412	1
7	Hussni Abu Hashweh	Department of Antiquities	06-3644336	1
8	Eng. Issa Ma'abneh	Jordan River Foundation	077-387627	1
9	Ziad Atallah	Jordan Valley Fish Farm	079-5595396	1
10	A'aesha Ahmad Abu-Syam	Khazma Women Cooperative Organization	05-3572589	1
11	Eng. Ahmad Khalil Abu-Syam	Khazma Women Cooperative Organization	079-5016027	1
12	Samira Mohammad Abu-Syam	Khazma Women Cooperative Organization	079-5016207	1
13	Sara Mohammad Khater	Khazma Women Cooperative Organization	079-5609873	1
14	Dr. Reem Kharouf	Ministry of Education	Home Phone: 06-5676067	1
15	Eng. Khaled Al-Arabiat	South Shuneh Educaion Directorate	077-833012	1
16	Eng. Adel Al-Khafajeh	Sweimeh Municpality	05-3560007 02-6453225	1
17	Jajwa Jawdat Sha'sha'a		5310075	1
18	Ramzi Kawar	Project Manager		1
19	Sandi Chesrown	AMIR Program		1
20	Dr. Sawsan Himmo	Consolidated Consultant	06-4612377	1
21	Dr. Adnan Al-Salihi	Consolidated Consultant	06-4612378	1
22	Dr. Raoul Nasr	Consolidated Consultant	06-4612379	1
23	Dr. Fawzi Sahawneh	Consolidated Consultant	06-4612380	1
24	Dr. Munir Rusan	Consolidated Consultant	06-4612381	1
25	Majdi Salameh	Consolidated Consultant	06-4612382	1
26	Mahmoud Hishmeh	Consolidated Consultant	06-4612383	1
27	Lama Awad	Consolidated Consultant	06-4612384	1
28	Majd Tukan	Consolidated Consultant	06-4612385	1
29	Abd Rahman Jaber	Consolidated Consultant	06-4612386	1
30	Rola Quba'a	Consolidated Consultant	06-4612387	1
			Total # of Invitees	**30**

Table 3: Participants at Zone 1 Gocus Gorup

No.	Participants Name	Instituion	Phone Number	Number of Participating Individuals
1	Eng. Amer Al-Safadi	Agricultural Directorate of Jordan Valley	6573050	1
2	Eng. Tayseer Ghzawi	Assistant Secretary General-Jordan Valley Authoirty	05-3570556	1
3	Eng. Munther Al-Bekheet	Deir Alla Municipality- Head of Municipality	079-5280609	1
4	Hani Al-Hassan	Deir Alla Municipality-Member	079-5303447	1
5	Dr. Salem Amarat	Deir Alla Municpality	3573029	1
6	Hadby Al-Huwarrat	Farmer	077-406670	1
7	Ali Al-Faqeer	Farmer	6575425	1
8	Abdullah Al-Wa'aee	Farmer		1
9	Dr. Atta Ayoub	Jordan Environment Society- Deir Alla	079-6205138	1
10	Eng. Anas A'amaira	Jordan River Foundation	079-57143080	1
11	Nisreen Araj	Jordan Valley Authoirty	079-5610069	1
12	Eng. Ahmed Saeed	Jordan Valley Authoirty	079-5991187	1
13	Saleem Sobeh Bshara	Jordanian Himmeh	079-5190325	1
14	Hatem Mohammad Mari	Jordanian Himmeh - Noor ElHussein Foundation	077-346711	1
15	Ahmad Al-Salihi	Jordanian Mineral Himmeh Company (A Subsidiary of Zara Investment Group)	06-4651228	1
16	Adel Khalil Abu Siam	Khazma Member of Deir Alla Municipality	079-5583902	1
17	Ahmad Saleh Al-Dabbas	Kreimeh Municipality	077-411670 02-6575095	1
18	Dr. Reem Kharouf	Ministry of Education	06-5676067	1
19	Eng. Faysal Kaseer	Ministry of Education	6587658	1
20	Lubna A'meira	Ministry of Public Works and Housing	06-5850470	1
21	Dana Al-Bekheet	Ministry of Public Works and Housing	06-5850471	1
22	Amin Ibrahim Abdallah	Mokeiba Tahta	079-5283371	1
23	A'ahed Mursal	Mu'adi Municipality-Member	077-416725	1
24	Eng. Mohammad Al-O'boud	New Deir Alla Municipality	3573029	1
25	Eng. Yousef Al-Sakran	New Deir Alla Municipality	079-6556444	1
26	Ali Abd AlHafez	New Mu'adi Municipality	077-334569	1
27	Ali Ahmad Okla	New Mu'adi Municipality	3571834	1
28	Eng. AbdKareem Abu Zeina	New Mu'adi Municipality- Head of Municipality	079-5938751	1
29	Mohammad Saed Al-A'abedy	North Jordan Valley Awqaf- Head of Municipality	6587304	1

No.	Participants Name	Instituion	Phone Number	Number of Participating Individuals
30	Mousa Ahmad Al-Denyar	North Shuneh Municipality-Member	6578188	1
31	Eng. Khaled A'nab	Sharhabeil Bin Hasnah Municipality	079-5540221	1
32	Mansab Mohammad Al-Kuwaisem	Tabqat Fahel Municipality	02-6560486	1
33	Khaled Abu Attaih	Tabqat Fahel Municipality	079-5118059	1
34	Mohammad Suleiman Khashan	Tabqat Fahel Municipality	079-5561362	1
35	Mohammad Falayeh Talaqa	Tabqat Fahel Municipality	6550366	1
36	Eng. Jamal	Water Authority	077-429890	1
37	Eng. Ghazi Abdo Ahmad	Water Authority- Head of Water Treatment Department	077-481300	1
38	Ali Fahed		077-762071	1
39	Sandi Chesrown	AMIR Program		1
40	Eng. Khaled Murad	Consolidated Consultant	06-4612377	1
41	Dr. Sawsan Himmo	Consolidated Consultant	06-4612377	1
42	Dr. Adnan Al-Salihi	Consolidated Consultant	06-4612378	1
43	Dr. Raoul Nasr	Consolidated Consultant	06-4612379	1
44	Dr. Fawzi Sahawneh	Consolidated Consultant	06-4612380	1
45	Dr. Munir Rusan	Consolidated Consultant	06-4612381	1
46	Majdi Salameh	Consolidated Consultant	06-4612382	1
47	Mahmoud Hishmeh	Consolidated Consultant	06-4612383	1
48	Ruba Khoury	Consolidated Consultant	06-4612384	1
49	Noura Qudah	Consolidated Consultant	06-4612385	1
50	Luba Hamdi	Consolidated Consultant	06-4612386	1
51	Rola Quba'a	Consolidated Consultant	06-4612387	1
			Total # of Invitees	**51**

2 FOCUS GROUP 1

2.1 Social Aspects-Southern Zone Focus Group

Representatives were invited in Zone 3 of the project from the Southern Ghors and Wadi Araba.

2.1.1 Group Members

The names of the members of the environment and tourism focus group are shown in **Table 4**.

Table 4: The members of the social focus group

No.	Name	Institution
1.	Abdullah Al-Oneh	Ministry of Interior/Al-Safi
2.	Suleiman Al-Muradat	Jordan Hashemite Fund
3.	Naifeh Al-Nawasrah	Women of Ghor Al-Safi Cooperation
4.	Eng. Youssef Moustafa	Ministry of Education/Al-Aqaba
5.	Emad Al-Atrous	Department of Antiquities-Southern Ghors
6.	Khamis Al-Bawat	Southern Ghors
7.	Faraj Al-Kabash	Qatar/Wadi Araba
8.	Yehya Al-Qaisy	Jordan Valley Authority
9.	Mahmoud Hishmeh	Consolidated Consultants-Focus Group Facilitator
10.	Dr. Fouzi Sahawneh	Consolidated Consultants- Focus Group Facilitator
11.	Majd Toukan	Consolidated Consultants

2.1.2 Discussions within Tourism and Environment Focus Group

The following issues were discussed within the social focus group:

Schools:

- Teachers live far away from schools and so there is no stability and settlement.
- Students live far from schools, which makes them tired and decreases their productivity.
- Teachers with experience want to move to more civilized places, which means changing the teacher more than once per year for students.
- There is a shortage of teachers due to their movement to another location during the school year.
- Uncomfortable environment for teachers to work in undeveloped or rural areas, or unequipped areas.
- Schools are big but the resources and budget are not enough.
- There is no periodic maintenance for schools and its equipments.
- Dr. Reem from the Ministry of Education: there is department for maintenance of school equipments such as computers. In addition, the Ministry of Education has established directorates in Irbid and Amman and is currently studying establishing directorates in the South.
- There are around 50 students in each classroom, which is a high number and causes classrooms to be very crowded.
- The problem of student's dropouts from schools. For example, the number of students in the elementary section is 80 and turns to 15 at the end of the secondary classes. This is mainly because students are not comfortable in schools, teachers' qualifications, school building and the lack of job opportunities for all specialities.
- There is a big load on teachers in terms of the number of classes that has to be taught.

- In general, teachers' qualifications are bachelor's degree.
- A study in the region indicates that the current birth rate requires the opening of a new school each year.
- The school in Qatar is equipped with a computer room, however, there is no computer teacher and thus they can't make use of it.
- Busses pick up teachers, however, if any teacher was late for any reason it will cause the others to be late too and sometimes not able to reach their schools.
- The long distance of schools limits the possibility of females joining schools.
- The limited resources reduce the possibility of qualified students joining the specialities they want.
- There is no higher education offered in this region.

Suggestions:

- Allow acceptances with less than the standard requirements for students in different domains since they have special conditions.
- Provide educational scholarships for local people.
- Hire local people for jobs in the area.
- Establish vocational schools: there are some vocational schools for males but not for females. This has been suggested since 4 years and a 25 dunums land has been allocated now for it but waiting the Ministry of Education action.
- Establishment of agricultural schools since they live in agricultural areas.
- Establishment of higher education colleges or universities.

Health Issues:

- There is a lack of specialized doctors and doctors in general in relation to the number of local residents.
- Hospitals are far from residential areas.
- Insufficient number of hospitals compared to the present population.
- The ratio of locals who are not capable of getting treatment and buying medicine reaches 80%.
- There is no medical insurance in the Southern Ghors except for the areas between Qatar and Kreikra.
- Rodents and rats create a big threat on the area and causes health problems such as Bilharzias. Dirt and untreated wastewater are the major cause of these rodents.
- Septic tanks flood and pollute the agricultural lands and streets.
- Some people are not ready to pay for the installation of sewer connections.

Job opportunities and sources of income:

- 65-70% of the people work in agriculture from the Ghor area.
- Economic return from agriculture is low for families.
- 52% of the lands are allocated for local people in the area and the rest are for residents of Amman and other areas.

Housing:

- Fifa is a very bad residential area and is filled with plastic houses.
- The ratio of people who rent houses is very low; people either live in their owned houses or in plastic tents or houses.
- Some own lands but are not able to build a house on it.
- Most areas have mother and child care centers and family planning centers.

- Roads are acceptable, however, the area of Al-Naqa'a and Al-Safi need a bridge to connect them because they are separated by a Wadi.

2.2 Water and Agriculture – Southern Zone Focus Group

Representatives were invited in zone 3 of the project from Southern Ghors and Wadi Araba.

2.2.1 Group Members

The names of the members of the tourism and environment Focus Group are shown in **Table 5**.

Table 5: The members of the water and agricultural resources focus group

No.	Name	Institution
1.	Oudeh SalamehAl-Kutayeb	Qatar - Wadi Araba
2.	Saleh Al-Ghawat	Head of Islamic Center
3.	Eng. Issam Al-Adayla	South Jordan Valley Education Directorate
4.	Salem Salim Al-Kutayeb	Qatar - Wadi Araba
5.	Eng. Aktham Mdanat	Ministry of Agriculture
6.	Eng. Sahem Al-Tarawneh	Center for Advancement of Production - ARADA
7.	Barq Al-Majali	South Ghor Municipality-Member
8.	Nawras Al-Majali	Farmer and Head of the Cooperative Organization
9.	Barq Al-Majali	South Ghor Municipality-Member
10.	Eng. Jihad Al-Sakarat	Water Authority

2.2.2 Discussions within Focus Group

The following are the subjects laid for discussion:

- Surface water quality differs seasonally.
- Most of the irrigation water is surface water and valley water and some spring water (renewable according to the rain season) and some limited ground water.
- The quality of the soil affects the use of water for example in agriculture; the use of clay soil prevents the absorption of water and the use of sandy soil absorbs a lot of water.
- The mineral water from Afra and Al-Barbeta runs into the valleys such as Wadi Afra and contains Sulfur, low in oxygen and radioactive, this water is mixed with other spring water sources.
- There are some water treatment plants in Tafileh and Karak and which reaches the area.
- The JVA has installed filters on agricultural wells.
- Wells were not saline at first but they became so because of agriculture.
- There is mixing of salty and unsalted water to improve the quality of irrigation water.
- There are four phases for irrigation, the first 3 phases of the plant growth, low quality water is used, however, at the fruit growth stage good quality water is used.
- In Ghor, seasons often overlap with each other and so it is difficult to control the use of water.
- In Qatar, water is not suitable for drinking and so a treatment plant has been installed.
- Currently water from the Reverse Osmosis plant is mixed with well water for drinking water purposes and the project was very successful.
- There is a big loss of water, in agriculture a loss of 60% and drinking water 50%.
- According to a farmer from Qatar, lands can only be used for agriculture.

- Where lands are suitable for agriculture, it should be farmed and in areas where lands cannot be farmed, industries can be built such as quarries, marble factories, touristic lands and sports lands.
- Agricultural engineers and agricultural companies decide on the use of fertilizers.
- Industries have consumed a large amount of water and this affected the various resources.
- The absence of a sewer network affects the quality of water.
- Suggest the use of impotable water in other areas such as industries.
- The development of agricultural lands is what is important because residential areas are already developed.
- Research centers are needed.
- Farmers prefer the use of natural rather than chemical fertilizers.
- There is no market, cold storage facility, and plant nurseries.
- A factory for plastic recycling was suggested but then it was turned into plastic making and not recycling.
- In previous projects, there was a suggestion to use the solid waste coming out of a wastewater treatment plant as a fertilizer, however, people do not accept this option.
- In the south there is no use of technology such as the email even in governmental departments.
- There should be awareness sessions for all parts of the society such as birth control that needs mother and child centers, and agricultural technology and others.
- There have been several articles in the newspapers about the quality of the King Talal Dam water and this lead to many countries such as Gulf countries banning export or reducing it from Jordan.
- The misuse of pesticides and chemicals has lead to pollution such as disinfection gases. Farmers need to be aware that they should not use that large amount of chemicals.
- Pipelines from dams get to agricultural lands such that the pipeline coming from Mujib area gets to Fifa and Wadi Al-Safi.
- By constructing dams we can improve the quality and quantity of water.
- Should improve agricultural tools.
- Rehabilitate the networks.
- Chose the suitable crops.
- There is no other option for the current agricultural lands to change its cropping pattern.
- A study on the birth rate in the area shows that extra schools are needed.
- The general qualifications of teachers are bachelor degree.
- There are electricity problems in the area of Safi.
- Archaeological sites need improvement and provision with facilities.

2.3 Envrionment and Tourism

2.3.1 Group Members

The names of the members of the environment and tourism focus group are shown in **Table 6**.

Table 6: The members of the environment and tourism focus group

No.	Name	Institution
1.	Najwa Shaashaa	Farmer
2.	Sara Khater	Khazma Women cooperation
3.	Eng. Adel Al-Khatatbeh	Municipality Head of Suweimeh
4.	Eng. Khaled Al-Arabiat	Ministry of Education
5.	Mohammad Al-Wreikat	Awqaf of Balqa
6.	Hasanein Al-Jarah	Department of Antiquities-Middle Shouneh
7.	Majdi Salameh	Consolidated Consultants- Focus Group Facilitator
8.	Rola Quba'a	Consolidated Consultants
9.	Lama El-Awad	Consolidated Consultants

2.3.2 Discussions within Tourism and Environment Focus Group

The following issues were discussed within the environment and tourism focus group:

Archaeological sites and Tourism at the South Jordan Valley:

- Dead Sea basin includes several touristic/significant locations other than the seashores. The Dead Sea is one of the four pillars of tourism in Jordan.
- The Ghor As-Safi is a route from Amman to Aqaba. The Ministry of Tourism and Antiquities is building at Ghor As-Safi a museum for Lut and next year there will be attraction points for one day touristic visit. The easy access and comfort along the road will encourage tourists to come to Ghor As-Safi and consequently improve the economy of Ghor As-Safi.
- The problem is that there are no proper media campaigns that inform the people and tourist about the available archaeological and touristic sites. Also, most of touristic places are archaeological sites that lack touristic services that may encourage the tourist to visit it or spend sometime at the site. Therefore, archaeological sites need to be developed into touristic sites that have the required basic services to attract tourists.
- It was commented that touristic sites are related to availability of water and that the availability of services is the factor that determines carrying capacity.
- The Ministry of Tourism and Antiquities is not planning for "sleep over" projects in the area. The objective of its development projects is to make touristic services available for attracting tourists to the area and opening new job opportunities to the people of the area.
- It was asked whether the participants perceive having many new hotels along the Dead Sea shore as appropriate and suitable with the carrying capacity of the Dead Sea. The response was that the carrying capacity is related to availability of services and if services were available then the carrying capacity would be increased. However, from an environmental perspective, such services should not increase to a level that impacts the environment.
- The Consultant is currently working on photographing important archaeological sites in the Jordan Valley and recording their coordinates for putting the sites on GIS maps.
- It was suggested to visit Mr. Abd Sameea Abu Deyeh from the Department of Antiquities in order to document available archaeological sites in the area and discuss the means to protect those sites. However, it was mentioned that it is difficult to protect those sites since the issue of illegal archaeological diggings are related to

unemployment where some locals dig for artefacts in order to sell them and generate an income. So, unemployemtn is the real motive for digging for artefacts.

- It was mentioned that in the southern Ghor there are more than 50 sites (such as Tel El-Sukar). However, the Department of Antiquities did not develop these sites. Developing those sites would provide job opportunities to the local people and at the same time encourage tourism.
- At present, there is expansion in built up areas towards Cave of Lut site and this is constituting a threat to the Cave. There are lands near the Cave that will be built soon.
- In south Ghor there are also areas that are for the Ministry of Religious Affairs (Awqaf). The Ministry of Tourism has requested to work on those areas. However, the Ministry of Tourism is concerned that the Awqaf would in the future decide to invest those lands. Therefore, the Ministry of Tourism believes that land use planning is an opportunity for determining buffer zones.
- The Department of Antiquities (DoA) recommended to put the lands of archaeological sites under its responsibility and provide them with an appropriate buffer zone.
- There are several significant archaeological sites within the southern Jordan Valley and the Consultant requested that the DoA provide him with a list of those sites with columns indicating their significance and a column indicating recommendations regarding developing those sites. The Consultant also asked about the issue of having archaeological reserves and the role of natural reserves in preserving archaeological sites. However, those were questions to be answered in a meeting to be held with Mr Abd Al-Sameea Abu Deieh.
- The role of the Ministry of Tourism and Antiquities is to look after the archaeological sites. The only project taken by the Ministry at present is the Museum near the Cave of Lut. There is also a project for the development of the Tawheen Al-Sukar (Sugar Mills) site but it is not sure whether work on this project have started.
- Finan and Fidan areas are very important and natural reserves in the area have played a major role in protecting those archaeological sites.
- The Ministry of Tourism is also working on developing a road between Madaba and Mujib so that it provide access to tourism buses and cars to use a road linking both areas. The Jordan Rive Foundation is working on finding a fund to pay for this project.
- The DoA representative mentioned that given the great number of archaeological sites with Jordan Valley, it is impossible for this land use project to survey them within the very limited time of three months.
- The Ministry of Tourism and Antiquities mentioned that in Southern Jordan Valley complete infrastructure services have been implemented in areas that do not have any communities available or developing within them. So, it was questioned whether we are investing our resources in the most appropriate way.

Red-Dead Sea Canal and Availability of Water for Tourism Development:

- The Ministry of Tourism and Antiquities were asked whether they perceive that there is a relation between touristic projects and water availability. The Ministry does not have nay studies regarding this issue however, they do know that at Johannesburg there was a strong call for advocating the project and in general there is a strong relation between water and tourism.
- The Red-Dead Sea Canal was discussed in the perspective that it is a huge project whose cost may reach 3 billion JD and that its impact on southern Jordan Valley will be immense in terms of increasing availability of water and providing more job opportunities to the local people. Anyway, the Red-Dead Sea Canal would require a buffer zone of at least 200 m.
- It was discussed that the pillars of tourism include archaeological sites, recreational areas and natural scenes.

- It was mentioned that a mud factory project at the southern shore of the Dead Sea was stopped due to sinkholes.

Water Conservation:

- It was mentioned that there should be a differentiation between water used for drinking purposes and that used for irrigation. For example, in order to cultivate bananas, many framers rent several farm units in order to get a water share that can irrigate the banana farm unit. Therefore, there needs to be a greater control on this aspect. In addition, there is the problem of many illegal water wells.
- Most framers use drip irrigation but they still need media awareness that is built on scientific basis. Such an awareness campaign should inform the farmer that for instance he cultivated that kind of crop, it will generate for him that level of income or profit. The framer should be given several choices and asked to choose from them without forcing a certain kind of crop on him.
- It was also emphasize that if the farmer is not presented with practical and affordable solutions, he will not cooperate.
- People in the Ghor use the minimum level of water that needs to be consumed by an individual. Therefore, water conservation should look more at the tourism, industrial and agricultural sectors.
- Ministry of Water and Irrigation is working on securing water for Suweimah area. However, there is the problem of drawdown due to pumping by the Arab Potash and the Magnesia Companies. It was also mentioned that there is a water desalination project at Ghor As-Safi.
- Most five star hotels in the Dead Sea area have water softening mechanisms. However, it should be mentioned that the water delivered by the Water Authority is according to standards.
- According to the Karak Water Authority, there are three main industrial water users within its area. These are the Arab Potash, Magnesia and Bromine. Those three companies have their own water wells. Therefore, they requested that the study concentrates on water basins in the area.
- Dams is one type of land use. Therefore, the Water Authority should determine the location of dams and wells and determine the approach to protecting them. Therefore, the Water Authority requested to take this into consideration during this study.

Important Environmental Locations and Biological Diversity:

- The RSCN described the project of integrated ecosystem management that it is preparing for the Jordan Valley. The emphasized the importance of the Jordan Rift Valley as part of the African Rift along which birds migrate between the African Continent and Europe. There are several important bird areas in the Jordan Valley. The integrated ecosystem management project will work with local people in order to reach the best approach for managing the water resources and on environmental friendly agricultural activities.
- There are eight important bird areas. These are Yarmouk River, North Jordan, Sweimeh, Mujib reserve, Ghor Fifa, Wadi Araba, Dana, Qatar, and Aqaba.
- Wadi Araba is considered to be a natural habitat for many plants and animals.
- There are suggested reserves at Fifa and Qatar that will be developed in agreement with Ministry of Agriculture.

3 FOCUS GROUP 2

3.1 Social Aspects – Middle Zone Focus Group

Representatives were invited in zone 2 of the project from Suweimeh municipality and the industries and hotels present in the Jordan Valley.

3.1.1 Group Members

The names of the members of the tourism and environment Focus Group are shown in **Table 7**.

Table 7: The members of the social focus group

No.	Name	Institution
1.	Najwa Jawdat Sha'sha'a	Farmer
2.	Sara Muhammad Khater	Khazma Women Cooperation
3.	Eng. Adel Khatatbeh	Municipality head of Suweimeh
4.	Eng. Khaled Arabiat	Ministry of Education – Buildings Department
5.	Muhammad Al-Wreikat	Awqaf of Balqa
6.	Hasanein Al-Jarrah	Department of Antiquities of middle ghor
7.	Dr. Fouzi Sahawneh	Consolidated Consultants
8.	Mahmoud Hishmeh	Consolidated Consultants
9.	Majd Toukan	Consolidated Consultants

3.1.2 Discussions within Focus Group

The following are the subjects laid for discussion:

Education:

- Increase vocational training centres in the area. The present available centres are not enough.
- Other centres in Ghor do not have any students and some centres are very big but are not utilized.
- The problem of poverty in the area limits the chances for education.
- Students lack the incentives to work because of the very limited work opportunities in all sectors and some are ashamed to work in the available jobs.
- There is an enormous increase in population because of the lack in awareness in this domain.
- There is no sense of belonging to the area among the new generation because of the lack of incentives, employment opportunities and salaries.
- Salaries are not enough so people prefer not to work.
- Suweimah: is touristic, people need computer courses and touristic education and establishment of industries that serves tourism in these areas.
- Middle Ghor: suggest the establishment of a faculty of agriculture in the area since it is an agricultural area and so no need to go to other far areas.
- Farmers do not own the lands they work in, which reduces their motivation since they cannot directly benefit from it. This also implies that the region is not benefiting from its own resources.
- Educational tools do not provide practical training for the students and thus does not prepare them to the real life.

- The number of schools is enough and the teachers are university graduates, however, there are very few students in each class since most of them do not find jobs after graduation and so they prefer to go directly into agriculture or sit at home.
- Is there teacher settlement? There are different points of views concerning this topic. The insufficiency is a result of lack of recreational places and work opportunities. The distances are not far but teachers prefer to leave to other places. Transportation should be provided and even dormitories to the teachers so that they have the incentive to at least stay the whole year and not leave the students in the middle of the year. Currently there is a teacher's dormitory but it is not used. This needs to at least be considered for fresh graduates, as a way of gaining experience.
- Lands are cheap and so it is easy to get bids to build schools.
- There are equal opportunities for both males and females.
- People are turning to vocational education since 1970 because of their low averages.

Health:

- Health: health centers are enough in Deir Alla and there is one hospital for the whole community of 60000 people. Other areas have a deficiency in specialized medical services such as the lack of an orthopaedic or a paediatrician.
- Suggestion of transforming the primary health care centers to specialized and comprehensive ones especially in the area of Deir Alla.
- Lack in the nursing staff.
- People suffer from pests from hotel wastes and drainage canals and dogs. Currently they used pesticides starting from South Shouneh till North Shouneh for one whole month to reduce their effects.
- There are pests that affect the people in the area and the tourists.
- Most people are medically insured either through the army, or through the policies of the companies they are employed in. Employees have the benefit of insuring their parents.
- Health insurance is very low in Khazmah.

Employment Opportunities:

- Foreign employment is very high in the region; the attendance said it is between 70-90%.
- Males refuse to work in agriculture and thus 80% of the women work in agriculture such as farming, collection of crops, filling and packaging. So women are the primary source of income at their houses.
- The owners of lands in the Jordan Valley are mostly from outside the valley.
- Employees of the JVA and the government have a large proportion of the good and productive lands.

Agriculture:

- Farmers find it more cost effective to plant vegetables instead of fruits, which are seasonal.
- They need industries for packaging of agricultural products, there is excess of vegetables but not of fruits.
- There is a problem in marketing for crafts such as sewing, ceramics, and flowers.
- Palms consume less water than bananas.
- There is a research centre in the Jordan Valley Agriculture department that studies the better crops to be used in agriculture but it is not effective.
- Water is too expensive.

Housing:

- Housing: the Jordan Valley Authority allocated 224m^2 of land for each family, however, they are only allowed to build on 60-80m^2 of that area, and since the sons live with their families when they get married this area becomes insufficient and crowded. There is a lack in planning these lands. Sometimes the owners tends to sell their lands to people who don't live in the Jordan valley, which means lack of control over the land and lack of incentive to those who end up working in that land (its not their own land).
- Some land in the South Shouneh and Suweimeh are not good for agriculture and so it is fine to build on them. However, other lands in middle Ghors such as Kreimeh, Deir Alla and Mashare are perfect for agriculture.
- There are no buildings at the west road connecting the south and north of the JV since it is an agricultural area. So urbanization is at the east part of the road since the lands are less fertile there.

Roads and transportation:

- The main road is only one way.
- The main road should be a highway instead of an ordinary road with 2 ways since it connects the north of Jordan with its south.

Others:

- The Jordan Valley Authority and the population groups do not work together because the groups are now under the municipalities and so they lost contact with the Authority.
- There is no enough awareness on the importance of family planning. Even if the wife has heard about family planning and she agrees with it she has no say in that subject.
- Have touristic areas in Suweimشeh.
- There are 280 archaeological sites most are inside hills between 10-200dunums.

3.1.3 Conclusions of the Focus Group

- Make use of the vocational training centres in the area.
- Make the agricultural guidance program more effective.
- Finding employment opportunities in more fields to give students the incentives for further education.
- Provide bigger parcels of land to the people in the JV.
- Allow the local people to become owners of their lands.
- Plan the main road as a highway.
- Provide more recreational areas such as public parks, playgrounds, and educational touristic centers.
- Implement training workshops on marketing.
- Establish food industries.
- Handicrafts.
- A comprehensive and specialized health care centre.

3.2 Water and Agriculture – Middle Zone Focus Group

Representatives were invited in zone 2 of the project from Suweimeh municipality and the industries and hotels present in the Jordan Valley.

3.2.1 Group Members

The names of the members of the tourism and environment Focus Group are shown in **Table 8**.

Table 8: The members of the water and agricultural resources focus group

No.	Name	Institution
1.	Eng. Ahmad Khalil Abu-Siam	Khazma Women cooperation
2.	Samira Muhammad Alayan	Khazma Women cooperation
3.	Dr. Reem Kharouf	Ministry of Education
4.	Eng. Ahmad Al-Abedallat	Deir Alla
5.	Abed Alsamee Ali Abu-Dieh	Department of Antiquities
6.	Dr. Adnan Al-Salihi	Consolidated Consultants
7.	Dr. Munir Al-Rusan	Consolidated Consultants
8.	Abedel Rahman Jaber	Consolidated Consultants

3.2.2 Discussions within Focus Group

The main issues that were discussed in this focus group are the agricultural sector and the water sources and distribution.

The following are the subjects laid for discussion:

Water sources (quality and quantity) and its effect on land use:

- Water sources are scarce and differ in quality where there is irrigation water, wastewater, irrigation water, and mixed water.
- Water sources are 1. King Abdullah Canal 2. King Talal Dam 3. Al-Karameh Dam 4. Al-Kafrain Dam 5. Wadi Shuaib Dam 6. Reused water for irrigation. Water from Zara and Zarqa Main is desalinated for drinking.
- Should use low water demanding crops.
- Should use salt resistant crops should be used.
- Sometimes bad quality water is used in irrigation.
- Should use new techniques in irrigation and fertilizers through irrigation waters.

Water distribution:

- Irrigation and domestic water distribution. After the rehabilitation of the Al-Karameh Dam water, it will be used to irrigate the 14.5 land. As for the areas of Hisban and Al-Kafrain, they are irrigated from the Hisban and Al-Kafrain Dams.
- In the area, potable water is from wells.

Cropping patterns:

- There is a variety in the cropping pattern were bananas, citrus, grapes and vegetables are grown. Suggest a change in the cropping pattern for example from bananas to less water consuming crops.
- Find less water demanding crops.
- Introduce new crops such as scented plants that are of high marketing values.
- Encourage and educate the farmer and the consumer to use new suggested cropping patterns.
- Reduce the area planted in the summer.

Water needs

Soil salinity

Irrigation water salinity

- Use salt resistant crops.
- Wash and rehabilitate the soil and make use of the rainy seasons.
- Make the agricultural guidance programs provided by the Ministry of Agriculture more effective.

Soil physical characteristics and ground water level

Income of the farmer

- Cost of crops; make the role of agricultural cooperatives more effective.
- Marketing costs.
- Establish marketing centers.
- Cost of irrigation water.
- The marketing value of the agricultural product.

Other issues discussed:

- Proper management of farms.
- Suggest alternative agricultural projects such as animal productions, food productions, and medicinal plants.
- The use of fertilizers and pesticides in agriculture.
- In zor ground water is very close to the surface and therefore fertilizers cannot be used so that it is not polluted.
- Will agriculture stay the same or will there be other alternatives such as industries or other land uses.
- Establish a wastewater network and water treatment plants.
- Take environmental factors into consideration.
- The role of rural women.
- The Khazma Women Cooperation has a dairy plant and they are studying the implementation of a medicinal plant project and a bee farm.
- There is a suggestion to decrease the unit of agricultural land so that it can be used in more simple ways.
- Encourage the work of NGOs.
- Encourage NGOs to allocate lands for its use.
- Suggestion to implement agricultural projects such as animal production and medicinal plants.
- The attitude of people if potable water was used for drinking and only treated water used for irrigation.
- Discuss the use of grey water and its uses.
- The per capita water quantity should not be discussed but the recycling and reuse of water sources.
- The Jordan Valley has drained the salty water and declared that it is useful for irrigation.
- Jordan River water can be treated and used in irrigation.
- Water from King Talal Dam is highly saline and needs mixing. However, the operation should not be called mixing, as the quantity of water mixed is very little.

- Establishment of farms for imported crops such as canned food.

3.2.3 Conclusions of the Focus Group

The following points and issues were mainly arrived at during the focus group discussions:

- Implement agricultural projects such as animal production and medicinal plants.
- Construction of treatment plants.
- Change the cropping pattern to less water consuming crops.
- Introduction of new crops.
- Make the agricultural guidance programs provided by the Ministry of Agriculture more effective.
- Establishment of farms for imported crops.
- Establishment of marketing centers.

3.3 Tourism and Environment – Middle Zone Focus Group

Representatives were invited in zone 2 of the project from Suweimeh municipality and the industries and hotels present in the Jordan Valley.

3.3.1 Group Members

The names of the members of the tourism and environment Focus Group are shown in **Table 9**.

Table 9: The members of the tourism and environment focus group

No.	Name	Institution
1.	Ramzi Kawar	Project Manager
2.	Ayshah Ahmad Abu-Siam	Khazma Women Organization
3.	Husni Abu-Shweimah	Department of Antiquities
4.	Munther Mohammad Atiyat	Awqaf Al-Balqa
5.	Eng. Issa Al-Maaita	Jordan River Foundation
6.	Ziad Atallah	Jordan Valley Fish Farm
7.	Dr. Raul Nasr	Consolidated Consultants
8.	Majdi Salameh	Consolidated Consultants
9.	Eng. Teiseer Al-Ghazawi	Jordan Valley Authority
10.	Lama El-Awad	Consolidated Consultants

3.3.2 Discussions within Focus Group

At the beginning of the meeting, participants were introduced to each other along with their occupations and concerns related to the project.

The following are the subjects laid for discussion:

Fish farm:

- They have 600-tons/year productions and the water salinity in which they farm Taloubi Fish is between 5.5-6. The farm has a closed system because of the small amount of water. If an open system is used then migratory birds will consume the fish.

- If the water coming into the fish farm is polluted then the fish will also be polluted and not suitable for consumption.
- Water in the Jordan Valley is saline and has an appropriate temperature for fish farming.
- Water coming out of the fish farm is rich in nitrogen and can be used in fodder and agriculture production.
- Some fish farms use the wastes of chicken without treatment to feed the fish and this causes a big problem in terms of polluting the fish and affects its export.

Jordan River Foundation:

- There is a comprehensive development project to be implemented by the Jordan River Foundation in Khazma and funded by the Ministry of Planning.
- A Wadi in the village needs to be fenced to protect the children of the village.
- A dairy plant is already present but the rent of the land is very expensive. The Khazma organization is trying with the help of the JRF to find a land where the plant can be located and where some cows can be raised.
- People need environmental and agricultural awareness.
- There is a need for a public space or park for children.
- There is a need for rehabilitation of the infrastructure.

Awqaf:

- There is no proof of property in the lands where mosques are located and the rest are allocations. There is a request that each municipality has its own cemetery. In addition there is no study on the ratio between mosques to people.
- Religious tourism is very important and there is a record of the number of visitors coming to Abu-Obeidah Sanctuary, which is supervised by the Royal Committee for the development of the companion's Sanctuary.
- Currently, there is a study in Dames Abu-Alhol to do a sanctuary.
- A residential area can be allocated for the implementation of Al-Zaka.

Cultural reserves and heritage management

- Poverty and unemployment lead to the abuse of archaeological sites.
- There is no awareness concerning the value of archaeological sites.
- Urbanization and infrastructure affect to a great extent archaeological sites.
- There are no enough resources to look for archaeological sites.
- Currently the government is in the process of modifying the archaeological law to protect archaeological sites. The law constitutes having a buffer zone of 5-25 meters away from the sites.
- There are heavy industries and quarries in the area; these should not be located less than 1 km away from the archaeological sites.
- There is a problem of illegal selling of archaeological goods.

Women of Khazma organization:

- They have a dairy plant and had some complaints and suggestions for it.
- Low–dense milk problem
- Suggestion of using grey water emerging from the dairy plant in the irrigation of a medical plants land.
- There are landslides in the valley in Khazma, which are dangerous especially for children, and so it should be fenced.

- There are garbage containers but the people still throw their wastes on the streets until the area became a waste dump.
- There is a request for a public area or garden for children to play.
- There are no trees to provide shade for the people.
- The road network is not bad.
- Public transportation is not efficient.

Jordan Valley Authority:

- The valley in Khazma has retaining walls and footpaths and suggests visiting the site with the people who are complaining.
- The best thing is to have an awareness campaign.
- There are no centers for the disabled in the area of Deir Alla but it seems that there is a plan in the Karn area to establish a centre for both disabled and the elderly.

Project Manager

- There is a problem of foreign employment and unemployment. Jordanians refuse to work as farmers because they prefer to work as employees, thus there should be awareness conducted in order to change the way people perceive good jobs and to accept handiwork. However, Jordan River Foundation thinks that if the Jordanian is given the appropriate salary he is willing to work.
- Employees in the Fish farm are Jordanian, however, they are hard to deal with since they do not like to work.
- In the farm of Zeid Al-Rifaii there are many active Jordanian women employees but men do not want to work and prefer that their wives work instead of them.
- The Jordan Valley Authority has given farmers pieces of land 12*24 m^2 but the problem is that children get married and live with their families and so the areas of lands are becoming too crowded. In addition, men are not finding any motivation to work because of the low returns and thus they send their wives to work or migrate to other countries.
- In addition the subject of natural reserves and the environment was also discussed.
- The Jordan Valley is an important migratory bird area and other living organisms.
- There is the Acacia tree and Arak, which is used to make the old tooth brushes (Miswak).
- There are medicinal plants in the area that should be protected and produced.
- There is aggressive urbanization towards natural lands.

Over grazing:

- There is over grazing that is affecting the important plant species. The fact that herders were prevented from using green areas brought individual grazing to an end. There is a change in the kind of agriculture from wheat into fruit trees which also decreased the effect of over grazing.

Illegal woodcutting:

- It has decreased first because of the change in the way of life where technology prevails and second because of the law preventing haphazard woodcutting.
- There is no specific place to be allocated as a protected area.

Sources of pollution:

- Fertilizers, inappropriate use of pesticides, uncovered or exposed wastewater, stagnant irrigation ponds in agricultural lands.

- The issue of using the remnants of crops and plants as fodder for animals while they are still filled will pesticides and so the animals are getting sick.
- Problem of the tomato paste industry that there is excess production that is more the capacity of the plant.

Quality of water:

- The water contains residues and thus people use filters.

3.3.3 Conclusions of the Focus Group

The following points and issues were mainly arrived at during the focus group discussions:

- Ownership of archaeological sites.
- Put archaeological sites in the name of the treasury.
- Put fences around archaeological sites to protect it from animals and human abuse.
- Provide facilities and a rest house, lights, and good roads to encourage tourism.
- Encourage people who have irrigation ponds with a capacity of 350m to use it in fish production but people have to consider the level of ammonia and minerals in water.
- Develop and improve the fish-farming sector so that it becomes accessible for everyone and in cheap prices. People should be educated on the fish market and fish consumption. If attention was given for the fish-farming sector then we will not be in need of importing fish.
- Need for a public space or park for children.
- Need for rehabilitation of the infra structure.
- Protection of archaeological sites and provision of services and facilities to encourage tourism.
- Need for public parks and recreational areas.
- Use of grey water in irrigation.
- Planting medicinal plants.
- Encourage eco tourism since the area is an important bird area and rich in cultural and archaeological sites.
- Emphasize sources of pollution.

4 FOCUS GROUP 3

4.1 Social Aspects – Northern Zone Focus Group

Representatives were invited in zone 1 of the project from northern municipalities and the industries and hotels present in the Jordan Valley.

4.1.1 Group Members

The names of the members of the tourism and environment Focus Group are shown in **Table 10**.

Table 10: The members of the social focus group

No.	Name	Institution
1.	Eng. Lubna Umeira	Ministry of Public Works and Housing
2.	Abdullah Al-Sawaii	Farmer
3.	Mohammad Talaq	Farmer/retired from JVA
4.	Mohammad al-Khashan	Tabqat Fahil Municipality Member/retired from municipalities
5.	Salim Bshara	Noor Al-Hussein Foundation/president of Wadi Khaled cooperative in the Jordanian Himmeh
6.	Dr. Salem Al-Amarat	Deir Alla Municipality
7.	Adel Abu-Siam	Deir Alla Municipality/ member of Khaza cooperative and a farmer
8.	Eng. Mohammad Al-Aboud	Deir Alla Municipality
9.	Ahed Al-Mirsal	Mu'adi Municiplaity member/farmer
10.	Ali Fahed	Farmer
11.	Eng. Faisal Qaseer	Ministry of Education
12.	Mahmoud Hishmeh	Consolidated Consultants
13.	Dr. Fouzi Sahawneh	Consolidated Consultants
14.	Luba Hamdi	Consolidated Consultants

4.1.2 Discussions within Focus Group

The following subjects were discussed:

Education:

- 30-35% of schools in the area are owned by JVA not by the (directorate of education) .in order to change its ownership the directorate has to pay to the JVA.
- Most of the school buildings are rented.
- Classrooms are so crowded due to the increasing rate of population.
- School buildings are not provided with facilities such as: playgrounds, laboratories, Etc
- Teachers employed by the directorate are not distributed according to their field of education.
- Some teachers are not qualified.
- Teachers move from one area to another, which affects the educational system and the students.
- The educational system that consists of two learning periods during the day leads to poor educational quality.
- Dropouts of students from schools due to poor standards of living in order to work.
- No higher education institutions, collages, or universities.
- People suggested that the JVA should allocate more lands units for constructing schools. In addition, the directorate of higher education should construct governmental collages and universities in the area.

Health care system:

- Health care centers are enough, but there is a lack of medical instruments, qualified medical specialists, and medical laboratories

- Hospitals are not enough in the region, the bed/person ratio is 8 beds per 35000 persons, according to participants, which very low rate. Number of doctors per persons is also low.
- People suggested that more land units should be allocated for constructing hospitals
- Plant pests increases numerously in summer in addition to house mosquitoes and flies.
- Most health centers in the area are primary health care centers; people suggested that some of the centers should be developed to comprehensive health care centers.
- There is no sewerage network system, people still use cesspits which pollute ground water in the area.
- No trash dumps in the area.
- Participants suggested that agricultural guidance in the Ministry of Agriculture should make farmers aware of the best land use methods that depend on the land properties and nature, use of pesticides and fertilizers, and planting lands according to the society demands.

Roads and transportation network:

- The main road in the area is so narrow and crowded, people suggested that it should be expanded in width, but this is not easy due to the presence of illegal supermarkets and trade centers in the area that belong to the main road. Previously, the main road was planned to be 40m in width but it is just 12m wide now.
- In order to decrease the congestion on the main road, people suggested that more land units should be allocated for the construction of ring roads all around each village and town in the area.
- Public transportation is not sufficient and efficient and so bus trips should be increased.
- Special lanes or even special road networks should be allocated for trucks.

Sources of income and job opportunities:

- Most of the farmers do not own the lands they work in.
- Foreign employment is increasing with time due to their lower salaries and higher productivity compared to local employees. This decreases the employment rate among the native people.
- The most important resource of income is agriculture; however, the economic returns are not sufficient. People think that the problem is insufficient marketing not productivity.
- People prefer working in governmental jobs rather than agriculture since it is not economically feasible nowadays.
- Agricultural lands are decreasing due to the trend of using agricultural lands as residential units.
- Lands that lie near the borders with Israel were taken by the government since the war of 1967 and they are not in use until now. Owners of those lands suffer from poverty; participants think that the problem of poverty and unemployment could be solved if the government returns back those lands to their owners. In brief the lands on the Israeli Jordanian borders are not used for political reasons
- People suggested that more land units should be allocated for establishing:
    - Agricultural factories such as juice factories, tomato factories, and organic natural fertilizer factories.
    - Handcrafts training centers.
    - Slaughterhouses
- There is an extended unexploited area that is owned by the government, people think that it would be better if the government uses part of this land as residential units since

it is not agricultural. This will help in solving the problem of using agricultural lands for residential purposes.

Suggestions:

- People suggested that more land units should be allocated for the purpose of constructing public parks, swimming pools (since king Abdullah culvert is used by children for swimming), and cemeteries.
- The Wadi Khaled Organization representative urged that we raise the issue of giving the land that was acquisited for building the Wadi Khaled Dam back to the local people of Himmeh to be used in agriculture. It was mentioned that the compensation people got in the 1970s is of no value and that people in the area are very poor and know only how to work in agriculture. Therefore, they need to have those agricultural farm units in order to generate income and jobs. This issue was emphasized by the locals who accompanied the Organization representative.
- Allocate more lands for residential uses since the area of land present is not enough especially that the population number is increasing.

4.2 Water and Agriculture – Northern Zone Focus Group

Representatives were invited in zone 1 of the project from the North Shouneh in the Jordan Valley.

4.2.1 Group members

The names of the members of the tourism and environment Focus Group are shown in **Table 11**.

Table 11: The members of the water and agriculture focus group

No.	Name	Institution
1.	Hani Al-Muhsen	Deir Alla Municipality
2.	Manseb Al-Qweisem	Tabqat Fahil Municipality
3.	Eng. Youssef Al-Sakran	Deir Alla Municipality
4.	Eng. AbdKareem Abu Zeina	New Mu'adi Municipality- Head of Municipality
5.	Amin Abdullah	Noor Al-Hussein Foundation
6.	Eng. Amer Al-Safadi	Agricultural Directorate of the Jordan Valley
7.	Eng. Ghazi Ahmad	Water Authority/Water Management of the north
8.	Ali Al-Faqeer	Agricultural Sector
9.	Eng. Dana Al-Bakheet	Ministry of Public Works and Housing
10.		Mu'adi Municipality
11.	Ali Oklah	Deir Alla Municipality
12.	Dr. Adnan Al-Salihi	Consolidated Consultants
13.	Dr. Munir Rusan	Consolidated Consultants
14.	Ruba Khoury	Consolidated Consultants

4.2.2 Issues Discussed within the focus group

The Quality of Water:

- Clean water
- Treated water
- Marginal water
- Mixed water (clean and treated)

- Using cropping patterns that suit the quantities of irrigation water and according to seasons.
- Soil type and its relation with plants and the quality of water used.

The Quantity of Water

- Quantity of water available now is sufficient but limited.
- Planting will be according to water quantities
- Water quantity fluctuations from year to year which leads to farmer's loss.
- New resources of water and its uses (Wehdeh Dam)
- Cropping Pattern and its economical effects compared with the quantity of water used.

Other Issues

- Marketing of Products
- The right management of farms
- The role of women
- The need for training courses
- The need for wastewater networks because its absence is causing groundwater pollution.

4.2.3 Discussion and Conclusions

- Water in the Jordan Valley is classified into three types; clean water, treated water and mixed water.
- Clean water is available in the area from many sources; Yarmouk River, several side wadis, Wadi Arab Dam, Ziqlab Dam and others.
- The source of irrigation water is classified as follows:
    - King Abdullah Canal is used for irrigating areas from Al-Adasiya tunnel till the end of Kreimeh area.
    - King Talal Dam is used for irrigating some of the middle areas.
    - Mixture from King Abdullah Canal & King Talal Dam is used for irrigating some areas in south Al-Karameh.
    - Al-Kafrein Dam and other small dams are used for irrigating some lands directly.
- According to Jordanian specifications EC range is (500-1,500) msiemens, the measured EC for irrigation water doesn't exceed 1000 msiemens and so it's within the standards and there is no harm from using it.
- Some farmers noted that reports revealed that the water in King Talal Dam is polluted and not suitable for irrigation or for raising fish. It was clarified that there are no such reports, and they could review all the reports issued by the water authority and royal scientific society which proves that the water of the dam is within the Jordanian Standards, however in some drought years the EC has increased a bit but this is not considered as pollution and still the water could be used to irrigate some kinds of plants that stand high EC.
- Try to use treated water in industry as much as possible.
- The cropping patterns could be classified according to irrigation water used; clean, treated, or mixed.
- It was noted that there is a treatment plant in Al-Diyyat and its water is used for irrigation but it still needs more time for studying. It was clarified that treated water from As-Samra WWTP is already used for irrigation after mixing it with King Talal Dam water, the results are very pleasant and there are no effects on crops.

- The need for training courses for farmers to enrich their knowledge and enable them to contribute in studies and experiments. It was clarified that there is already a number of organizations for the farmers funded by agencies; it just needs reorganization along with agricultural guidance centers to make it more effective.
- The need for water harvesting to be used for irrigation, which will minimize the quantity of water used for irrigation and to ask the government to give loans for the people to encourage them to do so. It was clarified that this has been already done in several projects such as the development of Zarqa river basin and the development of Yarmouk river basin, and the desert dams that contributes a lot in water harvesting.
- Most of the agricultural productions are vegetables, fruits, citrus, and grain. There is a need for an organization to guide the farmers and put a specific cropping pattern to follow. It was clarified that the organization exists since 1982 and so the issue is to make it more effective.
- Inform the farmer of the water budget of the area and let him choose the crops and areas to be planted according to the quantities of available water.
- Modify the irrigation networks in the farms to make it more efficient. It was clarified that there is already a department in the Water Authority to modify the irrigation networks inside the farms and who ever needs that have to let them know and they will do all appropriate studies and work.
- The kind of soil has not been changed due to the use of treated and mixed water and this was clear from previous years, however, in drought years the EC has increased a bit and some crops have been damaged.
- It was noted that Karameh Dam water has high EC and not suitable for irrigation. It was clarified that this was due to drought seasons, and now in winter water from KAC is used for leaching soil and in few years it will be back to normal, and that this water could be used for irrigating some kind of crops like palm that stand high EC.
- Marketing of crops:
    - Marketing is not in good condition and not sufficient because production is much more than demand.
    - To encourage marketing outside the country, there are already three marketing centers; Al-Qarn, North Shouneh and Al-Sawalha, but they need to be activated and to construct a company to organize the work of these centers.
    - To establish food factories to use all excess crops in the area.
    - To establish training centers for the local people in the area to train them and allow them to work in factories.
- To establish a funding center to compensate farmers in cases of disasters.
- To subsidize the farming of grains is a continuous recommendation from the government.
- Wastewater networks do not exist in the area which has a negative impact on ground water and the environment. So, the area is in need for wastewater networks and treatment plants, and the effluent of the WWTP could be used for irrigation after mixing.
- To give some concern to animals and animal raising in the area.
- Women role:
    - To establish handicraft factories for women and to train them.
    - To establish educational centers.
    - It was noted that women in JV have a great role, they represent (70-90) % of the working force of the Jordanian workers, and comes in the second rank after foreign workers.
    - To encourage women to take part in food factories and to train them to do so.

- To train the locals of the area to work in the lands in order to minimize the number of foreign workers.

4.3 Environment and Tourism – Northern Zone Focus Group

The names of the members of the tourism and environment Focus Group are shown in **Table 12**.

Table 12: The members of the environment and tourism focus group

No.	Name	Institution
1.	Eng. Khaled Anab	Sharhabil Bin Hasnah Municipality
2.	Mohammad Al-Amri	Presdient of the North Shuneh Awqaf
3.	Mousa Al-theeban	Mouath Bin Jabal Municipality member
4.	Dr. Ata Ayyoub	Jordan Environment Society/Deir Alla
5.	Eng. Munther Al-Bakheet	Municipality Head of Deir Alla Al-Jadeeda
6.	Eng. Anas Amaira	Jordan River Foundation
7.	Ahmad Al-Salihi	The Jordanian Mineral Himmeh Company
8.	Dr. Reem Al-Kharouf	Minsitry of Education
9.	Hatem Marii	Member in the Nour Al-Hussein Foundation/Jordanian Himmeh
10.	Ali Al-Hataleen	Mouaddi Al-Jadeeda municipality member
11.	Khaled Abu Abta	Tabqat Fahil municipality member
12.	Dr. Raul Nasr	Consolidated Consultants
13.	Majdi Salameh	Consolidated Consultants
14.	Noura Al-Qudat	Consolidated Consultants

Three aspects have been discussed in the environmental group: the economical, Environmental and transportation needs and problems for people living in the northern Ghor. These issues are summarized as follows:

- **Tabqat Fahil Municipality:** Services and utilities provided for people do not accommodate their needs; there are needs for playground areas and a swimming pool since many kids have drowned while playing in King Abdullah Canal. On the other hand, the head of the municipality indicated that the lack of parks and rest areas have caused tourism to withdraw.
- Concerning urban planning, farm units and residential buildings are established very close to each other and thus, pesticides and herbicides used in farming, adversely affect the buildings and the quality of air.
- There is a need for extended urbanization especially in Al Mashare' and Al Sheikh Hussein area.
- **Deir Alla** and **Al Kreimeh Municipalities:** Lack recreational facilities, and the farm units are way too small and being established aside to the residential buildings. **Deir Alla** complains from water pollution due to the absence of sewerage networks and the dependence on cesspit tanks. In addition, there are many violations concerning the main road in **Kreimeh** where it would end up narrow because people extend their small residential units while building and use part of the road area.
- Generally speaking, there is an unwise division of residential units. Some units are located in mountainous locations, where constructing access roads to those areas and providing waterlines is a problem.
- **Al Ma'adi Municipality:** claims for extended urbanization. Residents need playground areas for their kids and parks for recreation.
- Limited residential areas.

- The Municipality complains, especially during the summer, from the pollution caused by wastewater and solid wastes in South Twal/Al Deyyat solid waste dump area, which provides a suitable ambient for flies and mosquitoes and other annoying insects, that is besides the unpleasant smell caused by the dump area.
- **Al Ardha area:** The president of the Jordan Environment Society indicated that the lack of proper planning lead to environmental problems where the factories have been established randomly, not taking into consideration the residential areas. The tomato paste factory is known to be of a major environmental problem there.
- Residential units are crowded and population growth has lead to increased dependence on cesspit tanks since wastewater networks are yet not available in many parts of the Ghor.
- The president of the JES suggests some ideas in managing solid waste such as plastic recycling and using organic fertilizers. Besides, EIA studies must always be done before implementing any project in the area.
- Agricultural roads that provide access to farms are needed in **Mu'ath Bin Jabal and Al Himmeh** Municipalities. In one winter, floods in Al Himmeh road caused many losses in the farms that didn't have access roads, this lead to isolation of the farms from the area around.
- The Jordanian Himmeh Company has a new project which will be located on a 42 dunums and consists of hot therapeutic pools and a hotel of 25 chalets and 10 rooms. This will provide spa tourism for the Himmeh area and employ local people from the **Al Mkheiba** area.
- The representative of **Al Shuneh Awqaf** complained about the existence of dump areas near water resources.
- Ancient monuments need to be protected and given more attention. In areas where the Companions shrine is present, people are increasingly using cemeteries nearby because of its religious importance causing them to be very crowded.
- Reusing treated water for agriculture was very well welcomed by the people. People are ready to pay certain fees for the operation of the wastewater treatment plant since they already pay for the sewerage service. However, constructing a central treatment plant was not a good idea because of the flat terrain in the area which will make construction very difficult and will need deeper excavations and thus affecting the ancient monuments. As a result, it is preferable to construct a treatment plant for each area instead of one central plant.
- Water harvesting has been successfully used in the irrigation of olive trees and others.
- **Ghor and Al Rayyan areas:** The Jordan River Foundation is implementing income-generating projects in order to alleviate the living conditions of the people in Ghor and **Al Rayyan** area. The project consists of establishing Al Rayyan center, which aims at training a number of women on certain handicrafts and marketing their work in different places and then help those ladies to start their own business. The handicrafts made use of raw materials from burnt banana leaves that are considered waste. However, the main problem facing women in the center is the lack of an efficient transportation system and lit roads.
- There is a need for youth and computer centers that will make the youth search for information easier and enhance their computer skills thus increasing their chances in finding a job.
- Another suggestion that was of interest to the residents is the spring festival that is thought to enhance tourism since the area is of a religious, cultural and natural significance. The spring festival requires rehabilitation of infrastructure, utilities, agricultural areas and the shore that is polluted with litters.
- Other suggestions were made concerning making places for feeding and raising cattle and more centers for handicrafts, where charity fund (Al Zakat) is capable of directing and funding people who have skills and marketing their work.

- One of the existing parks in the area is Pella Park.

ANNEX 3
INTERVIEW RECORDS

Annex 3: Interview Records

1 AGRICULTURAL RESOURCES INTERVIEWS

Interview Record	
Interviewee Information	
Name:	Mohammad Suliaman Sudi
Occupation:	Member of Farmer Association and a Citrus Farmer
Name of Institution: **(in English & Arabic)**	Farmer Association اتحاد المزارعين
Institution Contact Information	
Telephone:	+962 79 566 4844
Fax:	-
E-mail:	
Interview Information	
Place:	Irbid
Date:	March 27th, 2004
Time:	11:00 a.m.
Interview Record	
The interviewee answers to the questions can be summarized as follow: 1. the main obstacle of agriculture sector in the JV is marketing followed by the quantity of water 2. the priority for water distribution should go to agriculture because it is the main source of income for the local community in the JV. In addition he stresses that more water should be given for agriculture 3. he supports the idea of given different prices for different water quality and give also lower price for the agriculture sector compared to tourism and industry 4. he agrees that treated wastewater can be successfully for irrigation given a proper management is practices 5. he agrees to replace crops with high water needs by those with lower needs but ot exclude citrus because of the difficulties of doing so and the damages to the farmers that may cause. In addition he stress the point that for any new crop that could be introduced the marketing must be ensured by the government	
Interviewer Name: Dr. Munir Rusan	

Interview Record	
Interviewee Information	
Name:	Ali Gharaibeh
Occupation:	Director of Deir Alla Research Station
Name of Institution: **(in English & Arabic)**	Deir Alla Research Station محطة دير علا للأبحاث الزراعية
Institution Contact Information	
Telephone:	+962 5 357 003
Fax:	+962 5 357 3201
E-mail:	-
Interview Information	
Place:	Irbid
Date:	March 25th, 2004
Time:	9:00 p.m.

Interview Record

The interviewee answers to the questions can be summarized as follow:

1. the main obstacle of agriculture sector in the JV is marketing followed by the quantity of water
2. the priority for water distribution should go to agriculture because it is the main source of income for the local community in the JV
3. he supports the idea of given different prices for different water quality and give also lower price for the agriculture sector compared to tourism and industry
4. he agrees that treated wastewater can be successfully for irrigation given a proper management is practices
5. he strongly disagree with replacing tomato and citrus by other crops that have lower water needs as this is part of the culture and tradition farming

Interviewer Name: Dr. Munir Rusan

Interview Record	
Interviewee Information	
Name:	Roy Ventura
Occupation:	Senior Engineer (Office of Water Resources & Environment)
Name of Institution: **(in English & Arabic)**	USAID الوكالة الأميركية للإنماء الدولي
Institution Contact Information	
Telephone:	+962 6 590 6255
Fax:	+962 6 592 0143
E-mail:	rventura@usaid.gov
Interview Information	
Place: **Date:** **Time:**	Amman April 7th, 2004 9:00 a.m.
Interview Record	

The interviewee answers to the questions can be summarized as follow:

1. the main obstacle of agriculture sector in the JV is the improper crop selection where the current crops are of high water requirement. He suggest ot adopt crops with less water needs but at the same time be very careful not to make ay damage to the social and life of the farmers.
2. the priority for water distribution should go to the tourism and industry related to the tourism and take advantages of the potential tourist features in the JV
3. he does not support the idea of given different prices for different water quality because of the difficulties of executing such task
4. he agrees that treated wastewater can be successfully for irrigation and for industry and that can save potable water for domestic sector. However, he emphasized the point not to reduce the fraction of water currently allocated for agriculture but not to exceed it

Interviewer Name: Dr. Munir Rusan

2 SOCIAL INTERVIEWS

Interview Record	
Interviewee Information	
Name:	Mr. Omar Al-Hmoud
Occupation:	Program Officer/ EPP (Enhanced Productivity Programme)
Name of Institution: (in English & Arabic)	Ministry of Planning and International Cooperation (MOPIC) وزارة التخطيط والتعاون الدولي
Institution Contact Information	
Telephone:	+962 6 464 4466
Fax:	+962 6 464 4536
E-mail:	omar.h@map.gov.jo
Interview Information	
Place:	MOPC
Date:	April 14th, 2004
Time:	9:30 a.m.
Interview Record	

- Ongoing Studies:
  - A socio-economic study by Wakkas conducted at Northen Shuneh. This study is a joint one among GTZ, MOPIC, and City and Village Development Bank (CVDB). Dr. Mohammad Kazem may be contacted to get a copy of this study; he is available at GTZ office at CVDB.
  - Currently JOHUD are doing a socio-economic study at area of Sheikh-Hussein. This study is submitted to MOPIC and Community Centres Association (CCA) which is headed by Dr. Sari Naser. This study did a baseline survey at Ghor Safi. Contact number for CCA is 06-4388324.
  - Jordan River Foundation (JRF) did a Participatory Rural Appraisal (PRA) as a need assessment study at Khazma.
  - JOHUD did a PRA in South Shuneh. The areas included and that are part of Jordan valley are Shuneh, Al-Karasreh, Jufeh, and Al-Nahda. Mr. Jamil Mohammad can be contacted at 06-5560741.
- "Environmental Rest House" belongs to University of Jordan; a project called "Let's try together".
- Regarding recommendations for employment, the above studies answers the question.
- Training: IRADA through MMIS (a management contractor for MOPIC) conducted an Enhanced Productivity Programme (EPP). As part of this programme, there are 21 Enhanced Productivity Centres (EPCs) part of which are available at Jordan Valley. Ms. Salwa Bamieh is responsible for the project and her contact number is 06-4649040.

A list of ongoing projects in the Jordan Valley will be faxed soon to Consolidated Consultants Office.

Interviewer Name: Dr. Fouzi Sahawneh

Interview Record	
Interviewee Information	
Name:	Dr. Taghreed Abu Hamdan
Occupation:	Director – Monitoring and Evaluation Unit
Name of Institution: **(in English & Arabic)**	The Jordanian Hashemite Fund for Human Development الصندوق الأردني الهاشمي للتنمية البشرية
Institution Contact Information	
Telephone:	+962 6 556 0741
Fax:	+962 6 582 7350
E-mail:	taghreed@johud.org.jo
Interview Information	
Place: **Date:** **Time:**	The Jordanian Hashemite Fund for Human Development April 14th, 2004
Interview Record	
• Refer to attachment below.	
Interviewer Name: Dr. Fouzi Sahawneh	

The Jordanian Hashemite Fund for Human Development / Monitoring and Evaluation Unit

Programmes and Projects implemented by the Jordanian Hashemite Fund in the Ghors (Jordan Valley)

Introduction:

The Jordanian Hashemite Fund has 50 centres in 11 governorates. Various development programmes re provided to the local community with respect to childhood, development of natural resources, economic strengthening, youth participation, information technology for development purposes, proper judgement, and women's right and support.

In the Ghors (Jordan valley), the Fund has 5 centres that present the following programmes and projects to the local community:

1. Princess Basma Centre for Development/ Ghor Safi:

Childhood: Children's nurseries, parents' awareness, parents' involvement with child nurseries, and summer camps and clubs for children.

Women programs: Awareness and education in various fields, women committees (volunteer committees supporting the center and connecting it with the local community in order to get to know their opinions and needs for training programs), local rural market, and training on food processing.

Information Technology:

Youth: youth committees

On-going projects:

- Development of the use irrigation water at the farm level
- Family planning and the role of women in development
- Community participation in sustainable management of water at the farm level

2. Princess Basma Centre for Development/Ghor Haditha

Childhood: Children's nurseries, parents' awareness, parents' involvement with child nurseries, and summer camps and clubs for children.

Women programs: Awareness and education in various fields, women committees (volunteer committees supporting the center and connecting it with the local community in order to get to know their opinions and needs for training programs), local rural market, and training on food processing.

Youth: youth committees

On-going projects:

- Development of the use irrigation water at the farm level
- Community participation in sustainable management of water at the farm level

3. Princess Basma Centre for Development/Ghor Al-Mazraa

Childhood: Children's nurseries, parents' awareness, parents' involvement with child nurseries, and summer camps and clubs for children.

Women programs: Awareness and education in various fields, women committees (volunteer committees supporting the center and connecting it with the local community in order to get to know their opinions and needs for training programs), local rural market, and training on food processing.

On-going projects:

- Development of the use irrigation water for agriculture
- Community participation in sustainable management of water at the farm level

4. Sheikh Hussein Center for Development- Irbid Governorates

Childhood: Children's nurseries, parents' awareness, parents' involvement with child nurseries, and summer camps and clubs for children.

Women programs: Awareness and education in various fields, women committees (volunteer committees supporting the center and connecting it with the local community in order to get to know their opinions and needs for training programs), local rural market, and training on food processing.

Agricultural Development: house gardens

On-going projects:

- Comprehensive Development Project

5. Princess Basma Centre for Development/South Shuneh- Balqa Governorate

Childhood: Children's nurseries, parents' awareness, parents' involvement with child nurseries, and summer camps and clubs for children. In addition, there is a therapy unit for children with special needs (disabled).

Women programs: Awareness and education in various fields, women committees (volunteer committees supporting the center and connecting it with the local community in order to get to know their opinions and needs for training programs), local rural market, and training on food processing.

Agricultural Development: house gardens

On-going projects:

- Original agriculture
- Environmental restaurant
- Women and their role in the conservation of sustainable environmental resources
- Community participation in sustainable management of water at the farm level

3 WATER RESOURCES INTERVIEWS:

Interview Record	
Interviewee Information	
Name:	Patrick Papania
Occupation:	Team Leader
Name of Institution: (in English & Arabic)	KAFA'A for sustainable irrigation water use
Institution Contact Information	
Telephone:	+962 6 566 7730, +962 77 805313
Fax:	+962 6 566 1263
E-mail:	ppapania@digiscape.com
Web Site:	www.kafaa.org
Interview Information	
Place:	KAFA'A Office
Date:	April 12th, 2004
Time:	10:30 am
Interview Record	

- Since Oct. 2003 for three years
- USAID Fund
- The main objective is to increase the efficiency of water used in agricultural sector (through planting high value crops) as indicated by the project name
- 4 Deliverables by KAFA'A to help the farmers to consumed water efficiently:
  - Provide practical and applicable information
  - Create income through sustainable approaches for local communities
  - Training the interested groups by Jordanian and International experts
  - Link Decision Makers with Communities
- The main objective could be achieved through introducing proper crops pattern, advise to change farmers behaviour, marketing, management to use different water qualities, and others
- Through the project, Policies regarding high income water consumption (Jordanian or International) will be reviewed and two new policies will be introduced
- The project will consider Soil Quality, Water Quality, and Crops Pattern to produce high value crops
- Areas to covered by the project are:
  - Jordan Valley
  - Amman-Zarqa Basin

Interviewer Name: Dr. Adnan Al-Salihi

Interview Record	
Interviewee Information	
Name:	Mona Grieser
Occupation:	Chief of Party
Name of Institution: (in English & Arabic)	Water Efficiency and Public Information for Action (WEPIA)
Institution Contact Information	
Telephone:	+962 6 552 7893/5
Fax:	+962 6 552 7894
E-mail:	mgrieser@joinnet.com.jo
Interview Information	
Place:	WEPIA Office
Date:	April 8th, 2004
Time:	2:00 pm

Interview Record

- The project mainly deals with public participation in water savings through water saving devices, increasing efficiency, grey water reuse, format policies (e.g. flush rate), purification codes (e.g. water use for landscape), and others
- The project consternates in two areas;
  - Tourist Activities
  - Grant Money to Communities
- Deal with Format Policy for conservation water (construction laws), for example the flush rate
- Hotels should use water conservation devices
- Grey water to be used outside the house at areas of no sewerage network such as KaraK area (Shfaiera Al Sharqya)
- Hotels only in Jordan Valley are covered by the project

Interviewer Name: Dr. Adnan Al-Salihi

Interview Record	
Interviewee Information	
Name:	Mr. Philipp Magiera
Occupation:	
Name of Institution: (in English & Arabic)	GTZ – Water Sector Planning Support
Institution Contact Information	
Telephone:	+962 6 568 5389
Fax:	
E-mail:	
Interview Information	
Place:	Phone Interview
Date:	April 7th, 2004
Interview Record	

The Project "Water Sector Planning Support" is a national project for Jordan and is not directly related to Jordan Valley. Therefore, it was recommended to contact the following GTZ projects that are of direct relation to Jordan valley:

1. Reuse of Reclaimed Water in Jordan Valley
2. Water Management and Irrigated Agriculture

Interviewer Name: Rola Quba'a

Interview Record	
Interviewee Information	
Name:	Eng. Ali Adwan
Occupation:	Team Leader, Jordan Valley
Name of Institution: (in English & Arabic)	Water Resources Management in Irrigated Agriculture-WMIA/GTZ
Institution Contact Information	
Telephone:	+962 6 567 8926
Fax:	+962 6 567 8926
E-mail:	ali_adwan@wanadoo.jo
Interview Information	
Place:	GTZ Project Office at Jordan Valley Authority
Date:	April 7th, 2004
Time:	11:00 a.m.
Interview Record	

- Project objective is to encourage farmers participation in management and distribution of irrigation water.
- Mr. Regner is the Project Manager.
- The project started in June 2001. It serves the Ministry of Agriculture and the Jordan Valley Authority to establish some institutional committee for farmers for distribution of water.
- The second phase of the project started in January 2004 and its duration is three years. There is also a third phase for this project.
- The strategy is to improve irrigation management through farmers participation. However, the project does not have a set model for the form of participation. It only encourages farmers to form cooperative communities leaving them the freedom of determining the form of this participation.

Interviewer Name: Dr. Adnan Al-Salihi & Rola Quba'a

Interview Record	
Interviewee Information	
Name:	Dr. Khaleel Al-Absi
Occupation:	Project Director
Name of Institution: (in English & Arabic)	Use of Reclaimed Water in the Jordan Valley - GTZ
Institution Contact Information	
Telephone:	+962 6 560 4239
Fax:	+962 6 560 4239
E-mail:	
Interview Information	
Place:	GTZ Project Office at Jordan Valley Authority
Date:	April 7th, 2004
Time:	11:40 a.m.
Interview Record	

- Copy of "Guidelines for Brackish Water Irrigation in the Jordan Valley". Project was finalised in year 2003 and a copy of guidelines for using brackish water in Jordan Valley was provided.
- Reclaimed Water Project has been ongoing for the past 12 to 13 months.
- Copy of "Reclaimed Water Project- Baseline Report", First Report.

Interviewer Name: Dr. Adnan Al-Salihi & Rola Quba'a

Interview Record	
Interviewee Information	
Name:	Nazeer Abu Arqoob
Occupation:	Assistant Secretary General for Wastewater Sector
Name of Institution:	Water Authority of Jordan (WAJ)
Institution Contact Information	
Telephone:	+962 6 568 0100
Fax:	+962 6 568 0891
E-mail:	nazeer_AbuArqoob@mwi.gov.jo
Interview Information	
Place:	WAJ Offices
Date:	April 7th, 2004
Time:	9:00 a.m.

Interview Record

- TYPSA study to determine the location of the three suggested wastewater treatment plants.
- Suggested Reservoir located below wadi Arab Dam for the effluent from wadi Arab and Central Irbid wastewater treatment plants.
- To get additional information on the effluent reuse project financed by the KfW, contact Eng. Saleh Malkawi.
- For the Red-Dead Sea Canal alignment, contact Eng. Richard Persaud from Harza.
- The northern conveyor of the Zara Main Water Conveyance System Project include desalination plant and two pump stations. As for the other conveyor towards the south Ghor there is another, it is to be checked with Jordan valley Authority.
- Raw water conveyor that takes water from Mujib, Zara and Zarqa-Main to desalination plant located at the intersection of the Deas Sea-Naour road and the road to Jerusalem.
- Tel Al-Mantah Wastewater Treatment Plant is run by the Jordan Valley Authority. 100% of its treated effluent is reused.
- There are private wastewater treatment plants in the Jordan valley. These are to be checked with Eng. Ekram Daghistany from Jordan Valley Authority.

Interviewer Name: Dr. Sawsan Himmo

Interview Record	
Interviewee Information	
Name:	Eng. Yousef Hasan Ayadi
Occupation:	Deputy of Planning in JVA
Name of Institution: (in English & Arabic)	Ministry of Water and Irrigation
Institution Contact Information	
Telephone:	+962 6 569 7940 +962 79 5588087
Fax:	
E-mail:	Youssef_hassan@mwi.gov.jo
Interview Information	
Place:	MWI New Building, Office 313
Date:	April 8th, 2004
Time:	8:30 am

Interview Record

- New Vision
  A prominent institution for developing the Jordan Valley and providing quality services to its residents and investors, and be an example of high efficiency among public sector institutions in Jordan.
- New Mission
  The Jordan Valley Authority develops, manages, and protects water and land resources and their supporting infrastructure in the Jordan Valley in an environmentally and economically sound manner, in the Jordanian national interest, through creating partnerships with the private sector where appropriate. JVA will also implement projects stemming from regional agreements on water and development on behalf of the Jordanian government.
- JVA has developed four goals, which represent the four main macro-tasks that it must carry out in order to fulfil its mission. These four goals are:

Goal One: Water Resource Development and Management

Meet the needs of current and future water users by managing, developing, protecting and sustaining both existing and new water resources, and to do this in a way which takes into account both economic and environmental considerations, and involves the private sector where appropriate. Dams construction could be the priority number one, as an example 30 MCM of rain harvesting dams was developed and Wehdeh Dam is under construction.

Goal Two: Water Supply and Distribution

Ensure that JVA's existing water delivery and distribution infrastructure, systems and facilities are managed in an efficient, transparent and equitable manner, and involve the private sector where appropriate. FTAs flow is going to reduce to 6 *l*/s, which is the design flow.

Goal Three: Land Development and Management

Develop, manage, regulate and protect land and related resources in the Jordan Valley in order to maximize their economic usefulness while taking into account environmental considerations, and involve the private sector where appropriate. 30 to 40 Dunums could be insufficient to support family now since this area was suggested many years ago. After 2001, lands can be sold for more efficient handling. JVA must give up the unused lands.

Interview Record

Goal Four: Organizational Performance Improvement and Development
Develop and reorganize JVA to enable it to better achieve its new mission and improve its performance and effectiveness in providing quality service to its stakeholders.
• New Irrigation Projects will not support by donors any more. Last of these projects are:
  o 2200 Dunums could get water 2 MCM from Mujib
  o 7500 Dunums at Khnizera, Fifa, and Summar could get 8.5 MCM from Tanour Dam
• Mujib water to Industrial use will cost Potash 0.53 JD/m^3 for 10 MCM per annum.
• Mekhieba water (20-30 MCM) could transfer to domestic and Abu Zeighan (15 MCM) through RO to Amman.
• Unconventional water (Brackish and Treated Wastewater) to Irrigation.
• New infrastructures (25 MJD) at Dead Sea area.
• New Touristic investment (411 MJD) at Dead Sea
  o Sharm Co. (37 MJD)
  o Belfsta Co. (35 MJD)
  o Aomnix Group (140 MJD)
• New study for new touristic area at Kafrein Dam and Karamah Dam
• Irrigation Project 14.5 could be transferred to a touristic area

Interviewer Name: Dr. Adnan Al-Salihi

4 ENVIRONMENT INTERVIEWS

Interview Record	
Interviewee Information	
Name:	Mr. Khaled Nassar, Mr. Abdel Rahman Sultan
Occupation:	Projects Managers
Name of Institution: (in English & Arabic)	Friends of the Earth Middle East (FoEME) جمعية أصدقاء الأرض
Institution Contact Information	
Telephone:	+962 6 586 6602
Fax:	+962 6 586 6604
E-mail:	foeme@go.com.jo
Interview Information	
Place:	FOEME Offices – Biader Wadi Es Sair
Date:	April 4th, 2004
Time:	3:15-5:15 p.m.

Interview Record

Prior to the Interviewer introduction to the project, both Mr. Nassar and Sultan expressed their understanding of this project and other similar funded projects in the Jordan Valley as a tool handled by the donor agencies for assessing and promoting a new water pricing and water management policies especially concerning water use in the agriculture sector.

Their main concerns and comments were that:

1. The Jordan Valley Authority (JVA) is only concerned with the big farmers' interests and satisfaction neglecting small and medium ones.
2. JVA policies and decisions are affected by the local and regional political forces
3. Management of the Jordan valley (JV) should be planned and implemented in regional basis thereto assure sustainable development and Integrated Management of the inter and intra related management areas, for example the management of available water resources, the use of chemicals in the agriculture, and also the Management of the Dead Sea Basin.
4. Many governmental and nongovernmental organizations had carried out several multidisciplinary studies within the mandate of the JV, and several studies are ongoing today. However, severe lack of coordination and exchange of information is witnessed, as will as duplication of work, ignorance of sensitive issues of concern, limited accessibility to important information and consequently weakness of the decision support system and losing the opportunity of integrated resources management. Also, the lack of coordination results in economical losses, mismanagement of nature resources and impacting the environmental health.
5. Related stakeholders should be involved in this project
6. Always in such projects there is no proper coordination & cooperation between the client and the donors on the objectives, criteria and conditions since the donors imposes their own regulations.

7. Sinkholes are a major problem in the Dead Sea area, and those are affected by the retraction of the Dead Sea. Other environmental problems associated with the

Interview Record

retraction of the Dead Sea are the migration of the special oasis ecosystems, theses oasis are very important and sensitive habitat. Also, at Abatah Spring area the *Ghar gharansis* (endemic fish) exist, up to date this area is considered as the only habitat for this fish.

8. Acacias Woodland in Qatar area are endangered, however, Qatar is a proposed protected area and will be declared as a protected area as soon funds are available.
9. Tourism development in the JV should be combined with the development of convenient and demanded tourism linkages. It might be important to oversee these linkages as part of their regional context thereto ensures integration instead of competition.
10. Pubic participation in the planning and implementation phases of the development (economical, social and environmental) projects in the JV is very important.
11. The land use planners should recognize the importance of developing urban areas (towns and villages) and to ensure the availability of suitable services and utilities.
12. The agriculture sector require full attention to the environmental and economical associated problems, especially water consumption, miss use of agrochemicals and the expansion of the agricultural land. Specifically the techniques used for growing plants in the sand dunes area in Wadi Araba should apply agricultural patterns that minimize soil erosion. However, agriculture in Wadi Araba results in fragmentation of special habitat islands and affects relict species.
13. The Dead Red canal project will posses several impacts to the environmental setting in the Valley, both positive and negative impacts are anticipated and a comprehensive and elaborated EIA and environmental management plans should be prepared prior to the project construction.
14. Empower citizens and equips NGO's and civil society organizations funds and other sustainability tools.
15. Concentrate on socio–economic projects.
16. Privatization of lands is going to be a major problem.
17. There is no master plan for the Dead Sea. However, FOEME is suggesting and working on declaring the Dead Sea basin as a Man and Biosphere Reserve.
18. The tourism sector in the JV suffers from very weak marketing policies and activities. At least basic tourism development facilities and services should be planned and prepared to improve the JV tourism product and aggressively marketed.

Interviewer Name: Majdi Salameh

Interview Record	
Interviewee Information	
Name:	Eng .Mahmoud Abu Seteh
Occupation:	Rangeland specialist
Name of Institution: (in English & Arabic)	Ministry of Agriculture وزارة الزراعة
Institution Contact Information	
Telephone:	+962 6 567 4094 / +962 77 475 874
Fax:	+962 6 567 4094
E-mail:	tcprange@nets.jo
Interview Information	
Place:	Ministry of Agriculture
Date:	April 18th, 2004
Time:	10:30 am
Interview Record	

The Main Ideas of the interview

1. The grazing patterns in the north and middle parts of the valley are quite different in nature and effect from the grazing patterns in the south parts of the valley where:
    a. Grazing in the southern parts is more dependants on the natural vegetation, which are scarce and mainly concentrated within the riparian zones of the wadis and streams. Also, in the southern parts, up to 85% of the animal feed is from the natural vegetation and up to 20% is provided as supplementary feed. The settlement projects of the Bedouins resulted in concentrating the grazing pressure within the settled zones and its surroundings. Goats and camels are favoured on sheep's since they are more adapted to the harsh environmental conditions.
    b. Grazing in the northern and middle parts of the valley include growing sheep's, goats and cows, range vegetation provides with up to 75% of the feed consumed by these animals, supplementary feed and agriculture waste provides with up to 30% feed.
    c. Overgrazing can be witnessed almost every where in the valley; however, the impact is more apparent on the Humra area in the northern parts where the deciduous oak and Kharob are significantly impacted. While in the southern parts the important Arak and Acacia stands are significantly affected. These sites are proposed protected areas. Unfortunately, the overgrazing is usually associated with aggressive woodcutting; consequently, the problem is much complicated.
    d. The overgrazing and woodcutting problems are more significant and require more attention in the southern parts since the vegetation cover is already scarce and the climatic conditions are harsh. Another sensitive site is the tamriks woodland north to the dead sea, this area is very important and suffers from heavy woodcutting and grazing, more attention to this area is need thereto; conserve its uniqueness and rarity.

Interview Record
2. Problems Facing the Development of Rangelands within the Jordan Valley: a. One of major problems is the ambiguity of responsibilities for managing the rangelands and forestlands especially in the north parts of the valley starting from the Jordan University Farms and up north. This problem results in almost total ignorance of this area and though mismanagement and the loss of forests and rangelands. Mr. Abu Seteh stated that the Ministry of Agriculture could not work in these areas. b. The problem of plastic waste disposal and dispersal. c. The soil erosion problem caused by the overgrazing and woodcutting 3. Recommendations: a. To control grazing activities based on the grazing capacity of available rangelands b. To rehabilitate overgrazed rangelands c. To delineate rangelands and other areas suitable for agriculture expansion d. To enhance more communication and coordination between responsible authorities e. To establish Agriculture Research and Training Center (Training, Awareness and research targeting farmers, employees and other groups) – Dair alla or close to the Jordan University Farms are potential locations. f. To Declare Qater, Mas'ada Mountain and Ghore Al Safi as reserves in full coordination and cooperation with local communities.
Interviewer Name: Majdi salameh

Interview Record	
Interviewee Information	
Name:	Eng. Khalaf Al Ogleh
Occupation:	Biodiversity Division Head
Name of Institution: **(in English & Arabic)**	Ministry of Environment وزارة البيئة
Institution Contact Information	
Telephone:	
Fax:	
E-mail:	
Interview Information	
Place:	Ministry of Environment
Date:	April 14th, 2004
Time:	9:00 am
Interview Record	

Main Comments and Findings:

1. Pollution: mainly resulting from industries, the misuse of pesticides, fertilisers and other chemicals used in agriculture. The impacts of chemicals misuse is not local and it has to with the dispersion of these chemical by air and water, also, the misuse of agrochemicals on the other side of the valley is problematic and require proper management at both sides. Also, the industrial sources of pollution should be monitored continuously, and proper mitigation measures, pollution prevention/minimisation, and treatment should be applied and monitored. Other sources of pollution include the mismanaged solid and liquid wastes. Integrated Waste Management Systems are recommended, and these systems should be combined with proper selection of management techniques and waste treatment/disposal locations, in addition to the development and enforcement of environmental legislation and standards, public awareness activities and systematic monitoring.
2. Overgrazing and Woodcutting: this problem is of highly concern since the valley holds unique, sensitive and diverse ecosystem, overgrazing and illegal woodcutting results in loss of habitat and diversity. However, organised grazing associated with rangeland and forestry development would ensure conserving the ecosystem.
3. Shortage of parks for local, national and international tourism. This shortage result in many environmental problems like waste generation and accumulation, fires, risks to public health and safety, and also visual impacts. It is highly recommended to establish parks and tourism gardens supported with the needed facilities and services to ensure mitigating the up mentioned impacts and to ensure proper management of these parks.
4. Nature conservation problem. Several areas in the valley where identified as protected areas, proposed protected areas, important bird areas (IBAs) and national parks. All these sites represent biological hotspots and sensitive ecological sites, where suitable conservation activities should be applied. For the protected areas the conservation problem is already tickled and solved through integrating nature conservation with local community involvement and development of environmental friendly income generating activities. The proposed protected areas are subject to be declared as protected areas whenever funds area available, however, more efforts and attention should be given to the involvement and participation of local communities within these areas and its close neibouring areas. Still these proposed protected areas are subject to many environmental threats mainly related to overgrazing and

Interview Record
woodcutting and the increase accessibility to remote areas. IBAs are quite vast areas, still these locations are witnessing ever growing expansion of agricultural and touristic projects, the most threatened IBA by these developments is Al Maghtas-Swaimeh. On one hand, the development of economical activities is essential, still it has to cause deleterious effect to the local environment, including the water harvesting projects that had affected severally the water budget of the Dead Sea and the generated impacts by the retraction of the Dead Sea including the appearance of several sinkholes, migration of the unique oasis systems, changing negatively the status of several species to become threatened or endangered with the risk of extinction (at least locally). On the other hand, enforcing environmental legislation's, implementing suitable environmental management projects, and enhancing alternative, environmentally sound economical projects like ecotourism and the integrated pest management in agriculture would endure sustainable development within the valley and conservation of those internationally important and yet sensitive IBAs. 5. Flies and insects management. This problem is not only a critical environmental problem but also serious challenges for economical development especially in the tourism sector. The main cause of this problem is the mismanagement of natural fertilisers and open water bodies. The Ministry of Environment in co-ordination with JVA and the Ministry of Agriculture is currently in the preparation phase to implement comprehensive mitigation plan.
Interviewer Name: Majdi Salameh

Interview Record	
Interviewee Information	
Name:	Habib Habash
Occupation:	Assistant Secretary General for Tourism Affairs
Name of Institution: (in English & Arabic)	Ministry of Tourism and Antiques وزارة السياحة والآثار
Institution Contact Information	
Telephone:	+962 6 464 2394
Fax:	+962 6 464 8465
E-mail:	hhabash@mota.gov.jo
Interview Information	
Place:	Ministry of Tourism and Antiques
Date:	April 6th, 2004
Time:	1:45-3:00 pm

Interview Record

Main Findings:

1. Existing tourism sites
    - Um Qais
    - Pella (Tabqet Fahel)
    - Tombs of the Companions
    - Al Yarmouk
    - Al Himeh
    - The Baptism Site (Al Maghtas)
    - Hot springs of Dair Allah
    - Dead Sea Shores
2. On going tourism development projects
    - Lots Cave
    - The Museum of the Lowest Point on Earth
    - Tlal and Twahin El Suker (Sugar mines)
3. Potential Tourism Development Projects
    - Al Baqurah
    - The ottoman Rail Road between Al Yarmouk – Besan – Hifa
    - Ecotourism (Al Yarmouk, Wadi Al Mujib, …etc)
4. The Dead Sea tourism assets and values include the following:
    - Sunbathing (Bromine in the air and less harmful radiations)
    - Climate (25% more oxygen at 410 meter below the sea level)
    - Medical value (Dead Sea salts as quire for many skin diseases including Psoriasis) – port of Herod
    - Cultural and archaeological values
    - Religious
5. Tourism in the JV is mainly limited to the Dead Sea coast and requires more well developed and implemented marketing strategies. Also, pricing is an issue of concern for marketing tourism products.

Interview Record
6. Most of the tourism development potentials in the JV might require developing it in its regional context. This arrangement would ensure the integrity of the tourism story and would minimize the impact of regional competition.
Interviewer Name: Majdi Salmeh and Hala Mesmar

Interview Record	
Interviewee Information	
Name:	Marah Al Khayat
Occupation:	Projects Manager
Name of Institution: **(in English & Arabic)**	Ministry of Tourism and Antiques وزارة السياحة والآثار
Institution Contact Information	
Telephone:	+962 6 464 2394
Fax:	+962 6 464 8465
E-mail:	marah@mota.gov.jo
Interview Information	
Place:	Ministry of Tourism and Antiques
Date:	April 6th, 2004
Time:	1:45-3:00 pm
Interview Record	

The interview with Eng. Al Khayat mainly concentrated on the existing and proposed projects by the Ministry of Tourism in the Jordan Valley, the on going and proposed projects include:

1. Himat Abu Thableh – North Ghour
2. The Museum of the lowest point on earth
3. Wadi Ibn Hammad Project
4. Dead Sea-Mukawer Road
5. Lutes Cave Project
6. Sugar Mines (Twahen Al Sukaer)

Other projects are carried out by the private sector include hotels near on the Dead Sea Coast.

Eng. Al Khayat suggested completing the interview with Mr. Habib Habash the Secretary General Assistant for Tourism Affairs. Please refer to the interview record with Mr. Habash.

Interviewer Name: Majdi Salmeh and Hala Mesmar

Interview Record	
Interviewee Information	
Name:	
Occupation:	Director of Awqaf Division
Name of Institution: (in English & Arabic)	Ministry of Awqaf and Religious Affairs وزارة الأوقاف و الشئون و المقدسات الإسلامية
Institution Contact Information	
Telephone:	+962 6 566 6141
Fax:	
E-mail:	
Interview Information	
Place:	Phone Call
Date:	
Time:	
Interview Record	
A phone call was made with the director of the Awqaf division in the ministry of religious affairs, the purpose of this call was to arrange for an appointment to conduct interview regarding the JVA land use project. The Awqaf director responded that the land use plan should recognize the Awqaf lands and that he has nothing to add in the interview and for more information about the tombs and cemeteries can be obtained from the field officers. The Awqaf represent ivies and field officers where invited to participate in the conducted discussion groups, for more information on their issues of concern and input please refer to the discussion groups report.	
Interviewer Name: Majdi Salameh	

Interview Record	
Interviewee Information	
Name:	Mr. Khaled Irani - Mr. Yahia Khaled
Occupation:	RSCN Director General - Director of Conservation Division
Name of Institution: (in English & Arabic)	The Royal Society for the Conservation of Nature الجمعية الملكية لحماية الطبيعة
Institution Contact Information	
Telephone:	+962 6 533 7931 / +962 6 533 7932
Fax:	+962 6 534 7411
E-mail:	dconservation@rscn.org.jo
Interview Information	
Place:	RSCN offices – Al Jubiha – Amman
Date:	April 29th, 2004
Time:	10:00 am

Interview Record

Prior to the discussion the main study findings and maps work relevant to nature conservation was presented to the interviewees in order to verify the documented relevant information and sites. The following are the comments of the interviewees:

1. The documented information and locations are almost all the land use planning information relevant to the RSCN work and activities.
2. Currently the RSCN is in the process of implementing of a Block B grant from the GEF regarding Integrated Ecosystem Management in the Valley. This project will improve nature conservation within the core protected areas and will enhance more suitable nature conservation and environmental protection within the buffer zones, IBAs and also the development areas. The land use planning project would be of great help for implementing nature conservation and sites management.
3. The RSCN is highly concerned with the on going and planned tourism development and the ongoing construction activities within the north cost of the Dead Sea and Swaimeh, since this area is highly sensitive and rare. The RSCN suggested ecotourism development and environmentally sound tourism activities within this area that ensures maximum tourism development with minimal construction activities. A nature based tourism reserve to include the stretch between the Dead Sea north coast up to Wadi Al Kharar is highly recommended, camp sites with optimum number of bed unites within the carrying capacity of the area is also recommended.
4. The RSCN is developing a ecotourism facilities at Wadi Fenan, the RSCN is planning to develop this area as a tourism orientation center within the Jordan valley and also to Dana, Rum and Petra.

Interviewer Name: Majdi Salameh

5 HOTELS AND INDUSTRIES INTERVIEWS AND QUESTIONNAIRES USED IN CONDUCTING THE ECONOMIC INTERVIEWS

CALENDAR OF HOTELS AND INDUSTRIES INTERVIEWS

Sunday 21/3/2004:-

- Zara group: Movenpick Dead Sea + Kempenski + Zara Hotel in Himmeh – Interview with Saleh Al-Refai (General Manager).

Monday 22/3/2004:-

- Dead Sea Spa Hotel (Amman Head Office): Interview with Nader Amr (Director for Sales & Marketing).
- Marriott Hotel (Amman): Interview with Amal Damrah (Marketing Administration Assistant)

Tuesday 23/3/2004:-

- Greater Amman Municipality: Information about Amman Tourism Beach – Engineer Mohammad Al-Najdawi.
- Jordanian Company for Marketing and Production of Agricultural Products (Amman Head Office)

Thursday 25/3/2004:-

- Greater Amman Municipality: Interview with Engineer Mohammad Al-Najdawi – He refused to give information about Amman Tourism Beach.
- Jordan Hotels Association: Information about hotels in Amman, Dead Sea, Petra & Aqaba.
- Holiday Inn Hotel (Amman): Interview with Khaled Kana'an (Sales Executive) – They have no information about Holiday Inn Dead Sea/Planned Hotel.
- Intercontinental Jordan Hotel (Amman): Management Offices (Lucy Aslo) – They have no information about Holiday Inn Dead Sea/Planned Hotel.

Friday 26/3/2004:-

Marriott Hotel **(Dead Sea)**: **They refused to make an interview because they are very busy.**

Saturday 27/3/2004:-

- Jordanian Company for Marketing and Production of Agricultural Products (Tomato Paste Factory) (Arda): Interview with Met'eb Hdairess (Industrial Compound Manager).
- Sundays Company: Phone call with Osama Ammareen – He refused to give information about the planned hotel.

Sunday 28/3/2004:-

- Jordan Valley Authority: Interview with Engineer Ikram Al-Daghistani (Investment Department) – Information about tourist projects in Dead Sea area.
- Zara Group: Information about Movenpick Dead Sea Water & Sewage Consumption 2000, 2001, 2002 & 2003.
- Jordan Investment Board: Interview with Marwa Abd Al-Hak (One Place Service Section) – They refused to give information about investments in Jordan without a formal letter from the company.
- Arab Potash Company (Amman): Hisham Maslamani's office (Financial Manager Assistant).
- Regency Palace Hotel: Interview with Saliba Shnoudi (Financial Manager).
- Zara Cosmetics: Phone call with Luma Abbasi – She said that she would be out of the country.

Monday 29/3/2004:-

- Ministry of Tourism: Interview with Haider Ksous (Statistics Section) – Information about hotels & tourist projects in the kingdom.

Tuesday 30/3/2004:-

- Jordan Valley Authority: Gathering information – Interview with Engineer Ahmad Saeed (Regulation Department).
- Tomato Factory (El-Qarn – north of Kreymeh): Phone call with Met'eb Hdairess – He said that it wasn't a tomato factory, but it was for fresh vegetables and it is not working now.
- OMNIX: Phone call with Naim Al-Zabery - He refused to give information about the planned hotel.

Wednesday 31/3/2004:-

- Middle Ghor Industrial Company (Polystyrene Factory): Interview with Engineer Sayel Zaidan Masalhah (Manager & Owner).
- Arab Potash Company (Amman): Interview with Sameer Al-Smadi (Costs Accountant in the factory) – The questionnaire is not ready yet.
- Jordan Valley Authority: Gathering information – Interview with Engineer Nisreen Al-A'araj + Instructions of the organization of irrigation water use.
- Bella Vista: Phone call with Nayef Mowalla – He can't give information about the planned hotel because he is very busy.

Thursday 1/4/2004:-

- Jordan Investment Board: They took the formal letter, but the employee who is responsible for giving information (Marwa) was not there.
- Ministry of Tourism: Information about occupancy rate of hotels in Jordan – Not ready yet.

Saturday 3/4/2004:-

- Travertine Company – Travco (Quarry) (Fannoush – Arda): Interview with Engineer Qais Al-Qaisy (Technical Adviser).

Monday 5/4/2004:-

- Arab Potash Company (Amman): The questionnaire is ready.
- Jordan Investment Board: Information requested – Not ready yet. About the Industrial Estate Gateway (Jordan Gateway)(QIZ) – They said that it closed or about to close (Promotion Section).

Wednesday 7/4/2004:-

- Jordan Investment Board: Information about investment projects in Jordan 2001, 2002, 2003 & 2004.
- Ministry of Tourism: Information about occupancy rate of hotels in Jordan.

Jordan Valley Preliminary Land Use Master Plan

Questionnaire Addressing Hotels At Dead Sea Area

Section 1:

1. Date: _____

2. Name of Institution: _____

3. Hotel Location: _____

4. Interviewee Name: _____

5. Job Title: _____

6. Telephone: _____

7. Year of Hotel Establishment: _____

8. Area of land on which hotel is built: _____

9. Number of rooms: _____

10. Occupancy Rate:

Off Peak	**On Peak**

11. Number of Employees:

Administrative:	
Skilled Labour:	
Unskilled Labour:	
Total:	

12. Number of Employees according to nationality:

Jordanians:	
Arabs:	
Foreigners:	
Total:	

13. Number of Employees according to place of residency:

Jordan Valley (Ghors):	
Amman:	

14. In your opinion, what is the total number of rooms that the Dead Sea can carry?

_____

15. What is the percentage contribution of each of the following activities in the hotel's income?

- ☒ Food and Beverage _____
- ☒ Lodging _____
- ☒ Other activities, please specify:_____

16. Does the hotel have expansion plans? ☒ Yes ☒ No

If the answer is yes, how will this expansion take place? _____

_____

_____

What is the area to be used? _____

17. Source of water and quantity consumed:

☒ Jordan Valley Authority _____ (m^3)
☒ Private Wells _____ (m^3)
☒ Other, please specify: _____ (m^3)

18. Does the hotel have a water recycling system? ☒ Yes ☒ No

If the answer is yes, what is the quantity of recycled water?

_____ (m^3)

Does the hotel have water saving devices? ☒ Yes ☒ No

19. What is the quantity of water consumed?

☒ Water Consumed inside the hotel _____ (m^3)
☒ Water consumed for landscape irrigation _____ (m^3)
☒ Other water consumed, please specify: _____ (m^3)

Year	2003	2002	2001	2000	1999
Water Consumed (m^3/year)					
Total number of hotel residents in that year					
Total number of employees in that year					

20. What is quality and quantity of water used in industrial process?

☒ Drinking Water _____ (m^3)
☒ Irrigation Water _____ (m^3)

21. What is the total annual water cost? _____ (JD and indicate the year)

22. Do you have a wastewater treatment plant? ☒ Yes ☒ No

If the answer is yes, what do you do with the treated wastewater effluent?

_____

If the answer is no, what approach is sued for disposing of the wastewater?

_____

23. How do you expect to expand in water usage in the future?

_____

24. What is the approach used in disposal of the solid waste?

_____

_____

25. What is the quantity of solid waste produced over the past five years?

Year	2003	2002	2001	2000	1999
Solid waste produced (kg/year)					
Total number of hotel residents in that year					
Total number of employees in that year					

26. What is the cost associated with the disposal of this industrial waste?

_____

_____

27. Do you need assistance in addressing any environmental problem that the institution is facing?

☒ Yes ☒ No

If the answer is yes, what are these environmental problems?

_____

_____

28. Do you have an environmental management plan? ☒ Yes ☒ No

If the answer is yes, please elaborate on this plan:

_____

_____

29. Do you have environmental impact assessment studies? ☒ Yes ☒ No

If the answer is yes, can you provide us with a copy of this study? ☒ Yes ☒ No

30. Do you issue Administrative Annual Reports? ☒ Yes ☒ No

If the answer is yes, can you provide a copy? ☒ Yes ☒ No

Jordan Valley Preliminary Land Use Master Plan

Questionnaire Addressing Industrial Activities At Jordan Valley

Section 1:

1. Date: _____

2. Name of Institution: _____

3. Interviewee Name: _____

4. Job Title: _____

5. Telephone: _____

6. Year of Institution Establishment: _____

7. Area of Institution: _____

8. Number of Employees:

Administrative:	
Skilled Labour:	
Unskilled Labour:	
Total:	

9. Number of Employees according to nationality:

Jordanians:	
Arabs:	
Foreigners:	
Total:	

10. Number of Employees according to place of residency:

Jordan Valley (Ghors):	
Amman:	

11. Type of natural resource consumed by the industrial activity?

No.	Type of natural resource	Quantity of natural resource	Additional Comments
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

12. Availability of Annual Reports? _____

13. Does the institution have expansion plans? ☒ Yes ☒ No

If the answer is yes,
How? _____

What is the area to be used? _____

14. What is the quantity of water consumed per process per year? _____ (m^3/year)

15. Source of Water and quantity consumed:
☒ Jordan Valley Authority _____ (m^3)
☒ Private Wells _____ (m^3)
☒ Other, please specify: _____ (m^3)

16. Does the institution have a water recycling system? ☒ Yes ☒ No

If the answer is yes, what is the quantity of recycled water?
_____ (m^3)

17. What is the total annual water cost? _____ (JD and indicate the year)

18. What is quality and quantity of water used in industrial process?
☒ Drinking Water _____ (m^3)
☒ Treated Wastewater _____ (m^3)
☒ Brackish Water _____ (m^3)

19. Do you have a wastewater treatment plant? ☒ Yes ☒ No

If the answer is yes, what do you do with the treated wastewater effluent?
_____
_____

20. How do you expect to expand in water usage in the future?
_____
_____

21. What type of industrial solid waste is produced and in what quantities?

No.	Type	Quantity (kg/year)
1		
2		
3		
4		
5		

22. What is the approach used in disposal of the industrial solid waste?
_____
_____

23. What is the cost associated with the disposal of this industrial waste?
_____
_____

24. Do you need assistance in addressing any environmental problem that the institution is facing?

☒ Yes ☒ No

If the answer is yes, what are these environmental problems?

_____

_____

25. Do you have an environmental management plan? ☒ Yes ☒ No

26. Do you have environmental impact assessment studies? ☒ Yes ☒ No

If the answer is yes, can you provide us with a copy of this study? ☒ Yes ☒ No

27. Which of the following environmental problems are associated with the industrial process?

- ☒ Noise
- ☒ Dust
- ☒ Air pollution
- ☒ Groundwater pollution
- ☒ Accumulation of municipal solid waste
- ☒ Accumulation of industrial solid waste
- ☒ Others, please specify: _____

Results of the Hotels Application Form

NO.	QUESTION	DEAD SEA SPA	ZARA INVESTMENT	AMMAN TOURISM BEACH	JORDAN VALLEY MARIOTT RESORT & SPA	REGENCY PALACE
1	DATE	3/22/2004	3/21/2004	3/25/2004	3/22/2004	3/28/2004
3	LOCATION	Dead sea	Dead sea	Dead sea	Dead sea	Amman
5	JOB POSITION OF INTERVIEWEE	Management & Marketing Director	GENERAL DIRECTOR	Project Director	Financial Department Manager	
6	TELEPHONE NUMBER	053561000 / 055601554	064650366 / 064619624	079/5557955	065607607 / 053560400	65607000
7	YEAR ESTABLISHED	1989	1990		2002/2003	1980
8	AREA	42 dunums (42,000 m^2)	89 dunums (89,000 m^2)			5,560 m^2
9	NO.OF ROOM	100	340		216	300
10	OCCUPANCY RATE (%)					
	OFF PEAK	30%-40%	30%		25%	41%
	ON PEAK	70%	50%		98%	
11	NUMBER OF EMPLOYEES					
	MANAGEMENT.	10%	20			22
	SKILLED LABOUR	80%	320			170
	UNSKILLED LABOUR	10%	20			72
	TOTAL	100	360			264
12	EMPLOYEES NATIONALITY					
	JORDANIAN	97%	355			244
	ARAB	3%				19
	NON-JORDANIAN		5			1
	TOTAL		360			264
13	EMPLOYEES RESIDENCY					
	NO. OF EML.FROM GHOR	40%				
	NO.OF EML. FROM AMMAN OR OTHER	60%	99% from ammnn			All
14	OPNION REGARDING DEAD SEA CAPACITY REGARDING NUMBER OF ROOMS	2,000 rooms	In israel, they have 2,500 rooms on dead sea (hyatt israel have 450 rooms)		1500 room	
15	% ACTIVITIES CONTRIBUTION TO INCOME					
	FOOD &BEVERAGE	30%	45%		20%	39,5%
	STAY	40%	50%		70%	44%
	OTHERS	15% spa treatment 15% entertainment	Wedd.& conf. 5%		10%	16,5%
16	EXPANSION PLANS					
	YES	Yes				
	NO		No			No
	TOTAL AREA	12 dunums for increasing rooms (adding 146 rooms)				
17	WATER SOURCE					
	JORD. VALL.		20-30 m^3			3,390 m^3
	PRIVATE WELL					
	OTHERS		130m^3 (private water tanks)			
18	WATER RECYCLING					
	YES / QUANTITY RECYCLED		Yes / 80%		Yes	
	NO	No				No
	WATER SAVING EQUP. YES	Yes	Yes			Yes
	WATER SAVING EQUP. NO					
19	WATER CONSUMPTION		Winter: 160 m^3 Summer: 360 m^3			
	INSIDE HOTEL		120 m^3			33,900 m^3 in 2003
	IRRIGATION WATER		40 m^3			
	OTHERS					
	2003 TOTAL WATER QUANTITY					33,900 m^3
	2003 HOTEL RESIDENTS					
	2003 EMPLOYEES NO.					
	2002 TOTAL WATER QUANTITY					
	2002 HOTEL RESIDENTS					
	2002 EMPLOYEES NO.					
	2001 TOTAL WATER QUANTITY					

NO.	QUESTION	DEAD SEA SPA	ZARA INVESTMENT	AMMAN TOURISM BEACH	JORDAN VALLEY MARIOTT RESORT & SPA	REGENCY PALACE
	2001 HOTEL RESIDENTS					
	2001 EMPLOYEES NO.					
	2000 TOTAL WATER QUANTITY					
	2000 HOTEL RESIDENTS					
	2000 EMPLOYEES NO.					
	1999 TOTAL WATER QUANTITY					
	1999 HOTEL RESIDENTS					
	1999 EMPLOYEES NO.					
20	SOURCE OF WATER FOR:					
	DRINKING	Mineral water	Healthy water		Mineral water	Mineral water
	IRRIGATION WATER					
	OTHERS					
21	ANNAUL WATER COST					
	COST JD					48600
22	WASTEWATER TREATMENT					
	YES / USAGE		Yes / used for irrigation			
	NO / DISPOSAL METHOD	No / private wastewater tankers				No / wastewater system
23	EXPANSION IN WATER CONSUMPTION	Expected to increase due to increase in room number			No expanion	Working towards saving water quantity consumed
24	SOLID WASTE DISPOSAL	Municipality	Suweimah municipality			Big container
25	SOLID WASTE QUANTITY	No information				
	2003 SOLID WASTE QUANTITY					
	2003 HOTEL RESIDENTS					
	2003 EMPLOYEES NO.					
	2002 SOLID WASTE QUANTITY					
	2002 HOTEL RESIDENTS					
	2002 EMPLOYEES NO.					
	2001 SOLID WASTE QUANTITY					
	2001 HOTEL RESIDENTS					
	2001 T.EMP					
	2000 SOLID WASTE QUANTITY					
	2000 HOTEL RESIDENTS					
	2000 EMPLOYEES NO.					
	1999 SOLID WASTE QUANTITY					
	1999 HOTEL RESIDENTS					
	1999 EMPLOYEES NO.					
26	TOTAL COST OF SOLID WASTE DISPOSAL	High				
27	ASSITANCE IN ENVIRONMENTAL PROBLEMS					
	YES	Yes	Need a park on eastern side of the road		Yes the problem of the decrease of dead sea water level and problem of insects	
	NO					No
28	ENVIRONMENTAL AMANGEMENT PLAN					
	YES		Yes		No	
	NO	No				No
29	ENVIRONMENTAL IMPACT ASSESSMENT					
	YES					
	NO	No	No		No	No
30	ANNUAL ADMINISTRATIVE REPORT					
	YES		Yes			
	NO	No			No	No

6 OTHER INTERVIEWS

Interview Record	
Interviewee Information	
Name:	Eng. Marwan Bqa'in
Occupation:	
Name of Institution: **(in English & Arabic)**	Ministry of Energy and Mineral Resources وزارة الطاقة والثروة المعدنية
Institution Contact Information	
Telephone:	-
Fax:	-
E-mail:	
Interview Information	
Place:	Phone Interview
Date:	May 8th, 2004
Time:	11:00 a.m.
Interview Record	
The interview asked about the availability of gas pipelines running within the Jordan Valley Authority mandate to which the respondent provided the following information: • There are two gas pipelines: 1. 36 inch gas pipeline running along the Ras Al-Naqab-Aqaba Highway. 2. 8 inch gas pipeline running from the south at the Saudi Border to the Aqaba Port. • However, there are no gas pipelines passing within the Jordan Valley Authority mandate.	
Interviewer Name: Dr. Sawsan Himmo	

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