THE HASHEMITE KINGDOM OF JORDAN

MINISTRY OF WATER & IRRIGATION

JORDAN VALLEY AUTHORITY

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT (USAID)

Jordan Valley Preliminary Land Use Master Plan Project

Social, Transportation, and Economic Assessment

Volume 3 of 5

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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

1 PROJECT GOALS AND OBJECTIVES

The Jordan Valley is Jordan's premier agricultural production area. The mild winters in the valley, which are due to the predominant below-sea-level (b.s.l.) elevations, provide great potential as a natural greenhouse for the production of high-value off-season fruits and vegetables. In addition to the significant agriculture, the Jordan Valley, including the Dead Sea, contains environmentally sensitive ecosystems and coastline, industrial areas, human settlements, and important cultural and natural sites which should be protected and linked for tourism development. These geographic areas are important to the creation of sustainable economic opportunities for Jordan and the region.

The Jordan Valley Authority (JVA) requested assistance to undertake work identified in the Regional Land Use Planning and Land Management Strategy for the Jordan Valley Authority. The United States Agency for International Development (USAID)/Jordan Water SO Office has indicated that it will assist the JVA in the development of a preliminary land use master plan for tourism and commercial/industrial purposes.

The main objectives of the project include:

1- Assisting Jordan Valley Authority in physical land use planning needs for the 3 identified zones in the project area; Zone 1: Yarmouk River to the Baptism Site, Zone 2: the Dead Sea area, and Zone 3: the Southern Ghors and Wadi Araba;
2- Analyzing the existing land uses including agricultural, industrial, natural and cultural sites; and
3- Providing recommendations for appropriate land uses that will allow increasing economic opportunities.

The project area covers the whole mandate of the Jordan Valley Authority, which extends from Yarmouk River in the North to Qater in the South (Wadi Araba); the eastern boundaries are contours 300 and 500 in the area north and south of the Dead Sea, respectively. It should be noted that Umm Qais, which is not within Jordan Valley Authority mandate, has been included in the study due to its importance in establishing the tourism linkages in the area.

On the 19th of February 2004, the United States Agency for International Development (USAID) retained the services of Consolidated Consultants for the Jordan Valley Preliminary Land Use Master Plan Project. The Kick off meeting was held on the 29th of February 2004.

The objective of the Consultant's services as mentioned above is to assess the existing land uses in the project area. The assignment was carried out in three phases. These project phases have been modified from those described in the scope of work so that Phase 1 represents data collection, Phase 2 analysis of existing conditions and establishment of the land use planning, and Phase 3 is related to production of final land use maps for the three zones. Thus, the three phases are as follows:

- **Phase 1** which includes:
    - collecting and disseminating background information and baseline data
    - cross referencing of existing Geographic Information System (GIS) data
    - completing photo survey of the study areas
    - conducting three Focus Groups
    - creating of draft overlay maps of baseline conditions
    - completing interviews
    - participating in the land use planning team workshop
    - presenting baseline findings to client for discussion

- **Phase 2** which includes:
    - analysing the existing conditions in the Jordan Valley
    - creating preliminary drawings (18 A-0)
    - developing design guidelines
    - preparing bibliography of data used for report
    - completing preliminary report text and send copy to project manager and land use planner for editing
- **Phase 3** which includes:
    - informing the team and clients throughout the duration of the project
    - revising text and prepare draft final report with drawings
    - presenting draft final to client
    - revising drawings/ text as necessary layout, printing, binding copies
    - producing the Final Report with overlay land use maps
    - submitting the Final Report to client

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 SOCIAL ASSESSMENT

This social assessment covers the following issues:

1- Gather sociological data through the use of a questionnaire designed for the purpose, and to be filled out by those present at the three focus groups, one in each study zone.
2- Organize and conduct three stakeholder focus groups, chosen at random from among those present, in order to explore the social problems they face, and their suggested proposals for solving those problems.
3- Prepare a training assessment.
4- Provide a written report on the above findings to the Project Manager per project schedule.

2.1 Population

The Population of Jordan grew from an estimated figure of around 470,000 in the early fifties to 900,000 in 1961 (1961 census) to 2,150,000 in 1979 (1979 census) and to 4.14 million in 1994 (1994 census). The Department of Statistics estimated the total population in 2002 to be 5.3 million.

The present rate of growth of 2.8% is sufficient to double the total population to around 10 million in about 25 years if it continues to grow at the present rate. However, the growth rate is expected to slow gradually in the coming years.

The Total Fertility Rate (TFR), which is the average number of children a woman is expected to have during her reproductive years, fell from 7.4 children/woman according to the 1976 World Fertility Survey to half (3.7) according to the 2002 Fertility and Family Health Survey conducted by the Department of Statistics (DOS), and it is expected and hoped 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.

The total Population of the study area is a little over 191 thousand according to the 2002 estimates of DOS. The growth rate of the population of the study area is not possible to estimate because the whole area is part of several governorates. It is felt, however, that TFR in the study area is higher than the national average, and if it is going to drop, it will be a much smaller drop. The growth rate and the TFR are expected to drop gradually for the county as a whole, but it is felt that the rate in the study area will continue as is. Therefore, and according to our projections, the total population of the study are will reach 238,000 in 2010 and 314,000 in 2020.

Table 1 presents the population estimates of all the population settlements (villages, towns and cities) in the Jordan Valley and Wadi Araba (i.e., the study area) according to the three zones of the study.

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**

As can be seen from **Table 1**, the 32 settlements in Zone 1 have a total population of 154,814 people, and those in Zone 2 have a total of 5,963, and Zone 3 settlements have a total of 30,308. Thus, the three zones amount to a total of 191,085 which makes up about 3.6% of the total population of Jordan. The tribes inhabiting the Jordan valley are presented in **Table 2**.

Table 2: Tribes of Ghor

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

With respect to the level of poverty in the study area, the Ministry of Social Development was contacted but there are no studies on poverty available. In addition, even though there are poverty areas, the study could not reach a supported documentation of those areas from the focus groups sessions especially that people are known to hesitate to provide information on the issue of poverty.

2.2 Focus Groups

2.2.1 Focus Group in the South Ghor (March 18, 2004)

The discussions in the focus group by those present dealt with the following four major areas:

1- Education- The participants discussed the need to address the following shortages:
   - Shortage of schools in light of increasing number of students.
   - Due to economic conditions in the area and the climate, only 10% make it to secondary level.
   - Villages are far apart from each other, which makes reaching some schools difficult, especially among females.
   - Turnover and shortage of teachers is high.
   - Some teachers are not qualified to teach certain subjects. Local teachers are available but not appointed.
   - No specialized schools in agriculture or tourism are available.

2- Health- The participants emphasized addressing the following problems in future planning:
   - All health centres are primary, need comprehensive ones.
   - The hospital lacks modern equipment and qualified staff.

- No sewage system is available.
- Certain diseases are widespread such as Thalasemia, Belharsia and others.

3- Sources of Income and Job Opportunities:
   - Most people work in agriculture but do not own the land they work on.
   - Difficulties in marketing their products.
   - Large number of foreign labour.

   The participants suggested allocation of land to build factories to absorb the local surplus such as tomatoes, dairy products and others. They also suggested a factory for fertilizer treatment.

4- Housing and Roads:
   - Many People do not own their homes even though they own the land. Some live in tents and under trees.
   - Roads are considered good.
   - They need public recreation areas.

   The participants suggested that the authorities build homes for those who do not have homes.

In view of the above problems, the required land uses are as follows:

- Allocation of land for building schools and colleges.
- Allocation of land to build a hospital and comprehensive health care centres
- Allocation of land for building factories to deal with agricultural surpluses
- Allocation of land for public recreation especially on the shores of the Dead sea

2.2.2 Focus Group in the Middle Ghor (March 20, 2004)

The discussions focused on the following items:

1- Education- There seemed to be general satisfaction and the participants discussed the following:
   - There are enough schools for all, and they have no problem acquiring land for expansion if and when needed.
   - No Problem with turn–over of teachers, and most teachers are university graduates and qualified.
   - There is a shortage in training centres.

   The participants indicated that Suweimah is a tourist area, therefore, it needs a tourist training centre, they also indicated that the middle Ghor is an agricultural area and needs an agricultural college or training centre for the locals, and an agricultural research office to improve quality.

2- Health:
   - Almost all health centres are primary, need to establish comprehensive centres.
   - Hospitals are available but they suffer form lack of modern equipment, trained personnel and medical staff in certain specializations.
   - Widespread of flies and mosquitoes, and dogs.

The participants recommended the establishment of comprehensive medical centres and the allocation of lands for this purpose. They also need a sewage system.

3- Sources of Income and Job Opportunities:
   - The main source of income is agriculture, but most people do not own their lands
   - Foreign labour is in abundance.
   - Income from agricultural activities is not good.
   - More females work in agriculture than males.

The participants indicated that unemployment is the major issue, and work in agriculture is not rewarding in view of the difficulties of marketing their produce.

They recommended allocation of land to establish factories for surplus tomatoes and dairy products, and a factory for fertilizer production. They also recommended a training centre for handicrafts for females.

4- Housing and Roads:
   - Houses in general are small in area, and so people build over good agricultural lands.
   - No supervision and no building codes.
   - The main road which crosses most populated centres is only two lanes and therefore, is congested with traffic, especially pickups and trucks.

The participants indicted that the major problem is overcrowded homes. They stressed the importance of using the vast lands (desert and semi–desert) located between Suweimah to South Shuneh. They also recommended forbidding any building west of the main road in order to protect agricultural lands. Roads should be widened. Tourist parks are needed.

2.2.3 Focus Group in North Ghor (March 24, 2004)

Discussions focused on the following Fields:

1- Education:
   - Shortage of schools because about 35% of schools are rented or they are built on lands belonging to JVA, and JVA asks for rent for these lands and the Ministry of Education cannot afford to pay rents. This is due to the two period system, and huge number of students which leads to low quality education.
   - Lack of secondary schools in some areas.
   - Shortage of qualified teachers and high turn–over especially among certain specializations.
   - No specialized college or school of higher learning.

The participants recommended allocation of land for schools, especially in the area from Kraymeh to Al-Adaseiah.

2- Health:
   - Almost all the health centres are primary, big shortage in comprehensive centres and hospitals. The hospital that exists by name only and suffer from shortages in beds and trained medical staff.

- No sewage system, which may lead to spread of disease, and flies.
- These is only one garbage dump.

The suggested remedy by the participants is to allocate land to build a big hospital and changing some of the primary health centres to comprehensive ones. Allocation of land for garbage dump and the establishment of a sewage system.

3- Sources of Income and Job Opportunities:

Income generated from agriculture is insufficient because of competition by foreign labour and difficulties in marketing products. Unemployment is widespread.

The recommended actions by the participants are the allocation of lands for building factories to handle surplus in tomato production and in dairy production and vegetables. They also recommended building a factory for fertilizers and allocating lands for animal selling.

4- Housing and roads:

- House sizes are small, which forces some to expand over agricultural land.
- The major road, which passes through most of the population settlements, is congested with trucks and pickups. There are also two major crossing points with Israel and the West Bank.

The major recommendation is to use the hilly areas which are classified as ranch areas for building houses and recreation areas in order to protect agricultural lands from encroachment. Widening of the major road is a necessity.

2.3 Summary of Focus Group Discussions

By reviewing all the notes taken during the discussions, we found a great deal of similarities among the three focus group discussions. Therefore, the problems and suggested or proposed solutions for each field will be listed separately.

(a) Education

- Problems:
  - Shortage of well equipped and well kept schools for all basic learning.
  - Shortage of qualified teachers, secondary schools to train the locals in agriculture and tourism in certain areas, and occupational schools for girls in other areas.
  - Many school buildings are rented especially in North Gohr area (30-35%).
  - All these shortages cause many students to leave school in early stages of learning.
  - High turnover among teachers most of whom come from other areas, and do not like such inhospitable climatic conditions.

- Suggested remedial measures:
  - Building more class rooms to replace rented ones and to accommodate increasing numbers of students due to high birth rate in the Valley.
  - Allocation of more lands for school expansion and playgrounds.
  - Better coordination between JVA and the Ministry of Education in this field.
  - Building one or more junior colleges in needed areas of the Valley.

- Upkeep of the existing schools through continuous maintenance.

(b) Health

- Problems:
  - Shortage of comprehensive health centres
  - Shortage of hospitals in some areas
  - If a hospital exists, it suffers from shortage of modern equipment, laboratories and X-ray.
  - Shortage of specialized medical staff (doctors, nurses, midwives, and laboratory and X-ray technicians).
  - Shortage of sewerage systems in most areas.

  As a result of these shortages, many illnesses are spread in the valley such as: thalasemia, bilharzia, leishmania, and goiter.

- Suggested remedial measures- based on the discussions, the following measures were suggested:
  - upgrading of some primary health care centres to comprehensive ones where not available.
  - Establishment of comprehensive health centres to accommodate increasing numbers of patients.
  - Establishment of hospitals equipped with qualified medical staff and modern equipment.
  - Establishment of sewerage systems, which will help improve the health situation and avoid the occurrence of more diseases.
  - Cleaning of the environment by providing better collection of garbage through the provision of special equipment.

(c) Sources of Income and Job opportunities

- Problems:
  - Most people in all parts of the valley work in agriculture, and yet a majority of them do not own the land they plant.
  - Major difficulties in marketing their products.
  - Non-Jordanian labourers are in great numbers.
  - More females work in agriculture than males.
  - Some animals are herded especially goats.
  - Very low economic return on their work in agriculture.

- Suggested Remedial measures to Improve Income:
  - Establishment of tomato paste factory to take care of the excess production which seems to be a lingering problem.
  - Establishment of other factories for juices, dairy products, pickle, etc.
  - Allocation of land for the establishment of a fertilizer factory.
  - Allocation of land to plant medicinal and perfume plant.
  - Establishment of handicraft, flower arrangement, and ceramic works to absorb female labour.

(d) Housing and Roads

- Problems:
    - Houses are small in area in view of the large number of the household. This leads some to build over good agricultural land.
    - Some people (especially in the south), still live in tents or under trees.
    - No building codes or supervision during construction.
    - The main road which runs through the entire Valley from north to south is narrow and has heavy traffic, especially pickups and trucks.

- Suggested remedial measures to improve housing and roads:
    - Help provide more living space for families until such day they start having fewer number of children.
    - Provide homes for those who still live in tents or under trees.
    - Enforce existing building codes to improve the quality of houses.
    - The roads witness congestion of traffic especially since most of the main roads is two lanes. It needs to be widened and perhaps establish ring roads wherever possible without taking much land out of agricultural production.
    - Building housing projects on land not suitable for agriculture such as lands near Suweimah-Dead Sea all the way to South Shuneh.

2.4 Summary of Land Use Requirements

During the preparation of the final land use map for the Jordan Valley, the following suggestions ought to be taken into consideration:

- Allocation of land for schools, play grounds, and entertainment areas.
- Allocation of land to build one or more specialised schools (agricultural, tourism).
- Allocation of land for building more comprehensive medical or health centres.
- Allocation of land for garbage disposal (dumps).
- Distribution of land, especially the foothills east of the King Abdullah Canal which are earmarked as grazing areas.
- Allocation of land to establish factories for different purposes.
- Allocation of land to widen some of the roads and establish ring roads to avoid congestion in the cities.
- Special attention should be paid to the main road.

2.5 Analysis of Questionnaire

The following is the analysis of the answers of the respondents to the questionnaire **Table 3** presents who are the respondents and the sectors they represent.

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	12.5		
Others			7.6

The analysis showed that 94% of participants in the south are males, while the percentage is around 70 in both the middle and the north. The participants in the South Ghor came from five population settlements (Ghor Mazra'a, Ghor Safi, Qater, and Ramleh). In the Middle Ghor, the participants come from Suweimah, South Shuneh and South Deir Alla. The participants in the North came from 18 population centres.

The majority of participants in the South Ghor came from three sectors; namely the government, NGO's and farmers. About 40% of the participants in the Middle Ghor came from the government sector and from both the farmers and the housewives. In the North Ghor, the farmers made up the largest group followed by municipal representatives, the housewives and government sector.

The respondents indicated the existence of many environmental problems in their areas as 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	-

Pollution seems to be the main problem in the South and the Middle Ghors. The spread of mosquitoes, flies and rats is a major problem in all areas. The absence of sewage system was expressed as an environmental problem in all areas.

When asked about the economic activities they wish to see in their areas, the respondents expressed their opinions as exemplified in **Table 5**.

Table 5: Desired economic activities (percentage)

	SJVSA (%)	MJVSA (%)	NJVSA (%)
Factories for agricultural products (tomato paste and pickles)	50.0	30.0	36.5
Daisy and Juice factories	-	-	25.0
Tourist Projects	12.5	50.0	-
Small workshops for Women	-	20.0	13.5
Marketing societies	-	-	11.5
Weaving Factory	-	20.0	-

The establishment of factories to handle surplus agricultural products was expressed as a desired economic activity. Tourist activities were expressed strongly in the Middle Ghor. All expressed the desire to have some sort of workshops for females.

Nearly all respondents indicated the lack of entertainment centres, and wish to have such centres for adults and children. Their responses are shown in **Table 6**.

Table 6: Entertainment centres (percentage)

	SJVSA (%)	MJVSA (%)	NJVSA (%)
Establishment of a tourist and entertainment centre on the shores of the Dead Sea	31.3	10.0	-
Public park and Children Park	31.3	50.0	40.0
Athletic and Education Centre	18.7	10.0	55.0
Teacher club and/or Public Café	18.7	-	-

All respondent expressed the need to have public parks and children parks in all areas to keep children out of playing in the streets. the North Ghor respondents emphasized the need for athletic and educational centres.

When asked about their opinion concerning the solution for the unemployment problem, the results are shown **Table 7**.

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

To overcome unemployment, all respondents emphasized the need for vocational training and education. Getting a job with the government, the army or the private sector was expressed by the people in the South and North Ghors. Emigration out of the area was expressed by some of the respondents in the north as a way of overcoming unemployment.

The majority of respondents expressed the need for vocational training. When asked about the type of training they need they expressed the opinions as shown in **Table 8**.

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

Training in carpentry and mechanics was expressed by all respondents as needed, along with computer training. Training in the fields of tourism was expressed strongly in the Middle and South Ghor because they have many tourist sites.

2.6 Needed Projects

The respondents of Ghor expressed their needs for the projects presented in **Table 9**.

Table 9: Projects 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 establishment of factories for agriculture products (tomato-paste and pickles) was highly desired by the respondents of Ghor from North to South, because Ghor areas are all farm lands. While the needs for tourist activities was strongly expressed in the middle and South Ghor due to the existence of tourism in the area (the Dead sea) other projects were highly centred in the Middle and North Ghors.

2.7 Training Needs

The respondents of Ghor strongly expressed their needs for the training presented in **Table 10**.

Table 10: Training needed

No.	Training	SJVSA	MJVSA	NJVSA
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 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.

2.8 Analysis of Focus Group Discussions in the South, Middle and North Ghor

To analyse the results of the focus group discussions in Ghors, the approach of SWOT (Strength, Weakness, Opportunities, and Threats) analysis was used. SWOT analysis is a tool able to analyze the existing and possible conditions to make a change through analysis:

1- **(S) Strengths**: which means the internal or the existing potentials which may help to meet the demands and to get rid of threats (i.e., what exists in Ghor for the respondents to achieve their demands in view of their resources).
2- **(W) Weaknesses**: which means internal lack which prevents the area from meeting their demands or needs (i.e., what are the problems of this area).

3- **(O) Opportunities**: this means any external conditions or any points that can help reach the goals, (i.e., changes or the external conditions which help in achieving the goals).
4- **(T) Threats**: any external conditions and points which negatively affect the opportunity to reach the goals (i.e., what things or future impacts will affect achieving our goals).

Table 11: SWOT Analysis for Social Aspects

SWOT Analysis	North Ghor	Middle Ghor	South Ghor
Strengths	▪ Health care centres availability ▪ Human power availability ▪ The respondents of the area are educationally qualified.	▪ Health care centres availability ▪ Human power availability ▪ The respondents of the area are educationally qualified. ▪ Availability of schools	▪ Health care centres availability ▪ Human power availability ▪ The respondents of the area are educationally qualified
Weaknesses	▪ Lack of schools which cause crowded classrooms and affects negatively the educational quality ▪ Lack of educational equipment ▪ No institutions of higher learning such as colleges, or universities for agriculture ▪ Lack of sewage network system and solid waste dumping sites in the area ▪ Most of the farmers do not own the lands they work in ▪ Houses in the area are small	▪ Vocational training centres in the area are not enough ▪ No institutions of higher learning agriculture ▪ Most of the farmers do not own the lands they work in ▪ Houses in the area are small	▪ Lack of schools which cause crowded classrooms and affects negatively the educational quality ▪ Lack of educational equipment. ▪ No institutions of higher learning such as colleges, or universities for agriculture ▪ Lack of sewage network system and solid waste dumping sites in the area ▪ Most of the farmers do not own the lands they work in ▪ Houses in the area are small
Opportunities	▪ Some land units should be allocated for the purpose of constructing houses ▪ Respondents have the ability to produce food products ▪ Women have abilities for weaving and other handicrafts	▪ Some land units should be allocated for the purpose of constructing houses ▪ Respondents have the ability to produce food products	▪ Some land units should be allocated for the purpose of constructing houses
Threats	▪ Teachers are unqualified ▪ Teachers move from one area to another ▪ Insufficient marketing for agricultural products ▪ Foreign employment is increasing	▪ Homes are randomly distributed ▪ No archaeological guidance ▪ There are buildings west of the road in an agriculture area ▪ Insufficient marketing for agricultural products ▪ Foreign employment is increasing	▪ Teachers move from one area to another ▪ Female teachers are unable to get to work on time for their schools because of the distance between homes and schools ▪ Foreign employment is increasing

3 TRANSPORTATION

Transportation is one of the many factors influencing the nature of society, but its special role derives from the fact that without it, the effective operation of other sectors of economy is almost precluded. Mobility has become an integral part of agriculture, manufacturing, recreation, programs of education and conduct of trade, travel and investment.

In a completely transport dependent society, the overriding role of transport in the nation's economical and social development is to assure a continuation of the level of service that have been an integral part of economic progress to date. Moreover, transportation policies and purposes need to be aimed directly at supporting national and community goals.

The unsatisfactory condition of transportation infrastructure always raises the question, how much a nation should spend on transportation compared to other sectors? Planners may find some guidance in allocating resources within the transport sector by keeping in mind the relation between transportation and the country output.

Bearing all that in mind, the planning authority in any country will have the mandatory force in organizing and running the transport sector.

Ministry of Transport (MOT) with its new arm the Public Transport Regulatory Commission (PTRC) has the overall statutory authority for transport planning and administration in Jordan. Other ministries and authorities have responsibility for certain aspects of transportation. Ministry of Planning helps set priorities; road construction and maintenance is carried out by the Ministry of Public Works and Housing (MPWH).

3.1 Roads

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 planed projects within the Jordan Valley Authority (JVA) mandate area.

A list of priority road projects of the Ministry of Public Works and Housing is given in **Table 12**. Those road projects and as shown on the table are of various priorities and implementation schedules depending on different funding and other factors.

Table 12: The Executive Plan of the Priority Highways for 2003 – 2007; Future Highway Projects (in Jordan Valley)

No	Project Title	Project Description	Length (km)	Execution Cost (Thousand JD)	Cross Section	The Expected Expenditure					Benefited Community
						2003	2004	2005	2006	2007	
1	Al-Safi/Wadi Araba Road	Rehabilitation of the road to become in line with secondary roads with two lanes and shoulders, and rehabilitation of the storm water drainage network	200	18600	Two lanes & Road Shoulders	--	7,000	7,000	5,000		Aqaba Special Economic Zone & Tourism Sector
2	Execution of Mouta/Kuthroba/ Ghour Road	Execution of the link between the factories area along the Dead Sea Coastal road and Mu'ta District, proceeding to desert highway in order to decrease the trucks movement along the Dead Sea Coastal Road	39	13000	Two Lanes + Shoulders & Climbing Lane	1,500	5,000	5,000	1,500		Citizens of Kerak Governorate & The employee of factories located in the Southern part of Dead Sea
3	Rehabilitation of Sweimeh / Zara Road, from the Hotels area up to Ma'een Intersection road	Completing the widening of the primary road from the hotels area up to Ma'een intersection road in order to become four lanes road	6	6000	Four Lanes	--	4,000	2,000			Tourism Sector
4	Rehabilitation of North Shuna / Southern Shuna Road	Rehabilitation of the road to become four lanes	90	40000	Four Lanes	--	15,000	15,000	10,000		Citizens of Irbid, Ajlun and Balqa Governorates & Tourism Sector & Passengers of Jordan River Bridges
5	Rehabilitation of Southern Shuna Road & Naour / Dead Sea Intersection road	Rehabilitation of the road to become four lanes	12	6000	Four Lanes	--	2,000	2,000	2,000		Citizens of Al-Balqa Governorate & Passengers across King Hussein Bridge
6	Rehabilitation of Sheikh Hussein Bridge/Northern Shuna Road	Widening and improving the road to become four lanes and to accomplish the four lanes network connection between Irbid/ North Shuna and Sheikh Hussein Intersection Bridge	12	6000	Four Lanes	--	2,000	2,000	2,000		Citizens of Irbid Governorate & Northern Ghour Area & Passengers across Sheikh Hussein Bridge

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

1- Irbid – North Shuneh road: upgrade the existing two-lane road to four-lane divided highway with a grade separation intersection.
2- Al Rama intersection - Al Qudis intersection road: upgrade the road to four-lane divided highway.
3- Al Qudis intersection – Suweimah – Al Zara – Ma'in road: upgrade the road to four-lane divided highway with service road on the Dead Sea shoreline side.
4- Ma'in – Dead Sea road (Dead Sea Parkway): a new two-lane with paved shoulders highway that connects Madaba – Ma'in hot spa with Dead Sea.
5- Suweimah National Park road: a two-lane two-way road off Route 65 to Suweimah National Park.

Those projects are summarized in **Table 13**.

Table 13: 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/Jeruslam 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.

3.1.1 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 JVA area connect to this road.

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

Dead Sea highway is combination two and four-lane all purpose highway of acceptable horizontal and vertical alignment. The highway is divided to three main section for the evaluation purpose; namely:

1- The southern section.
2- The northern section.
3- The middle section.

The southern section from the southern edge of JVA mandate area (Aqaba Special Economic Zone) to Ghor Al-Safi (approximately 146 km) is very lightly traveled two-way two-lane rural highway with about 8m paved width (**Figure 1**).

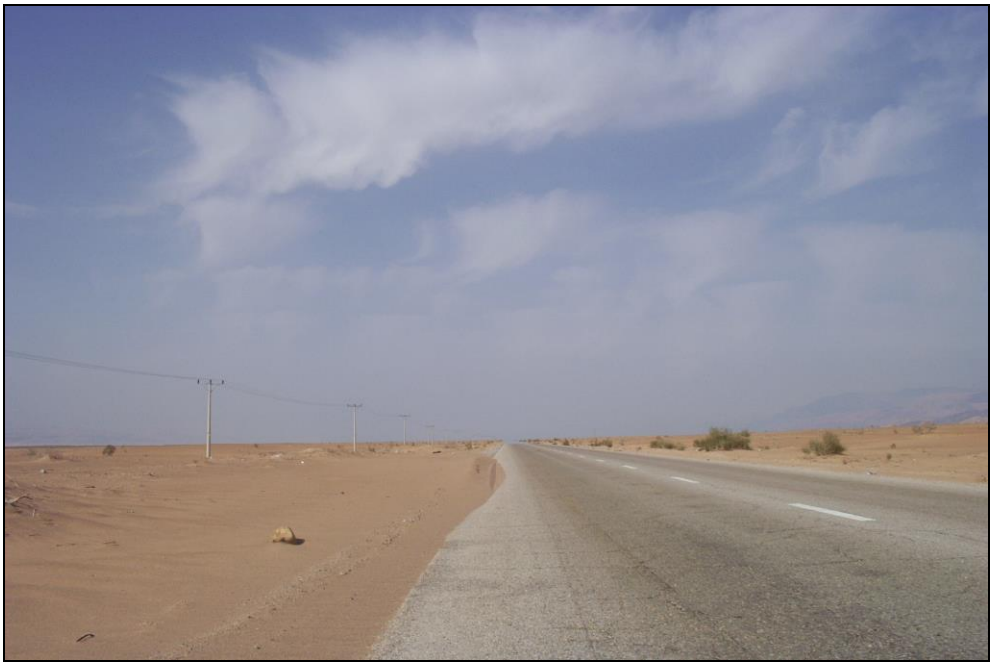

Figure 1: Dead Sea Highway (Route 65) – South of Dead Sea

This section of the road is serving 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.

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, which act as a local market centers, separated from each other by large areas of agricultural land (**Figure 2**).

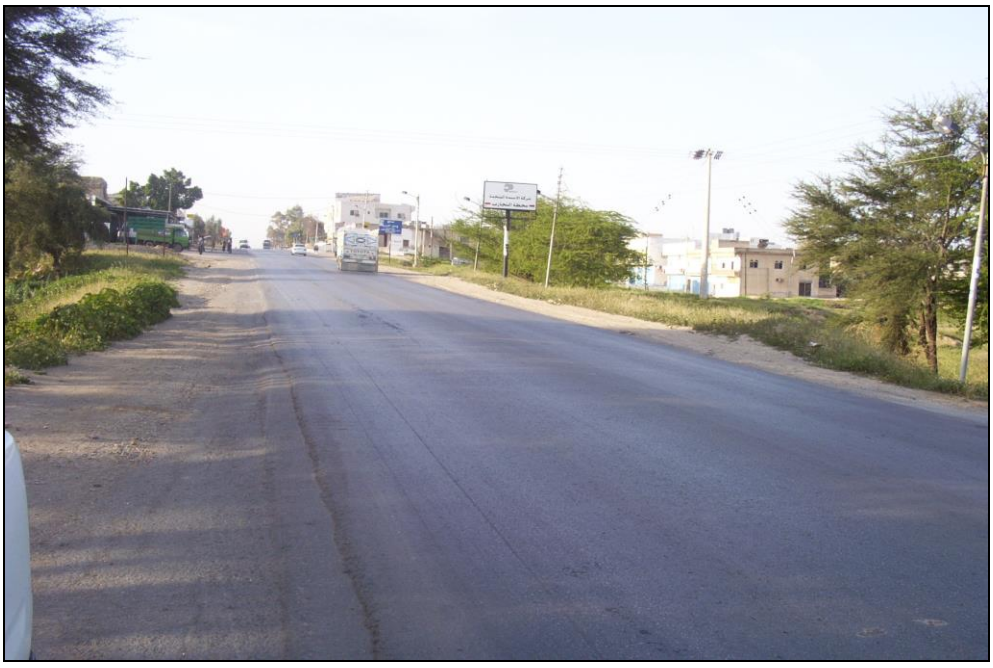

Figure 2: Dead Sea Highway (Route 65) – North of Dead Sea

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

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 3**).

Figure 3: 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 produces, farming vehicles and local traffic. This segment of the road is heavily intersected by tracks and minor roads used by farming vehicles. Most other intersections with major roads are signalized.

This section of Dead Sea Highway is poorly serviced and there is an immediate need for maintenance works especially for pavement, marking and signage.

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

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

The arguments for constructing a new highway are stronger than that of upgrading the existing one as upgrading the existing highway entails demolition of existing buildings and farms in villages, in addition to the fact that 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 Dead Sea. Part of this section from the Dead Sea hotels area to the Al Qudis intersection is being upgraded to four-Lane divided Expressway (under construction) to serve the growing tourist and agricultural traffic. Service road on the Dead Sea shoreline side and neighboring areas will be added to serve the local traffic (**Figure 4**).

Figure 4: Dead Sea Highway (Route 65) – Middle section at Dead Sea

3.1.2 Amman - Naur - Dead Sea (Route 40)

This is the main entrance to Jordan Valley Authority mandate area from Amman area (**Figure 5**).

Figure 5: Route 40. (Amman - Naur - Dead Sea)

It is a well engineered four-lane divided expressway, but is steep in some sections for heavy trucks and requires some widening on longer climbs. However, the visibility is quite adequate and there is a little need to make 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 four-lane divided highway (**Figure 6**).

Figure 6: Route 40 (Al Rama intersection to Al Qudis intersection)

3.1.3 South Shuneh – Al Salt Road

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

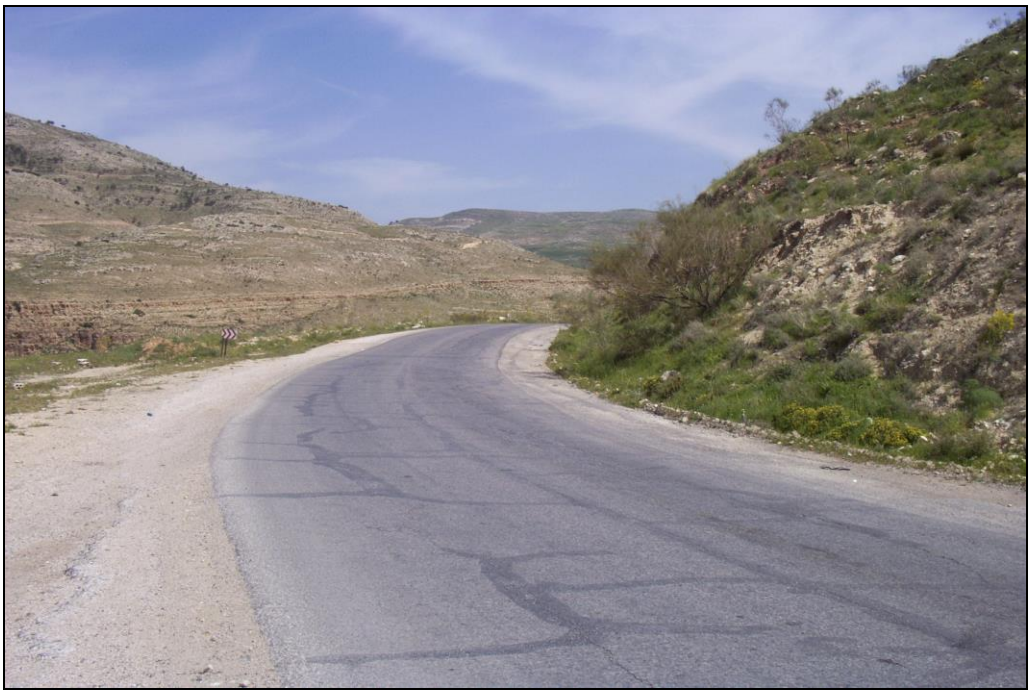

Figure 7: South Shuneh – Al Salt Road

As the road approaches the intersection with Route 65 (Dead Sea Highway), it is widened to four-lane divided 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 west bank.

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

3.1.4 Al Arda – Al Salt Road (Route 24)

Route 24 connects with Route 65 approximately 32 km 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-lane 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 (pavement cracks and pot holes). In addition some protection (falling rocks, Guard rails and barriers) and drainage works are needed (**Figure 8**).

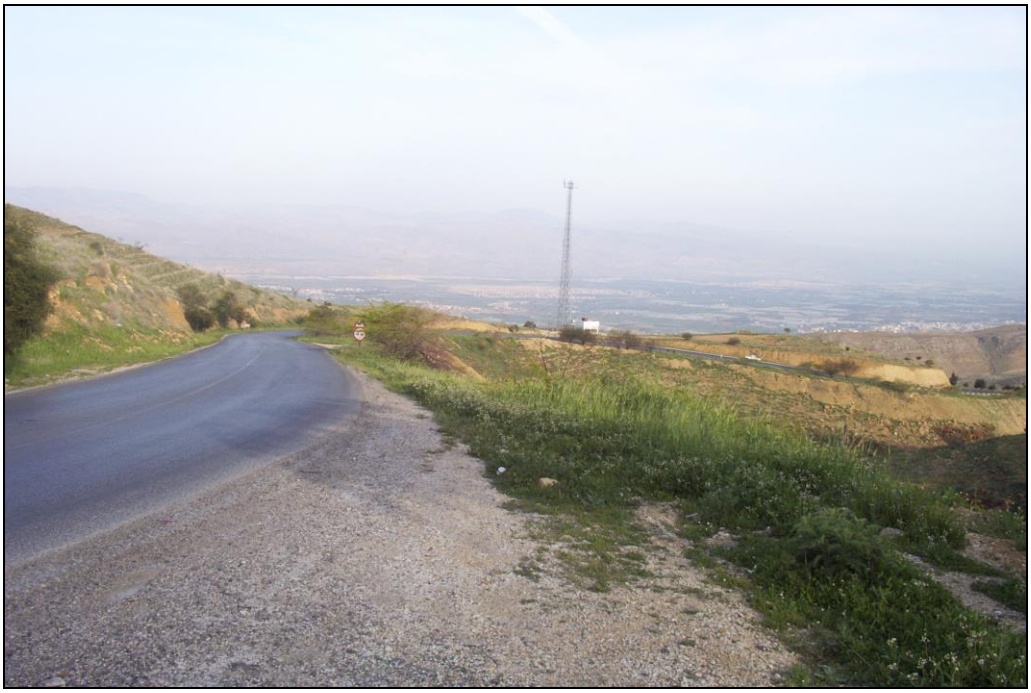

Figure 8: Al Arda – Al Salt Road (Route 24)

3.1.5 Kufranja – Ajlun Road

Continuing north (approximately 15km) along Route 65 from Muthallath Al Arada intersection is the intersection of Kufranja – Ajlun Road. This is a two-lane two-way undivided rural road to Kufranja and Ajlun (approximately 24km). This road has approximately 6m paved width (**Figure 9**).

The road climbs up the hills and mountains towards Ajlun. The width, horizontal and vertical curvature are below standards.

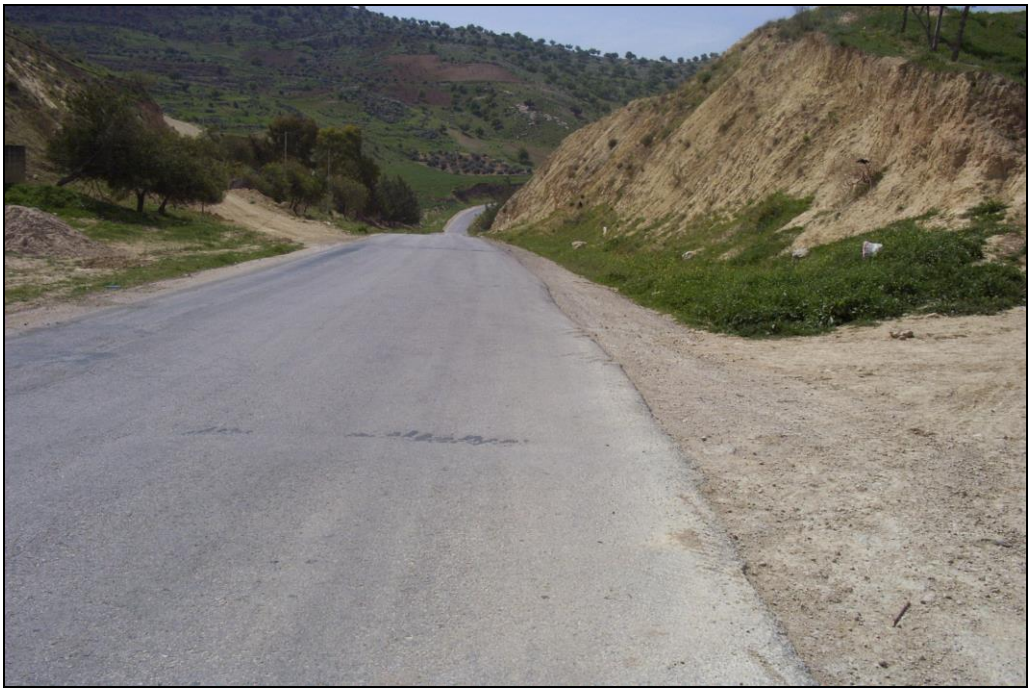

Figure 9: Kufranja – Ajlun Road

3.1.6 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 with approximately 7m paved carriageway (**Figure 10**).

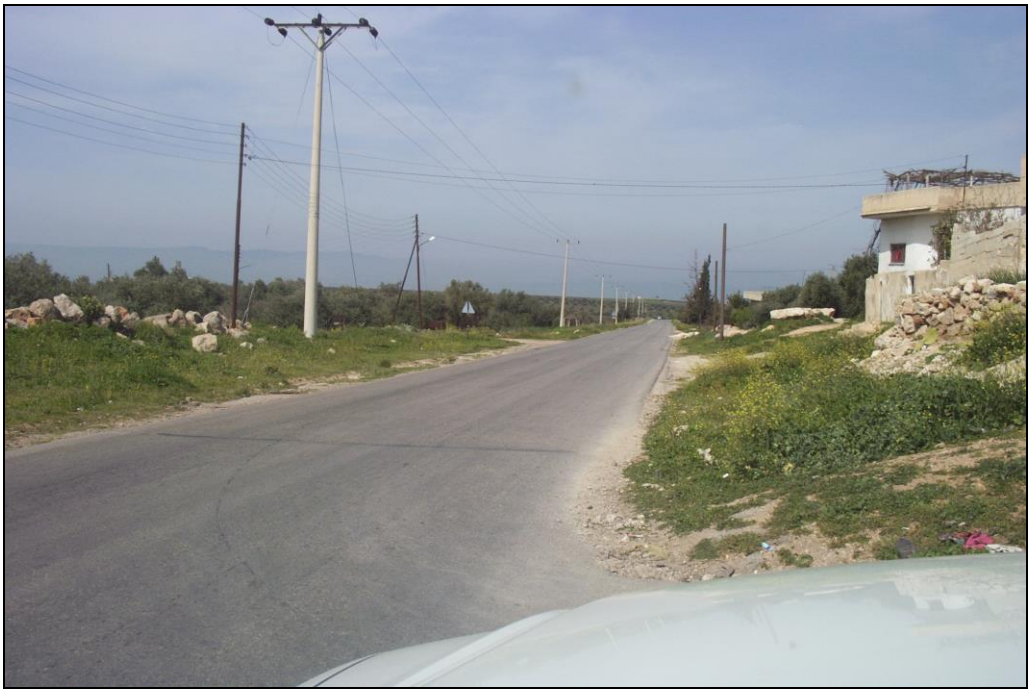

Figure 10: Qalat ar Rabad – Ajlun Road

3.1.7 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 up to Irbid city (34 km). It is a two-lane two-way road.

Same as previous road connecting to JVA mandate area; there is a need for corrective measures to horizontal and vertical alignment of the road.

3.1.8 Ash Shuneh (North) – Irbid (Route 16)

The existing two-lane two-way road is being upgraded to four-lane divided rural highway with shoulders (**Figure 11**).

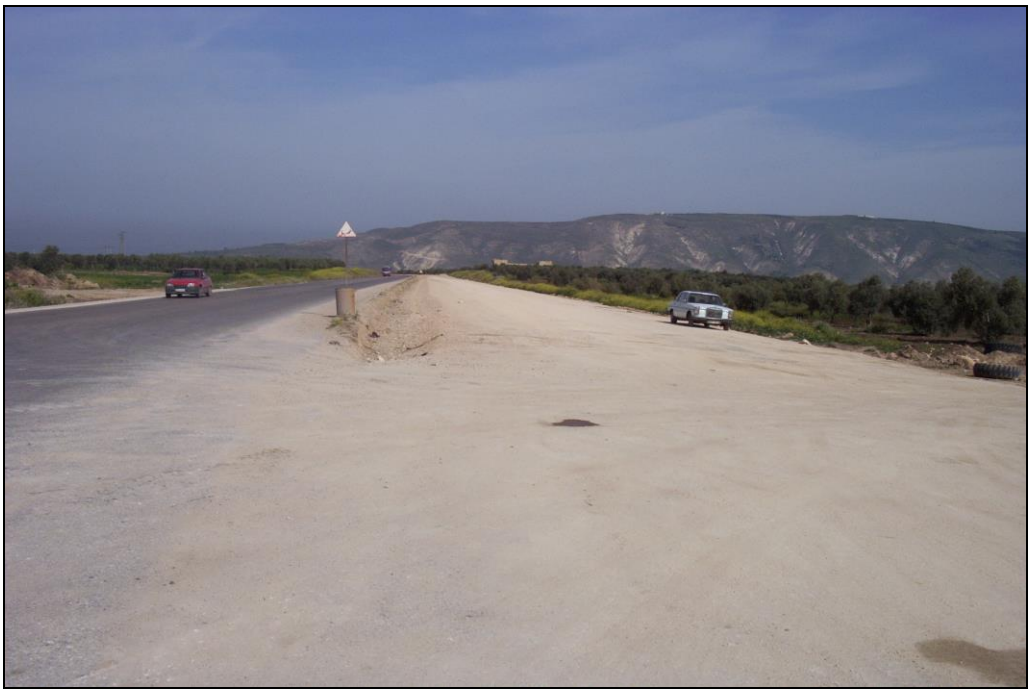

Figure 11: Ash Shuneh – Irbid (Route 16)

A new grade separated intersection approximately 2 km from the existing "T" intersection is being constructed (**Figure 12**).

After completion this road will be the main link to JVA 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 12: Ash Shuneh – Irbid (Route 16) – New grade separated intersection

3.1.9 Dead Sea Parkway

New road under construction that connects Madaba – Ma'in Hot Spa road to Route 65. This new road is two-lane two-way rural highway with paved shoulders and is approximately 11.6 km (**Figure 13**).

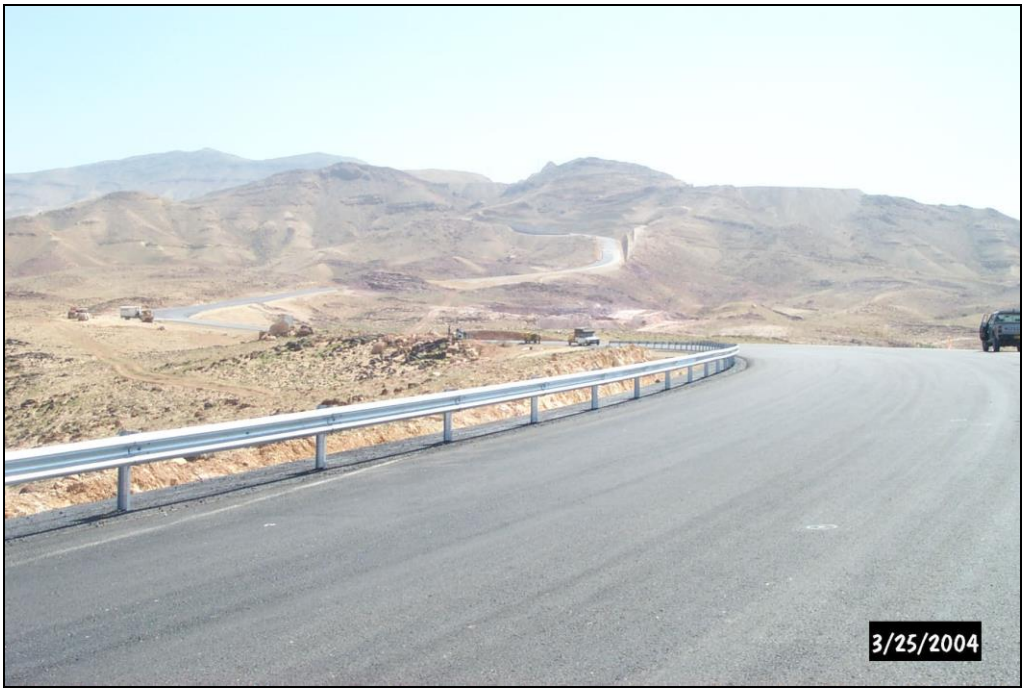

Figure 13: Typical section of Dead Sea Parkway

Route 65 will be upgraded to four lane divided from Al Qudis intersection up to this intersection as mentioned before (**Figure 14**).

Figure 14: Future Intersection Route 65 – Dead Sea Parkway

This road comprises also 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 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 15**).

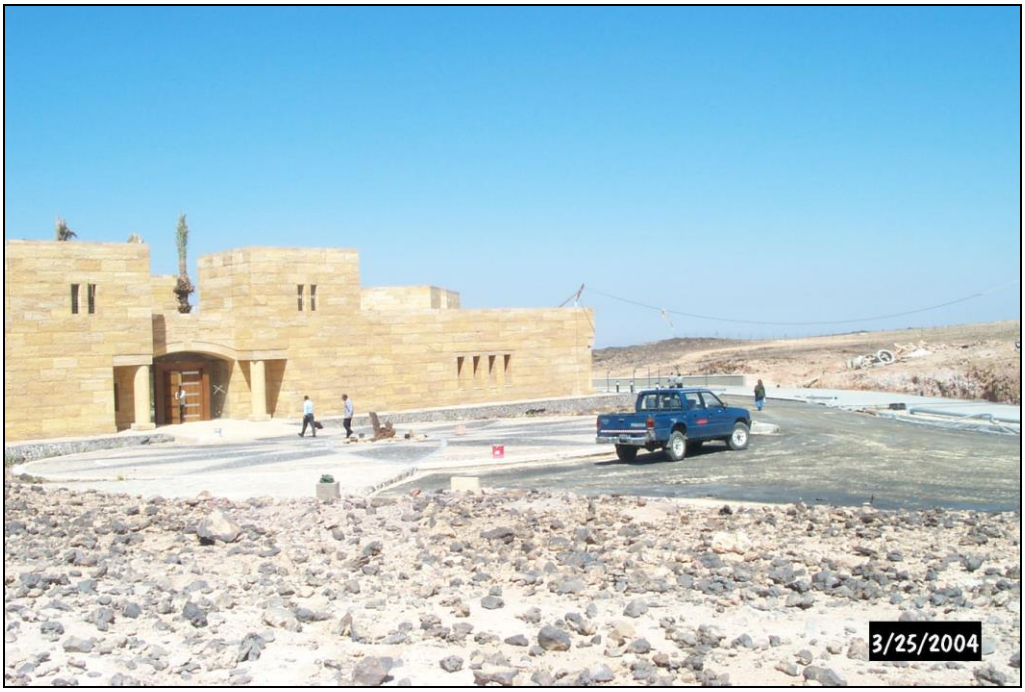

Figure 15: Panoramic Complex

The above components are now under construction to enhance and improve tourist movements between Dead Sea, Baptism Site, Panorama Complex, Ma'in Hot Spa, Mount Nebo, Petra and Aqaba.

3.1.10 Dead Sea – Karak road

This road intersects Route 65 near the Potas City South of Dead Sea and climbs the hills and mountains toward the main city of Karak (**Figure 16** and **Figure 17**).

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 produces as it connects Southern Ghors (valleys) with Karak.

As in other connecting roads, this road suffers from sharp curves, steep grades…etc.

MPWH is studying an additional rout that connects Kuthrubba (south of Karak) with the Jordan Valley. This new road under study will be about 39 km long, with a cross section of two-lanes, shoulders and climbing lanes.

Figure 16: Dead Sea – Karak road

Figure 17: Intersection Route 65 – Karak road

3.1.11 Ghor Fifa – Tafila road

Continuing south along Route 65, for approximately 30 km from the Karak road, is the "T" intersection with the Ghor Fifa –Tafila road. This two-lane two-way rural road climbs the mountains up to Tafila City (**Figure 18** and **Figure 19**).

Figure 18: Ghor Fifa - Tafila road

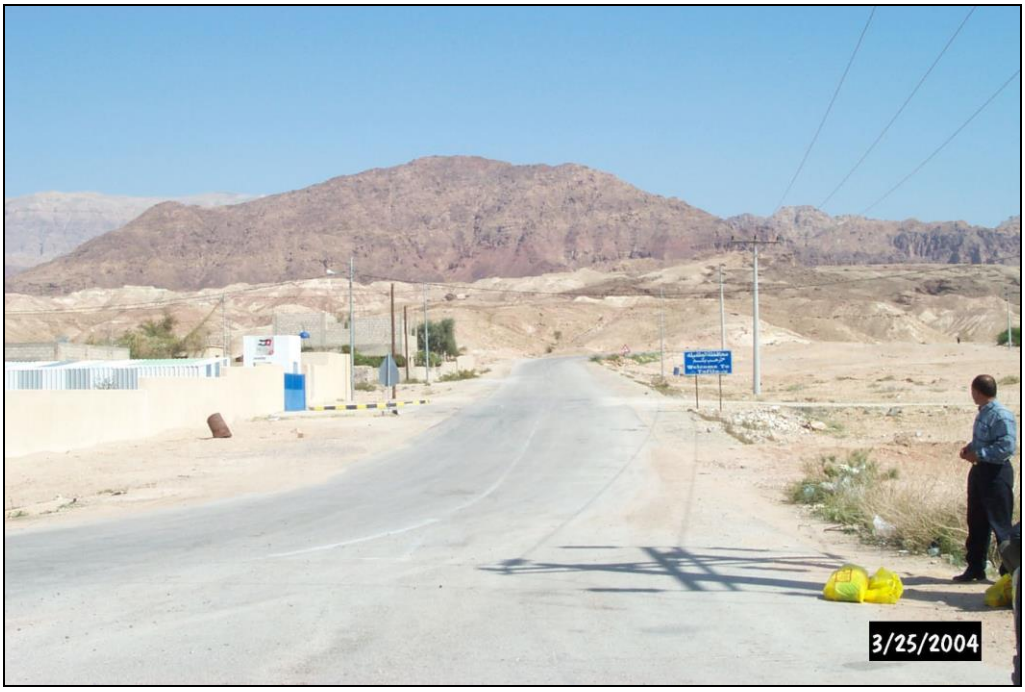

Figure 19: Intersection of Route 65 with Ghor Fifa - Tafila road

3.1.12 Dalagha – Wadi Musa – Ma'an Road

Further south along Route 65 is the intersection with Dalagha – Wadi Musa – Ma'an road (**Figure 20**).

Figure 20: 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 King's highway -wdai Musa - Petra. The road 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 lack proper drainage works (i.e. culverts, ditches…), as the road has washed out by the flash floods in two different locations (**Figure 21**). Also some protection works (i.e. guard rails, barriers…) is needed.

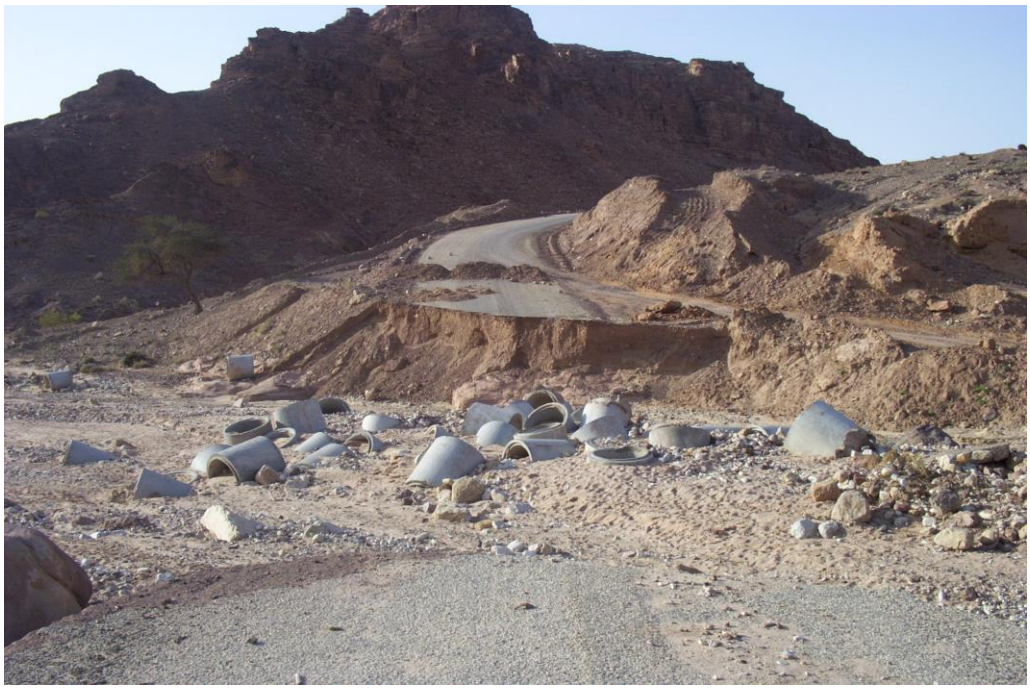

Figure 21: Dlagha – Ma'an road

3.2 Public Transport

Providing of highways and adequate public transport is in fact an integral part of providing a higher quality of life. In the focus groups, people complained that the public transport was not adequate.

Public transport is the responsibility of the Public Transport Regulatory Commission (PTRC), which have 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 14**.

Table 14: Public Transport Routes, number & classification of transport within JVA mandate area

Governorate: Al-Balqa	**Municipality: Middle Shuneh**		
Route Name	**Route Description**	**Year of Make**	**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
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

Governorate: Al-Balqa	Municipality: Middle Shuneh		
Route Name	**Route Description**	**Year of Make**	**Classification**
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
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

Governorate: Al-Balqa	Municipality: Middle Shuneh		
Route Name	**Route Description**	**Year of Make**	**Classification**
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
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		

4 ECONOMIC CONDITIONS

4.1 Agricultural Sector

Over the last couple of years, the Jordanian economy witnessed improvement in its performance, despite the persistence of the political and Security turbulences affecting the globe last year, where it achieved a growth of 5% in the current prices in 2002, which is the highest percentage through the past ten years. This increase intensified the trust in the economic reform programs undertaken by the Jordan Economy. Along with that, the Jordan Economy witnessed the persistence of the Government with the implementation of its national economic reform programs, concerning the privatization, organizing foreign labor force in the country, promoting exports and attracting foreign investments and combating poverty and unemployment.

The agricultural sector typically contributes 5% to GDP and employs 7% of the working population. Jordan has two distinct agricultural zones, the irrigated Jordan Valley and the rain-fed highlands. Government policy has been to encourage intensive fruit and vegetable growing in the Jordan Valley, both for local consumption and as a major export earner, and to boost cereal and fodder production in the highlands in an effort to reduce a high food import bill.

Extreme variations in seasonal rainfall in the highland areas lead to severe fluctuations in yields from year to year. Highland farmers are one of the poorest groups in the country. Irrigated farming in the Jordan Valley has been a success in production terms, but marketing has suffered from periods of overproduction and fluctuations in exports.

The effectiveness of farm input usage can have direct implications on producer profitability and the environmental integrity of the farm sector. Recently, issues of environmental safety, excessive usage of inputs in the agricultural production system, and the potential tradeoffs between productivity, profit and environmental integrity have been at the forefront of discussions on input usage.

Limited information exists, however, on the current effective usage of inputs within the context of modern agricultural production systems. If specific inputs can be identified as overused, producers may be able to lower their usage, increase profits, and potentially reduce environmental concerns. The extent to which this is possible needs to be considered in any comprehensive debate on farm productivity and environmental issues.

Many studies done on the Jordan Valley were concerned with ways to find different optimal cropping patterns to maximize farm income subject to a very important water constraint, which is the most limiting factor in the agricultural production in the region. Nevertheless, guidance regarding the use of available water has not been associated with the expansion of agricultural production. In fact, the use of water and other resources such as land is still far from economic efficiency considerations.

Agriculture in Jordan consumes about 64% of the available water resources, with an irrigated area of about 843,000 dunums (84,300 ha). The strong historical tradition, significant investments and economic importance of irrigated agriculture in Jordan are competing with escalating demands for water for non-agricultural sources (**Table 15**).

The decision to focus on the demand for water and on irrigated agriculture follows directly from the fact that supplies are already short and finding new water supplies is difficult. In the Jordan Valley, irrigation water is largely from surface sources fed by low annual rainfall.

Large projects to add to current water supplies are very costly. For example, water from the proposed Disi Conveyor Pipeline would have an estimated annualized cost of JD 0.424 per

cubic meter. Every cubic meter of water saved in agriculture is a cubic meter available for other uses and is one less that has to be found from new supplies at that kind of cost. The social opportunity cost of water in Jordan, including that used by farmers, is therefore very high.

Table 15: Water use in Jordan in 2002 according to MWI

Uses in MCM					
	Municipal	**Industrial**	**Irrigation**	**Livestock**	**Total Uses**
Surface Water	50.54	1.86	156.95	6.00	215.35
Ground Water	198.69	34.97	287.56	0.84	522.05
Treated Water	-	-	72.37	-	72.37
Total	249.23	36.83	516.87	6.84	809.77
Percentage	30.78	4.55	63.83	0.84	100.00

Table 16: Per capita water uses by sector in cubic meter according to MWI

Year	Population	Domestic	Industrial	Irrigation	Total
1999	4,900,000.0	48.1633	7.9592	115.3061	171.4286
2000	5,039,000.0	47.4301	7.3427	107.3626	162.1354
2001	5,182,000.0	47.4720	6.3682	95.5230	149.3632

In the Jordan Valley, surface supplies are supplemented in seasonally varying proportions by treated wastewater. The latter is a potential source of increased supply in the future but it also raises the possibility of microbial contamination.

Any hope of breaking into new markets in Europe or the US will require steps to avoid contamination through more effective water management at the farm level and a careful choice of crops by farmers.

Farmers must contend with increasing soil salinity that is reaching levels high enough in some areas to reduce yields for some crops. These include sensitive crops, such as strawberries, beans and onions, or even some that are moderately sensitive, including vegetables that are widely grown in Jordan such as eggplants and tomatoes.

There is considerable room for improved irrigation efficiency on farms and for savings obtained by switching crops from those with higher to others with lower water requirements. While the opportunity cost of water to the nation is high, the cost farmers have to pay is low. Charges for delivered water in the Jordan Valley are low. **Table 17** presents water prices for agricultural use in the Jordan Valley.

Groundwater is particularly important, and the main cost to farmers is the cost of pumping. Permits are required for wells there, but not all set limits to the amount of water that may be taken out. When limits are set, enforcement is weak, as indicated by the fact that not all wells are metered, and the meters do not work on many of those that are. Under circumstances like these, farmers do not have a high incentive to work toward high returns per cubic meter of water used. Simply charging farmers for water would be an economic solution, but one with great difficulties, politically and also socially given that it would hit the most marginal farmers the hardest.

Table 17: Water prices for agricultural use in the Jordan Valley

Cubic Meter of water for a unit with less than 35 Dunums	JD/m^3
< 2,500	0.008
2,501-3,500	0.015
3,501-4,501	0.020
> 4,501	0.035

Source: Jordan Valley Authority

For units with more than 35 dunums, water prices are calculated according to the following equation:

$$\text{Price} = \frac{X}{35} * Segment$$

Where: X is the area of the agricultural unit in dunums.
Segment is the block rate presented in **Table 17**.

In order to explain the above-mnetioned equation, consider the following example. Suppose a 45 dunum farm consumes 5,000 m^3 of water, then this fram will be charged according to the following:

40/35*	Segment	Block Rate	Cost (JD)
1.143	2500	0.008	22.86
1.143	1000	0.015	17.14
1.143	1000	0.02	22.86
1.143	500	0.035	20.00
		Total	**82.86**

* If the farm does not exceed 35 dunums in area, the cells in the first column will take the value of 1.

Changing trade policies also offers opportunities for improvement in water use. Current tariffs on imports designed to protect Jordanian farming from foreign competition cover some crops that are heavy users of water, such as citrus and bananas. Lowering these trade tariffs is likely to be politically even more difficult than changing water policies, but what the project can do is highlight to government, farmers, the media and the public what costs the protection gives rise to in terms of increased water use and higher consumer prices. It can also show how changes in crops grown, accompanied by improved management, can be made without lowering the incomes of farmers.

For the potential improvements in policies, technologies and practices to be widely adopted and used will require an excellent extension system.

Future investments in research and studies must be focused even more to identify and fill critical information gaps. Recommendations for technical, policy and management improvements in the irrigated sector must be assembled, their potential adoption by various end-users assessed in terms of feasibility, short and long-term impact, cost and other factors and priorities for action identified.

Several important questions regarding the policy on water and agriculture as it currently affects farmers' water use and cropping pattern decisions, such as:

- the extent to which the cost of water to farmers reflects the opportunity cost of water to Jordan.
- the enforcement of regulations.

- the availability to farmers of information on economic returns to water from different crops and different methods of improving irrigation efficiency.

Modifications in the policy environment with respect to water are needed to stimulate the desired changes in cropping patterns and water use behavior. The most important of these concerns how best to persuade farmers to take account of the true opportunity cost of water to the economy without imposing an undue economic burden on them, especially those least able to bear it. There are also other issues to be considered such as water rights and metering water use.

At present, protectionist policies influence cropping patterns, often in a way that increases agricultural use of water. A clear example is the case of bananas, which would not be produced in Jordan were it not for tariffs on imports. While removing such barriers to freer trade may be politically difficult, decision-makers should understand the cost of such protectionism, not only in terms of the cost of the fruit and vegetables concerned, but also in terms of increased water consumption.

Trade protection measures increase the profitability of crops that are heavy consumers of water. One of the ways to reduce the use of irrigation water is to lower the incentive that farmers have to grow crops needing large amounts of it. Part of the incentive comes from high product prices that are the result of protective tariffs on imports. Bananas are a prominent example, but are not an isolated one. The tariff rate on bananas is 30% plus JD 250 per ton, but the same is true of apples and the rate on oranges, lemons melons and strawberries is 35%. All require more water than vegetables.

Removing or reducing these tariffs would have a beneficial effect on water use, but it would also raises considerations that are both political, because bananas and especially citrus are important crops, and economic, because markets must be assured for whatever crops are grown instead.

Water banking. Presently farmers who receive surface water pay costs of delivering water to them (from JD 0.008/m^3 rising to JD 0.035 for larger amounts) in the Jordan Valley. Groundwater users must pay for the cost of pumping. In either case the cost of water to farmers is much less than the social cost of providing water from new supplies to meet expanding water demands. Mechanisms based on markets and prices would create an opportunity cost that would be an incentive for farmers to use less water. While there are many technologies that could be adopted to conserve water, their adoption is likely to be limited unless farmers have some economic incentive to adopt them.

Raising charges for water provides a negative incentive. Farmers would use water more carefully, but farm expenses would be higher, reducing farm income, and driving less efficient farmers and producers of lower valued crops out of production.

Markets for water could provide a positive incentive. A voluntary program of water banking to buy back water from willing sellers would also attract the less efficient farmers and producers of lower valued crops, but the payment would more than compensate farmers for the income they would give up by selling their water. The difficult aspect of such markets is that they require a clear allocation of water rights among farmers, a point discussed below.

Water markets could take several forms. Willing sellers might be offered a payment to give up part or all of their water use permanently or for one year only – similar to the water banks used in the western United States.

Alternatively, an interruptible water market would be based on a long-term contract under which the farmer uses the water in most years, but agrees to not use some amount of water in critical dry years. Yet another variation that would have benefits in areas with salinity

problems is a rotating-fallow market. Under this, a farmer agrees to give up some water and fallow some land for a few years. When that land returns to production, some other farmer agrees to fallow his land.

The range of possible market mechanisms is important, because they may differ in the degree to which they are socially and culturally acceptable to farmers. Some may be more acceptable to farmers of particular types, farmers growing particular crops, and farmers at particular life stages. As emphasized below, a prerequisite for water banks or markets to operate is a clear system of property rights for water.

The Jordanian Economy witnessed in 2002 an evident improvement in its performance, despite the persistence of the political and Security turbulences affecting the globe last year, where it achieved a growth of 5% in the current prices, which is the highest percentage through the past ten years. This increase intensified the trust in the economic reform programs undertaken by the Jordan Economy. Along with that, the Jordan Economy witnessed the persistence of the Government with the implementation of its national economic reform programs, concerning the privatization, organizing foreign labor force in the country, promoting exports and attracting foreign investments and combating poverty and unemployment.

Table 18: Revised land uses in terms of agricultural usage

Action	Positive Result	Negative Result
Switch of crop pattern from bananas and tomatoes to less water demanding	Water savings	Poorest farmers hurt Income reduction
Charge farmers the real cost of water	Water savings Incentive to change cropping pattern and use water carefully	Poorest farmers hurt Expenses higher
Reduce tariffs on imported bananas to allow fair competition	Lower consumer prices Reduce incetive to grow bananas	Reliant on imports
Promote/enforce water conservation	Cost of finding new water supplies	None- only reduced behavioral change
Create policy of crop rotation	Reduction in salinity Reduced water usage	Government must subsidize crop loss

4.2 Tourism Sector

The Kingdom's tourism sector has continued to be affected in 2002 by the turbulent political and security conditions that govern the Middle East, especially the Palestinian and Iraqi issues, and the negative affect they had on the flow of the tourists visiting the Kingdom. Despite continuing regional turmoil, the tourism sector managed to achieve a 7.3 percent increase in current value added against a decline of 3 percent last year. The contribution of this sector to GDP, at current basic prices, stood at 4.7 percent in 2002 against 4.6 percent in 2001. Most tourism-related indicators also showed improved performance during 2002. These include a rise in the ratio of tourism income to GDP, at current basic prices, from 9.1 percent in 2001 to 9.7 percent in 2002, and a 7.1 percent increase in the number of Arab arrivals, which compensated for the 16.7 percent plunge in arrivals from Europe (CBJ, 2002). In addition, there was high competition due to the increase in the number of the new hotels and that by itself, resulted in a low occupancy levels and even lower room rates. Indicators for 2002 compared to 2001, are presented **Table 19**.

Table 19: Indicators 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	298	309	4.730
Number of Hotel Rooms	16,880	17,400	3.050
Number of Beds	32,001	32,658	2.222
Number of Employees	10,893	9,928	(8.859)

Source: Ministry of Tourism

Table 20: 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**

Source: Ministry of Tourism

Table 21: 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 Stars	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**

Source: Ministry of Tourism

Table 22: Tourism Statistics 1997-2003

	1997	1998	1999	2000	2001	2002	2003
	1997	1998	1999	2000	2001	2002	2003
No. Of Classified Hotels	175	211	247	278	298	309	314
Classified Hotels "Rooms"	10,147	11,513	13,781	15,091	16,880	17,400	17,808
Classified Hotels "Beds"	19,074	21,941	26,295	29,002	32,001	32,658	33,475
No. Of Unclassified Hotels	161	169	175	174	174	152	144
Unclassified Hotels "Room"	1,962	2,191	2,400	2,394	2,367	1,989	1,890
Unclassified Hotels "Beds"	4,703	5,109	5,470	5,431	5,384	4,631	4,384
No. Of Tourist Restaurant	226	241	335	370	354	376	374
Travel Agents	370	394	398	397	398	403	426
Rent A-Car Co's	280	285	285	285	285	259	232
Rent A-Car	3,989	4,031	4,031	4,031	4,031	4,089	3,703
Petra & Suweimah Horses	388	388	388	388	388	386	353
Tourist Shops	171	173	173	173	160	230	211
Tourist Guides	587	628	700	685	680	570	547
Tourist Transportation Comp.	3	3	3	3	3	4	4

Source: Ministry of Tourism

The development of the Jordan Valley has followed the paths set out in successive legislations. The philosophies, concepts, policies and approaches were compatible with the economic and social environment prevailing at the time of enactment of the legislation. However, the economic and social environment is dynamic and transforms over time. Base conditions altered and new variables were introduced as the prospects for regional cooperation improved. Economic, social, environmental, natural resource and population characteristics have all changed, justifying new development initiatives for the Jordan Valley.

Table 23: Current situation and future estimations for tourism activities in 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.

Long-run figures were calculated according to the suggested plan by Sigma Study. The baseline data were obtained from the currently operating hotels in the area which are the Movenpick, Marriott and the Dead Sea Spa. Avreage numbers for different catgroies were calculated. These averages were used to estimate the catergories in the “Coming Soon” and the “Long-Run” columns of **Table 23**. In Sigma Study, there has been 20,000 suggested bed units. The expansion in the hotels area, the water consumption and employment were made according to the assumption that 10,800 rooms/20,000 bed units account for 43 hotels. Having

mentioned that, long-run calculations were made for a range of 40 to 50 htoels. The long run includes the current and coming soon hotels.

As for tourist activities, in addition to the historic site at the south edge of the selected region there is an ongoing development for tourist near the Dead Sea. A lot of hotels and activities are under construction, which requires water resources. Several projects to convey water to this area are under construction. Some conveyors are using the wells existing upstream of Kafrein area, others are based on conveying brackish water from southern wadis and desalinating before distribution.

Development in the Baptism site included restoring the discovered locations, in addition to building a visitor centre and related activities, construction of a desalination plant for the brackish aquifer to use the water for baptising as well as construction of a wastewater treatment plant and reuse system. It is expected that this location will attract more than 10,000 pilgrims per year.

The northern beaches of the Dead Sea are common visiting spots by people coming from Amman and other urban centers in Jordan especially during the cold months. The Dead Sea Resthouse is owned and operated by the government and is located at the northeastern tip of the Dead Sea. It offers food and beverage but no overnight accommodation. There are other smaller resthouses and general kiosks in the project area particularly along the Coastal Road.

Tourist development is an ongoing activity in the area. Planning and feasibility studies were carried out to develop the Dead Sea area to attract more tourists. The main issue in this regard was to ensure availability of water supply. Therefore, Jordan Valley Authority in Cooperation with Water Authority of Jordan has constructed a conveyor from the wells upstream Kafrein Dam to convey about 2 MCM/year to the area. This quantity is not sufficient to cover the needs for the year 2010, and therefore under another project water will be transferred from southern wadis to the area.

Currently there is an ongoing study to convey water to Amman from these wadis, and the plan is to provide the tourist area from this conveyor. The water to be conveyed is brackish and therefore a desalination plant will be constructed to the north of the Dead Sea with all required facilities for treatment before distributing to both Amman and the tourist area on the Dead Sea.

The tourist activities in the area are limited and great effort is taken by both JVA and Ministry of Tourism and Antiquities to develop the area. Currently the hotels are supplied with water from the wells feeding the villages around and there are ongoing projects to ensure sufficient water supply to the tourist area as mentioned earlier. A pipeline has already been constructed to convey 2 MCM/yr to the area from wells upstream Kafrein Dam, which is sufficient to cover the needs up to year 2005. A desalination plant is to be constructed in the coming years in the area to desalinate brackish water and supply both Amman and the tourist area. The plan is to provide 8 MCM/yr to the area and this will cover the demand up to year 2010.

4.3 Water Competition between Agriculture and Tourism

Since the development in the tourist sector is new to the area therefore no competition exists so far. The main activity in the area is still agriculture and long time will pass before convincing people in the area to change their field of interest.

According to the integrated development for the target region proposed by JVA, it can be noted that water resources for the tourist activities are separate from those for agriculture and are mainly based on desalinating the brackish water, which currently wasted to the Dead Sea. The irrigation supply is mainly based on surface water stored in Kafrein Dam and base flow diverted by weirs on Wadi Hisban. None of these sources are considered as domestic water

sources. The competition will be clear only if additional water supply is required in the future from wells which are currently used by farmers to supplement irrigation supply.

As mentioned earlier that desalinated water will be used to supply water to Amman and tourist in the area and this brackish water is coming from side wadis, which are currently discharging into the Dead Sea. This procedure will cause an environmental damage to the Dead Sea by increasing the rate of dropping in its level, which already exists due to less flow entering it from the Jordan River. Diverting water from side wadis means that even lesser flow is coming and the sea level will drop quicker than before. One solution to increase the level of the Dead Sea is by implementing the Red Sea–Dead Sea Canal project, but a long time will pass before reaching this stage as this project should be a regional one and is affected by the peace process in the region. Continuous dropping in the Dead Sea level Will have a great effect on tourist attraction which will drop eventually.

Most of the residents of the Jordan Valley live under hard economic conditions. Tourism can improve the standard of living of the local population by offering work opportunities to the local residents during the construction and operational phases and through introducing services and facilities that will enhance the quality of life of the people. Thus it becomes important to give the people of Suweimah the priority in filling the need for workers during the project's construction period. The same principle should be followed in filling tourist-related jobs during the operational phase. This will require that proper training programs in tourist-related skills be developed which will target the local people for this purpose.

Local people believe that the tourism will generally benefit their communities. Many participants in the focus groups asked for establishing a handicraft centres where they can exhibit and sell their traditional products. The following items were suggested to be produced and sold to tourists and visitors:

- Straw or wool carpets
- Straw baskets and brooms
- Weaving and knitting products
- Banana leaves baskets

It is expected that establishing the handicraft centres will provide the residents in the Jordan Valley with means for supplementing their income and improving their living conditions.

Increasing tourist arrival and stimulating tourist expenditure will have marked influence in the local economy. Tourist's expenditure will influence this rural agriculture area and provide an inflow of money that will enhance the standard of living in the vicinity.

At the macro level the multiplier effect of foreign currency inflow will revive various economic sectors. In particular transport sector, industrial sector, agriculture sector and service sector.

4.4 Industrial Sector

One of the major industries in Jordan is the Jordan Arab Potash Company. It mines potash, magnesium, bromine and their derivatives. It was established in 1956, and has two plants on the Dead Sea. It is the world's fifth largest potash producer, and is an important employer of 2000-2500 people. The company sold 1.96 million tons in 2002, worth approximately $200,000,000. India was the largest importer (521,000 tons), followed by Malaysia (157,000 tons), Indonesia, Philippines, Korea, Spain, Italy and Finland.

The total number of employees is (2,195) at the end of the year 2002, including the employees, workers and trainees, and around (200-230) daily workers (see **Table 24** and **Table 25**). The company provides its staff members with advanced medical services and is keen to train them and enhance their efficiency according to regular annual programs consisting of oral and sometimes overseas training courses. The total participants in such courses were (1,965) employee during the year 2002[2].

Table 24: 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 25: Labor Force Distribution 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

The Company continues to grant housing loans to its employees The total granted increased by around JD (1.3) Million to reach JD (16.9) Million at the year end At the same time it provides accommodation to its employees directly. About (2,193) of the Company staff members and their families reside in the Company's township and other housing facilities.

There are six companies which their activities are related to the potash industry and its mining. The Arab Potash Company owns various shares therein ranging from (20%-55%). Following is a briefing of the said companies:

- **Jordan Safi Salt Company (under liquidation)**

  Due to restructuring of the Jordan Dead Sea Industrial Company (JODICO), Arab Potash Company owns (24.2%) of the share capital of JOSSCO. This company has incurred losses despite the assistance provided indirect lending by Arab Potash or by guarantees against facilities granted thereto a voluntary liquidator resolution had been taken by the extra ordinary general assembly of the company at April 2, 2002.

[2] Arab Potash Company's Annual Report 2002.

The dues for Arab Potash Company from this company amounted to around JD (15) Million at the end of the year 2002. The liquidation committee awarded the bid to acquire its assets for JD (8) Million to Arab Potash Company at December 3"2002, and after the transfer of the assets to APC, it will be operated and managed by Jordan Industrial Co. (JODICO) on behalf of APC by a management contract.

- **Numeira Mixed Salts & Mud Company**

  This company was established in the year 1997 aiming at packaging and distributing mixed salts and mud for cosmetic industries purposes. The Arab Potash Company owns (52.7%) of the company's share capital of JD (1.5) Million. Also, Arab Potash Company's employees saving fund owns (32.7%) of its shares.

- **Jordan Magnesia Company**

  This company was established in the year 1997 with a share capital of JD (30) million, the construction of its plants at Ghor AI-Safi was started in the year 1999 for the purpose of producing (50) Thousand tons annually of magnesium oxide used in the fire bricks industry, and around (10) thousand tons of magnesium derivatives and magnesium hydroxide. The Arab Potash Company owns (55.3%) of the shares of this company. The capital investment in this project expected to reach about (77) Million.

- **Kemira Arab Potash Company**

  This joint venture was established with Kemira Company / Denmark in the year 1999 with a share capital of JD (29) million. The Plant at Aqaba will produce (150) Thousand metric tons annually of potassium nitrate (fertilizer) and (75) Thousand metric tons of di-calcium phosphate (animal feed). The company commenced production in the last quarter of the year 2002. The capital investment is expect to reach JD (80) Million. The Arab Potash Company owns this company equally with Kemira Company / Denmark (50% each).

- **Jordan Bromine Company**

  Jordan Bromine Company was established in the year 1999 with a share capital of JD (30) million following the signing of the joint venture agreement with Albemarle Corporation/USA, which owns the technical and the marketing know-how. The Jordan Bromine Company will construct a plant in Ghor AI-Safi for the production of bromine, calcium bromide, sodium bromide and hydrogen bromide, as well as to produce chlorine, hydrochloric acid, potassium hydroxide and tetrabromo besphenol. After the amendment of the joint venture agreement to construct a chlorine plant as well to purchase other assets, a resolution by the general assembly of the company had taken a decision at October 2002, to increases the share capital by JD (19.4) Million as additional paid in capital.

  The company commenced production at the last quarter of the year 2002. The capital investment is expected to reach JD (89) Million. The Arab Potash Company owns this company equally with Kemira Copany/Denemark (50% each).

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

  This company was established in the year 1994 as a holding company with a share capital of JD (60) Million at the initiative of the Arab Potash company, to oversee the activities of investments and setting up downstream industries from Dead Sea minerals, with the exception of potash industries. The Arab Potash Company, participated with (51%) of the company's share capital. (JODICO) established both the Jordan Magnesia Company in the year 1997 and the Jordan Safi Salt Company in the year 1996. The holding status of the company was repealed in the year 1998, enabling (JODICO) to participate in the share capital of the Jordan Bromine Company.

Other relatively small industries in the Jordan Valley include stone, cement, pumps, tubes, pipes, textiles, leather, furniture, paper, printing, chemicals, plastic, metals, mechanical equipment, electrical equipment, and transport.

Table 26 contains data about employment in three plants that would represent the above-mentioned industries.

Table 26: 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 Location of residency	Ghor Residents	39	42	80
	Non Ghor Residents	1	20	22

5 FISH FARMING IN JORDAN

The demand for fish in Jordan has been increasing in recent years. Jordan imports 1000 tons of seafish and 16,000 tons of frozen fish. That totals 17,500 tons per year in the existing market.

The capture of fishery in the Gulf of Aqaba has been declining over the years, from 125 tons in 1985 to just 15 tons in 2000. Aquaculture is an alternative to bridge the gap between supply and demand.

According to the Near East Foundation (NEF), there are 6 fish farming projects in Jordan:

1- The Arab Fish Farming Project in Northern Ghor.
2- The Jordan Valley Fisheries in Middle Ghor.
3- Al-Natoor Fisheries in Middle Ghor.
4- Al-Taba'a Fisheries in Middle Ghor.
5- Al-Jafari Fisheries in North Azraq.
6- The Jardaneh Fisheries in Sukhneh-Zarqa.

These projects all together provide the local market with just 600 tons of fresh fish. So, there is a good possibility to boost fish farming in Jordan. There needs to be stronger public awareness to do this (fresh fish is healthy and if Jordanians ate once per week production could double).

Tilapia is the world's original aquaculture fish. A native of Western Africa and the Middle East. This fish is also referred to as "Saint Peter's fish". Tilapia is the hardiest, most disease resistant fish in the world. They are easily the lowest cost and most dependable species to produce. Tilapia is fast growing, reaching market size of 500 gm within six months from the fingerling stage. This compares favorably to three years for salmon, two for trout and eighteen months for catfish. This reduces risks, cash flow and allows for quick market response.

With a controlled environment (steady warm temperatures and consistent water quality) Tilapia can be grown all year round. They can also be selectively bred more easily than other species, allowing faster improvements in size, growth rate, feed conversion and meat yield. They feed low on food chain with the ability to filter algae, plankton and other microorganisms. In addition to their easy adaptation to aquaculture techniques, the finished retail product also has a premium market image. The final product can be sold as whole fish, cleaned (scaled and entrails removed), or as fillets.

5.1 The Jordan Valley "Taloubi" Fish Farm

The aquaculture farm was established on 274 dunums in 1996. The objective of the project is to produce a premium quality Seafood at reasonable cost. The proprietary culturing techniques provide a superior premium product that has established itself as a leader in the seafood markets in the region. Seafood of this high quality has been previously unavailable in Jordan.

The farm is only 50 km from the capital city Amman (0.5 km) from the Baptism site and has an easy access to major roadways that helps the company to provide reliable distribution of fish.

The fish is grown in tanks where food and water conditions can be controlled to assure quality. The flavor of the fish can be adjusted by altering the water and feed conditions.

The fish has uniform Grey colored skin with high yielding and attractive white flesh. The fish meat resulting from this carefully controlled process contains 18% protein and only about 1% fat making it an excellent source of low-fat protein especially for heart conscious people who want a low cholesterol diet. A modern processing plant and special packaging methods gives the product a superior image over the competition.

Shelf life is defined as the time seafood products remain in fresh quality condition in the distribution channels before final purchase by the consumer. Tilapia products enjoy a shelf life of more than 14 days. This compares to 6-8 days for other cultured or wild caught fish. Proprietary processing and packaging methods and the ability to ship fresh daily will give us this extra shelf life.

The processing facility is designed to accommodate future expansion of the farm with a capacity to process up to 1,500 tons of fish per year.

Processing plant is designed and equipped to conform to the latest US and EU standards for hygienic food processing. Fish are processed whole, cleaned or filleted to customer specifications.

The product is delivered fresh, daily in refrigerated trucks to the local Jordanian market and nearby countries.

5.2 Small Farmers and Fish Farming

KAFA'A for sustainable irrigation water use with the Near East Foundation (NEF) launched a project to take fish farming to the next level in Ghor Al-Safi. Small farmers receive a loan of JD 570 to buy fingerlings, fish feed, and NEF technical assistance: JD 130 to buy fingerlings, JD 400 to buy feed and JD 40 to buy the NEF Assistance. This assistance included training the farmers about proper fish care and fish feeding and how to monitor pond health by checking water temperature, oxygen, and algae levels.

Table 27: 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			

Demonstrating their commitment to the program, the farmers will pay back the loan in 8 monthly payments. The first 5 payments are of JD 21, and the last 3 payments are of JD 155.

In addition, KAFA'A and the Near East Foundation (NEF) will manage to stimulate interest and lend credibility to fish farming in the area. NEF's role in project design and implementation helped to avoid previous problems encountered. Some issues include fish farming being viewed inappropriately as a get-rich-quick scheme, improper pond design, poor and/or inexperienced management, and farmers requesting assistance only after problems are encountered.

6 REFERENCES

6.1 References of Social Assessment

Department of Statistics, *2002 Population Estimates*, (Hashemite Kingdom of Jordan, Department of Statistics, 2003).

Peake, P., *A History of Jordan and its Tribes*, (University of Miami Press Coral Gables Florida, 1958).

6.2 References of Transportation

The Hazra JRV Group, *Jordan Rift Valley Integrated Development Study*, (Harza JRV Group, August 1997).

6.3 References of Economic Section and Fish Farming in Jordan

Central Bank of Jordan (CBJ), *Thirty Nine Annual Report*, (CBJ, 2002).

Chesrown, S. A. Sandi's Report. *Jordan Valley Authority Physical Planning Initial Consultancy*. (Achievement of Market-Friendly Initiatives and Results Program-AMIR 2.0 Program, Funded by U.S. Agency for International Development, April, 2003).

Sigma Consulting Engineers and THSI - Tourisme et Hotellerie Sauer Int. *Tourism Development Project of the East Coast of the Dead Sea (SPA); Part Five-Economic and Financial Feasibility Appraisal*. (Ministry of Water and Irrigation/Jordan Valley Authoirty, June, 1996).

Sigma Consulting Engineers. *The Development Project of the North Suweimeh Extension at the East Coast of the Dead Sea; Addendum-Economic and Financial Feasibility Appraisalnorth Suweimeh Development AREAS*. (Ministry of Water and Irrigation/Jordan Valley Authoirty, February, 1998).

Near East Foundaion, *Survey of Surface Water Bodies for the Purpose of Fish Farming in the Jordan Valley (in Arabic)*. (Ministry of Water and Irrigation/Jordan Valley Authority, September, 2003).

The Arab Potash Company Limited (APC), *Annual Report 2002*, (APC, 2002).