

Azraq Oasis Restoration Project

SOCIO-ECONOMIC ASSESSMENT OF THE PILOT SITES

Arab Women Organization

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Table of Contents

1. INTRODUCTION.....	2
2. BACKGROUND.....	2
General Background	
3. Azraq as Selected Pilot Sites	4
4. STUDY OBJECTIVES & RESOURCING.....	6
- Objectives	
- Study Team	
- Study Duration	
5. STUDY APPROACH & METHODOLOGY.....	11
- Participatory Approach	
- Formal study	
6. FIELD STUDY PROGRESS	12
- Stakeholder Analysis	
- Azraq District	
7. ANALYSIS in Figures	18
- Social Analysis	
- Economical Analysis	
- Socio –economic value of Azraq Water Basin	
- Health Condition	
- Environmental condition	
- Desertification, Dryness and excessive dust	
- Water Conditions	
- Agricultural conditions	
8. CONCLUSIONS	28
- Problems, Challenges and Restraints and Their Reflection on Socio-Economic Aspects	
- Level of Awareness and Level of Participation of Local Communities in Development Initiatives	
- Analysis from the Decision Makers perspective	
- Water Demand & Water Management	
- Awareness Raising & Capacity Building	
- Institutional Setup	
- Gender Issues	
9. RECOMMENDATIONS	32
- General Recommendations	
- Recommendations for the pilot projects	

1. INTRODUCTION

The International Union for the Conservation of Nature (IUCN) in cooperation with the Arab Women Organization (AWO) and Badia Research and Development Center is planning to implement pilot projects on Azraq Oasis, which is funded by the DGCS, WANI under the title of: “Azraq Oasis Restoration Project”.

The over all objective of the project is to build Capacities in systemic and participatory approaches to planning, restoration, development and management of the restoration of Azraq Oasis, being tested and demonstrated at the intermediate and local level by promoting increased participation and representation of stakeholders mainly end-users in planning and decision making processes (improved local water governance). The project builds on the principles of integrated water resources management (IWRM).

The Socio-economic-baseline study was executed by an Arab Women Organization under the project's supervision to obtain information about pilot project's target groups before the implementation of project activities. The study was conducted for farmers, households, women groups, water officials and community based organizations (CBO).

The study is considered as a core activity where target group analysis findings would be presented as reference for the project's future activities and as a baseline to be considered in future monitoring and impact assessment procedures.

2. BACKGROUND

General Background

The project has adopted a participatory planning process for water resource planning and management. This process builds on the identification of water-related problems and the development of area specifically long-term vision and strategies on the basis of different possible scenarios. The aim of this process is to support stakeholders at all levels in making the technical and political decisions to develop and manage their resources.

The long and complex process toward rehabilitation requires significant financial resources, close coordination among all stakeholders and wide-based public involvement and support. To have impacts on the ground, a set of urgent demonstration actions should start soon which will serve to build the profile of the rehabilitation and to demonstrate ‘quick wins’ from investment in oasis restoration that will be highly visible to the people of the basin. The action will designed to enable development of an integrated plan for restoration and management at oasis level, supported by capacity building, stakeholder dialogue over governance arrangements, and required assessments

and analysis. The integrated plan with pilot restoration projects will be initiated at oasis level with clear reference to the proposed pilot in the Inception phase "2007" which will identify and prioritize actions needed to implement basin restoration and to deliver benefits at a basin-wide scale

The project on Azraq Dialogue is with period of 30 months (June 2008 – November 2010) as the restoration of the basin is more than 30 years process where the critical success factor will be the commitment of the Government of Jordan and the Azraq community to make the necessary efforts in starting-up restoration of the basin. In addition, the cost of the restoration of the Basin will be lower today than any point in the future, thus saving money in the future.

The project will provide the stakeholders with the knowledge and skills to ensure the engagement of all the relevant stakeholders in the management and planning of their water resources and to enable them to play a major role in the reform process and hence contribute to the restoration and development of the Azraq Oasis and the welfare of the local communities around the oasis.

The project will implement few but meaningful pilot projects in the selected pilot sites that will aim to reduce pumping load as they improve the environmental situation, greening the area, promoting effective governance, as importantly it will demonstrate how an effective planning and management relationship can be developed and sustained between a local community, CBO, private sector and respective Government departments for improved water resource management and oasis restoration. The project will be implemented in such a way as to engender trusting working relations that can be used as a model for replication.

Taking into account the above considerations, the project will focus on two different levels of implementation: The Azraq Oasis for much of the activities on the ground and the Azraq Basin for more systemic analysis of the broader aquifer dynamics

Indeed, for direct implementation of activities on the ground the project will focus on the Azraq Oasis, its valuable wetlands and the direct (agricultural) environment. However, dynamics in this area cannot be disconnected from the overall ground water dynamics in the much larger Azraq Basin. These larger dynamics are critical and they will be taken into account in a more systemic analysis by help of Decision Support Tools. The ground water dynamics in the larger basin will be considered as an external factor to the ground water flows (recharge/abstraction) in the direct vicinity of the oasis and their possible impact on restoration of a substantial part of the original wetland/oasis.

3. Azraq District as selected pilot site:

Historical Background

The Azraq province is located in the eastern desert of Jordan, with an area of approximately 3500 km² and is administratively is under Zarqa governorate and is situated to the east of the centre of the governorate, it is bounded from the north by Safawi town of Mafraq governorate and from the south by the capital Amman and from the west by Dalil province and from the east by the Saudi Arabian borders. The centre of the province is located between the towns of north and south Azraq which comprise the most important residential areas in the province and about 85 km to the east of the centre of the governorate and it includes eight residential area according to the administrative division which are north Azraq town, south Azra, Al-Omari, Al – Ain Al-Baida'a, Mazari', Um Almasayeel, Dughaila, and the air force housing, and it has a population of approximately 1200 people.

Azraq is located within an underground water basin of an area of 12700 km² and rainwater and floods are considered to be the main water source for the Azraq basin, and so it is important to be

one of the most important renewable water resources in Jordan. And the water used to flow from this basin to the surface of the ground and form wells that transform into surface ponds in Azraq region, and this abundance of water, makes it possible for terrestrial wildlife to inhabit the area which lead to great biodiversity. And Azraq basin is also quite important because it is located in the heart of the desert and so the area has become a destination for migratory birds from Europe to South Africa.

And Azraq ruins and its surroundings are indicators of human inhabitation of this area for a long time, and Azraq was considered of considerable importance during the Roman era that witnessed the building of castles and palaces such as Azraq palace, and it became of crucial importance during the Umayyad era when Amra and Harraneh palaces were built, to facilitate trade and to reinforce military authority, and to employ the area for recreational purposes and for hunting.

In 1963, the government of the Hashemite Kingdom of Jordan started to pump water from the Azraq basin to Amman, at first the water was pumped in small quantities so it wasn't greatly but detrimental over time the amounts of water pumped from Azraq basin increased and the amount of water pumped out of Azraq for potable and agricultural purposes is estimated to be 50 million m³, and it is considered to be twice the recommended amount for annual exploitation. And this excessive pumping has left its negative mark upon the biodiversity of the area, so the wells have dried up and salinity increased in water for domestic and irrigation purposes, and the wildlife and numbers of resident and migratory birds are diminished, which has reflected in a negative manner on the socio-economical aspects of local communities.

- 1. Azraq North:** The biggest inhabited community in Azraq as it is the oldest inhabited by people. It is located in the north district inhabited by the tribe of Bani Ma'rouf (Drouz). Within this area, there is the Municipality building, the District Offices, some of the Governmental Directorates and Schools. The population is around 7000. This area includes the old castle and the old palace as well as educational and professional centers. Azraq north is connected by paved roads. From south, there is the Amman-Aqaba road and the road to Saudi borders. From north, there is the road to Safawi and the Iraqi borders.
- 2. Azraq South:** It is in the southern part with around 3500 inhabitants composed out of the Bani Sakher tribe and the Chechen minority. It is considered as the trade quarter because it is located on the road between Aqaba and Iraq. It includes the rest houses, restaurants, passengers' service spots. It has some schools for boys and girls. It has the building for the new municipality, the agriculture directorate and several headquarters for the NGOs, in addition to the Azraq reserve & Shomari Reserve.
- 3. Centre, Hamzeh Quarter:** The Centre includes the urban development area, which is 20 years old and located between Azraq north and Azraq South with the least number of inhabitants, 1200 mostly from the Zayadi tribe. They are composed from the families that

came from Iraq and Kuwait during the Gulf war. They were given the land and the urban development houses by a royal decree to assist them to merge. They depend on trade. It includes, Hamzeh Quarter, which is inhabited by Al-Hweitat tribe and has 3 schools.

4. Al-Mazari' Area (farms): It is the fourth area in the research. It is the specialized area in farming. It is the biggest agricultural area, but little is owned by the Azraq inhabitants. Most of the farms are owned by people from outside Azraq (Investors), who are the largest sector in agriculture. The investors build houses within their farms just to spend their weekends. The water sources for drinking and irrigation are the artisan wells. The land is still unlicensed as it is considered tribe interface land. Azraq inhabitants depend on these farms to maintain their needs for agricultural products and employment in some farms.

4. STUDY OBJECTIVES & RESOURCING

4.1 Objectives

Assess socio-economic impacts and benefits on local stakeholders and target groups at pilot site and monitoring the improvement of the environmental situation there using participatory appraisal techniques to obtain the data for the following items:

- General socio-economic information on the community with special focus on their interaction with the oasis present issues.
- Stakeholders willing to demonstrate how an effective planning and management relationship can be developed and sustained between a local community, CBO, private sector and respective Government departments for improved water resource management and river restoration.
- Stakeholders interest in making the technical and political decisions to develop and manage their resources.
- Awareness of water management and water efficient use issues.
- Proposed current oasis solutions by local communities (where, how, how, when, why, etc.) including community readiness for contribution (in kind, commitments, others)
- Agree on unified information between the officials of the different government directorates and the leaders of the local community.

4.2 Study Team

The study was led by the Azraq Field Coordinator/ Arab Women Organization under the supervision of the IUCN / Azraq Coordinator.

The research team consisted of specialized men and women with diversified practical experiences as well as individuals representing the various groups of the local community. In fact, the representatives from Azraq local communities formed the core of the research team. Thus, PRA methodology ensured the participation of all stakeholders in designing the research plan, the use of the special tools and the analysis of the findings.

A training workshop was conducted to train the team on the methodology of the Participatory Rapid Appraisal (PRA) and its tools in theory and practice. During the workshop, the participants designed the research plan to be implemented in 10 days duration. The training workshop was held in Azraq Municipality Library.

The overall objective of the training was to draw a clearer picture of Azraq situation and get a better understanding of the water situation in Azraq.

Hereunder **Table 1**, a list of the official and community representatives in the research team:

Name	Position
Mr. Adnan O'toum	Director of Azraq District
Dr. Ibraheem Al-Ateem	Director of Agriculture Directorate
Eng. Kamal Ata	Azraq Mayor
Eng. Muhammad Al-Hawi	Field Director of Azraq Basin
Dr. Odeh Al-Masa'eed	BRDC
Mr. Hussein Arsalan	Directorate of Land and Surveys
Mr. Naeif Al-Afeer	Azraq North Women Organization
Ms. Barmakieh Is'eed	Rural Women Empowerment Org.
Ms. Nofa Al-Fayez	Azraq South Women Org.
Mr. Nazeeh Al-Bassar	Azraq Cooperative
Mr. Turkey Al-Afeer	Azraq inhabitants Organization
Ms. Fatima Al-Dagamseh	Azraq Basin Office
Mr. Osama Tarabeh	Azraq Municipality Council
Mr. Mansour Al-Shoshan	Azraq Municipality Council / Representative of the Bedouin Skhour Tribe
Mr. Talal Ata	Azraq Municipality Council
Mr. Muhammad Issa	Chechen Voluntary Society
Ms. Meitha Salim Al-Sabra	Directorate of Social Development
Ms. Samia Al-Balous	Azraq Women Cooperative
Ms. Najah Damen Ata	Azraq Women organization
Ms. Sitekul Al-Shomari	Azraq Cultural Club
Mr. Shaker Al-Sarhan	RSCN
Mr. Muhammad Al-Chechani	Azraq Cooperative/ Representative of the Chechen
Mr. Rabee' Al-Bahri	Azraq Health Centre
Mr. Ra'fat Tarabeh	Azraq Agriculture Directorate
Ms. Rida Al-Younis	Women's Committee Forum
Mr. Nu'man Al Shishani	Azraq Municipality Council
Ms. Eman Al-Tawaiha	Azraq Women Organization
Mr. Othman Dawlat	Azraq Municipality Council & JES
Mr. Amin Suleiman Al-A'war	Deputy Mayor
Mr. Muneer Dogan Fadlalah	Azraq Secondary School

4.3 Research Plan

The design of the research plan consists of 4 major topics to study the situation and the needs of the inhabitants. Each major topic is divided into minor topic to make it easier to deal with according to the information revision list. Then, the tools for each minor topic were chosen.

- Social and Economic Situation

1. Family structure (whether husband and wife are relatives, who is the breadwinner, who works, etc.)
2. Number of family members
3. Number of wives
4. Males and females
5. Education
6. Extended or nuclear family
7. Role of social institutions (Water Management)
8. Social problems (disabled, divorcee...) and problem analysis
9. Income, number of productive members, income resources, expenditures (ration of water expenditure)... Invoices
10. Ownership (house, role of social projects and loans, productive projects in Azraq)
11. Employment
12. Small projects
13. Economic problems (Ex: unemployment, culture shame...)
14. Civil Society Organizations in Azraq (NGOs and their roles)
15. National Welfare that is affiliated to the Ministry of Social Development (MOSD)

- Health Situation

1. Diseases: Kinds and causes
2. Health institutions: Role and effectiveness (institution analysis)
3. Health problems
4. Water causing health problems (If present)
5. Health insurance (kind)

- Environmental Situation

1. Ways of disposing bio waste
2. Ways of disposing solid waste (containers, landfill...)
3. Kinds of sewage system (Septic, non Septic tank...)
4. Insects problem, rodents, flies (Causes and combating)
5. Dust problem and fire
6. Local combating institutions and their roles
7. Role of the community in preserving the environment
8. Soil salinity

- Agriculture Situation

1. Number of farms and their areas
2. Numbers of trees and kinds

3. Areas planted with field crops
4. Chicken farms and their production capacity
5. Fish farms and their production capacity
6. Number of licensed water wells and the unlicensed
7. Water quantity extracted from licensed water wells
8. Water quantity extracted from unlicensed water wells
9. Water quantity extracted for drinking and its monthly ratio
10. Quality of drinking water extracted from Azraq Basin
11. Quality of water used for agriculture and its ratio
12. Number of Jordanians working in the farms
13. Number of families living in the farms and their nationality

14. Number and sex of farm workers from Azraq inhabitants
15. Number of expatriate agriculture workers
16. Quantity of Azraq agriculture products and quantity of the exported
17. Special qualifications of Azraq agriculture products
18. Agriculture patterns in Azraq
19. Soil qualifications in Azraq
20. Marketing channels
21. Role of agriculture guidance
22. Agriculture needs for water
23. Dates of plantations
24. Most important agriculture diseases and pests
25. Fertilizers and pesticides that are used
26. Irrigation systems
27. Agriculture seasons
28. Knowledge of frosting dates
29. Areas of fertile lands
 - Water Situation
1. Waste water
 - Kind of sewage system (Septic, non septic, location, whether old wells are used as sewer)
 - Capacity of septic tanker, number of annual exudation and cost
 - Problems of sewage (Smell)
 - Are there common septic tanks
2. Drinking Water
 - Quantity of used drinking water (water bill)

 - Quality of drinking water and the level of acceptance by the community

- Capacity of water reservation for the family
- Ways of reserving water
- Number of weekly hours of water pumping
- Precision of water meters
- Cost of participation
- Regularity of water distribution
- Water quantity for the individual per day
- State of the water network
- Distance of the water network
- Water prices
- Water resources
- Water harvest methods and the capacity of the water well
- Number of the participants in the water meter
- Institutions for monitoring drinking and irrigation water
- Quantity of consumption related to season (summer or winter)
- Livestock and water consumption
- Gardens' consumption (Quantity)
- Purpose of using drinking water (washing, cooking, drinking)
- Requests for drinking water
- Citizens knowledge of the pumping program

4.4 Study Duration

The study covered a period of 31 days distributed as such:

Days	Activity
2	Field preparations and check list development
5	Training days on Participatory Rapid Appraisal
10	Field research / interviews
6	Data Analysis
2	Field feedback sessions
2	Meeting with related officials
3	Information analysis & conclusions & report writing
1	Debriefing & presentation meeting

5. STUDY APPROACH & METHODOLOGY

Participatory Approach

Qualitative approach that is consistent with the objectives of the consultation based on the participatory (PRA) approach and concept that provide us with in depth information using focusing on the following main tools:

- Focus group meetings: Focus meetings will be planned and executed with various stakeholders and target group categories to collect information on their current practices and situation and to get closer idea on their experience with this project. Special questions/chick list shall be developed for each focus group according to its mandate and responsibilities “As Attached Above”.
- Individual interviews: To find out males & females point of view and experiences with the project idea and objectives as well as target groups’ relationship to the project and water/environment in particular, some planned interviews shall be conducted with specialists, decision makers, and with the relevant CBOs. Special list of questions will be prepared for each according to their official /technical backgrounds.
- Questionnaire tool: With the assistance of the Project Adviser, a Questionnaire will be developed addressing a sample of local individuals “men-women” and households to meet the objectives of the consultation.
- Direct observation: The consultant will pay special effort to watch and observe the change of behavior of the locals “females and males” as a result of the programs, and other project activities. The consultant will also observe and discuss the style of answers, or the interaction and enthusiasm among members of the focus groups or their ignorance.
- Other Participatory tools: Ranking and mapping tools might be used according to mission progress and target groups’ interaction.

6. FIELD STUDY PROGRESS

Stakeholder Analysis

Table 2. Stakeholder Analysis Results in a Socio-Economic Context

Stakeholders	Features	Concern	Resources	Impact	Required procedure
Local residents Elders, village deputies, youth sector, women's sector, students, marginalized inhabitants	Rural, nomadic and other populations	Water user, livelihoods	Human resources and information	Pollution, drainage of natural resources	Upgrading livelihoods, involving them in initiatives and decision making
Farmers	Farmer Investor Interested	Water user and investment	Information	Consuming water and using pesticides	Guidance and raising awareness, involving them in initiatives and decision making
Directorate of Azraq province	Primary decision maker	Coordinating and supporting all development processes	Administrative and legal support and facilitating work	Positive support of the initiative	Coordinating and constant communication
The Royal Society for the Conservation of Nature / Azraq Water Reserve	Environmental national non-governmental organization	Preserving biodiversity and merging it with sustainable development	Logistic and technical support and information	Preserving a representative part of the ecosystem in Azraq region	Expanding the popular base of its programs
Ministry of Tourism	Secondary decision maker	Encouraging tourism	Information, promotion, preparing infrastructure	Impacting cultural and social heritage	An incentive to activate the role of tourism sector
Ministry of Water General Secretary and his assistants – Azraq pumping station/ Water Pond Department	Primary decision maker	Providing water and managing water demands	Information and references	Unsatisfactory application of water policies	Activating their roles in the application of policies and laws

Stakeholders	Features	Concern	Resources	Impact	Required procedure
Ministry of Environment - General Secretary and his assistants	Primary decision maker	Organizing and guidance	Information and references	The absence of a guiding plan for effective water and crop usage	Activating their role in guidance
Azraq civil societies and organizations	Representative and effective local partner	Local development and organizing	Information and human resources	Reducing salinity in the salty basin	Real partnership and providing funding
Azraq Municipality Development Unit	Local decision maker	Services and development and organizing	Human resources and information	Pollution by solid waste dump	Activating the development role, raising awareness, providing technical support
Ministry of Planning	Coordinating and funding bodies	Coordinating the funding	Information and Funding	Supporting development initiatives that have negative impact on the basin	Partnership and providing consultations
Iradeh Center	Economical consultancy center	Economical development	Technical support and information	undefined	Partnership
Ministry of Internal Affairs Development Directorate	Governmental Applying policies	Encouraging investment	Facilitating and coordinating	undefined	Constant communication
Azraq Development office	Governmental	Providing national aid	Information	unavailable	Constant communication

Azraq District:

- Location

Azraq area is located in the Jordanian Eastern Badia with an area of 3500 square meters. It is affiliated to Zarqa governorate administratively. The population is around 12500 inhabitants. It is surrounded by Mafraq from the north, Amman from the South (120 km). It is divided into the following administrative areas: A-Mazari', Al-Ein Al-Baida, Um Al-Masaeil, Air-base Housing, Azraq North,, Azraq South, Al-Umari and Al-Dgheila.

Azraq is considered part of Ramsar convention, because it is located in an underground water basin with 12700 km. This basin is one of the most important renewed water resources. It is 500 meters above sea-level.

- Climate

The climate is an arid and semi-arid one. It is a typical Jordanian Badia climate with less than 100 m of rainfall and with a temperature between 35 to 50 in summer and zero in winter.

- Available Services

Being administratively related to Zarqa governorate, many services are provided in Zarqa like the hospital, electricity, education directorate and others.

Inside Azraq there are:

- District Directorate
- Municipality department
- Agriculture Directorate
- Civil Security Centre
- Badia police Centre
- Health Centre
- Drinking water department
- Water basin department
- Social development office, including:
 - a. Non-Governmental Organizations
 - b. Cooperatives
 - c. "Irada" and other establishments
 - d. Water reservation and the "Shomary" reservation
 - e. Tourist and archeology Bureau
 - f. Public Work Office

The district is served by a net of paved roads in the different directions. There is a water network, an electricity network, telecommunication network, shops, restaurants and tourist places.

The education sector has 3 boys and girls schools in Azraq north. There are two schools in Azraq south. There is one school in Hamzeh quarter and two schools in the urban development area. There is one preparatory school and a co-educational elementary school in the Airbase area in Al-Mazari.. The education sector provides several specialties and courses.

- Socio-economic Situation

The aim of researching Azraq socio-economic situation is to reach an analysis for the number of the families, relations between husband and wife, number of children, number of disabled, social problems, education ratio and the culture of shame.

The research team divided Azraq into 4 areas; Azraq Noth, Azraq South, Centre and Hamzeh quarter and Al-Mazari’.

Research findings indicate that the nuclear family is the base with few extended type of families. Life age is up to 70 years and the average of family members is 9 (the highest in Jordan). Polygamy is not common and reaches 2% only.

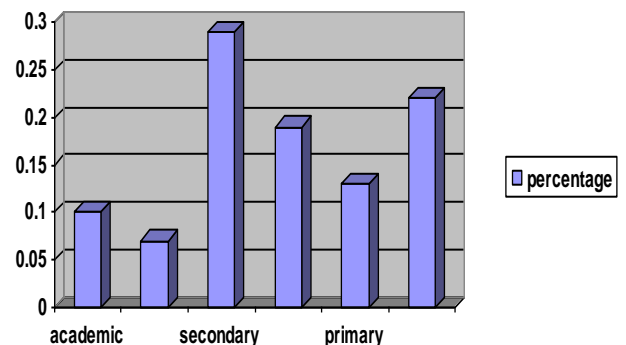
The level of education, according to the research team remarks, is high in the compulsory and secondary levels. The ratio in the compulsory cycle reaches 32% and in the secondary reaches 29%. As concerning the higher education, it reaches 7% and university enrollment is 10%. The ratio of illiteracy has reached 22% as in the attached graph.

As for women education in Azraq, it has been noted that some have finished the elementary level, a few have finished the secondary and few had finished the university graduate level. Higher education has enabled women to work in the different government directorates while the rest are housewives devoted to perform house chores and upbringing of children. There are no productive or profitable projects, in spite of the fact that there is an office for Irada (Ministry of planning service center for community) and another for the RSCN “Royal Society for Conservation of Nature).

The culture shame is so high and reaches up to 92%, according to the sample.

As for relations, it was found out that 48% of the families are not relatives and 46 are relatives. There remains 6 % with unclear kinship relations.

It was confirmed that 65% of the inhabitants have not recognized the effective role of the NGOs against 35% who recognized the impact of NGOs and there effective role. **Graph 1 Educational situation**

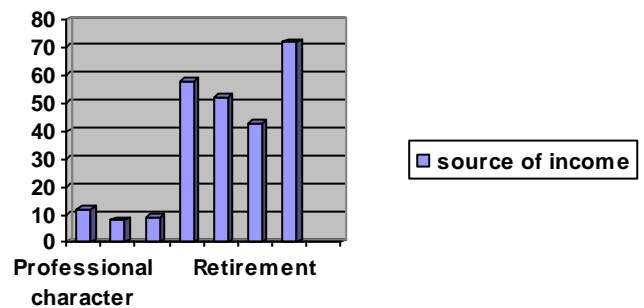


The research team has come to the conclusion that unemployment, is between 2 to 8 % due to the absence of productive institutions and the long distance from Amman.

The male and female ratios are so near: 49% for the males and 51% for the females. The house owners are 83% of the population, whereas 15% reside in rented houses and 2% live in tents.

PRA “Participatory Rapid Appraisal” has disclosed that the family income comes from governmental salaries, which reaches to 28%. A ratio of 26% persons depends on their own enterprises. A ratio of 20% depends on the Aid-Fund and 17 on pensions. A ratio of 3% depends on livestock and 4% on 5% on artisan professions.

As for the monthly income, 41 families out of the sample earn an average that ranges from 40 to 150 Dinars, which compromises 20% of the sample. 73 families earn 150 to 300 JDs, which comprises 36% of the sample. 34 families earn 301 to 450 JDs, which comprises 17% of the sample. 55 families, which is the largest number, earn 450 and above, which comprises 27% of the sample



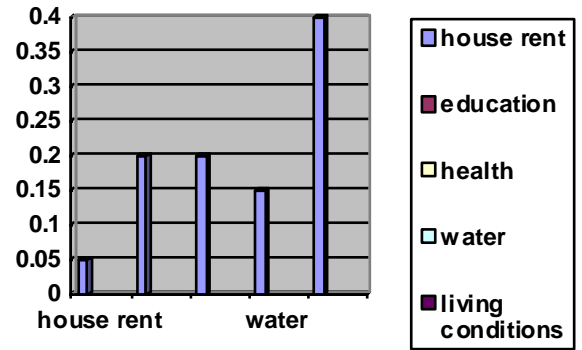
Graph 2/ Source of income

As for the expenditure, the survey indicated that expenditure goes as follows: water 15%, health 2%, education 2%, house rent 5% and living materials 4%.

The most important socio-economic problems in Azraq are:

1. Drought in the oasis with continuous growing of desertification and dust, which weakens tourism
2. Decreasing in water supply, the rise in water price and the low water pumping increase the family expenditure because families have to keep house tanks with pumps to reserve water and then pump it to tanks on house roofs
3. Health problems are caused by the existence of only one policlinic with less than needed practitioners to respond to the demand. So, more expenses are needed to travel to Zarqa or Amman to receive health care.
4. Education problems are caused by the lack of enough teaching cadre, which negatively impact the teaching level and the ratio of success in certain courses. So, people pay more to send their kids to schools in Zarqa.
5. The long distance from Azraq to Amman is the central cause of problems. So, the inhabitants have to pay more to go to universities, factories and government directorates.
6. The sewer problem due to absence of sewer system. So, people suffer from pollution and the presence of insects and rodents.

7. Land problems are caused by clan interface, which means not licensing the old divided pieces among the people. This diminishes land for housing and automatically raises the house rent and lead people to migrate.
8. Lack of enough developmental projects leaving people to suffer from unemployment and dependency on the welfare fund.



Graph 3 indicates the ratios of family expenditures

9. Weakness of the role of the government directorates leading to material and social losses and chaos in water consumption and plantation.
10. Stop extracting salt from the salty basin, which used to be an income source for living but stopped to increase unemployment.
11. Absence of universities and colleges, which increases the cost of teaching and lower the teaching level.

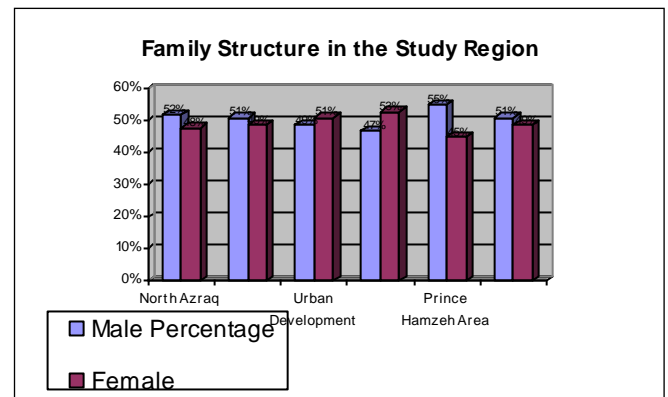
7. Analysis in Figures

• Social Analysis in Figures:

Family structure and male to female ratio

Figure 1 below shows the family structure and male to female ratio in Azraq region and the results show the family structure for each residential concentration independently.

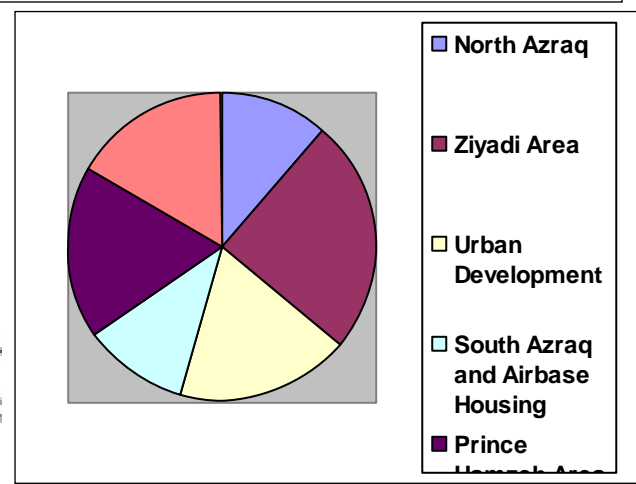
Figure 1: Family Structure in Azraq



Average number of family members

Figure 2 shows the average number of people in Azraq region, and the results show the average number of family members for each residential concentration independently.

Figure 2. Average Number of Azraq Family Members

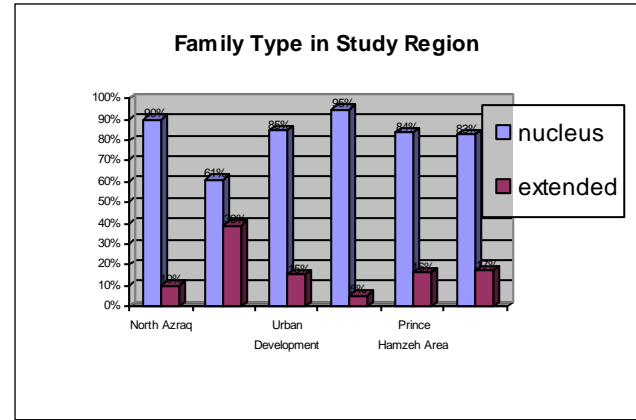


- **Family type**

Figure 3 shows family types in Azraq regions, and the results indicate the family type for each residential concentration independently.

Figure 3: Azraq Family Types

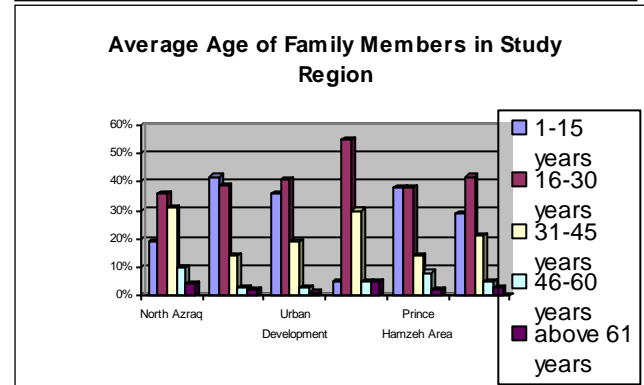
* The family nucleus consists of the father, mother and sons whereas the extended family means the presence of relatives living in the same house as the family



The Average Age of Family Members in the Study Region

Figure 4 below indicates the average age of family members in Azraq region, and the results show the average age for family members in each residential concentration independently.

Figure 4: Average Age of Azraq Family Members

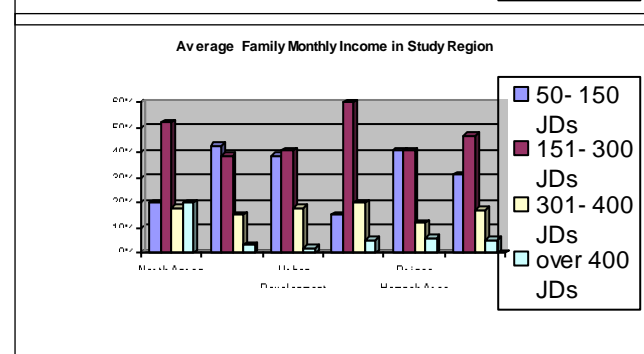


- **Economical Analysis in figures:**

Family Monthly Income in Study Region

Figure 5 shows the family monthly income in Azraq region for each individual residential concentration

Figure 5: Average Azraq Family Monthly Income



Main Income for Azraq Families in Study Region:

Table 3 indicates the sectors that represent main monthly income for families in Azraq region for each individual residential concentration.

Table 1: Main Sectors of Azraq Family Income

Residential Area	General Employment %	Trade and Commerce %	Livestock Raising %	Agriculture %	Salt Production %	National Welfare %	Other %
North Azraq	43	26	0	8	6	0	17
Ziyadi Area	29	24	18	0	0	0	29
Urban Development	27	10	12	0	0	25	26
South Azraq and Airbase Housing	50	30	0	5	5	0	10
Prince Hamzeh Area	16	3	28	5	0	40	8
Total Average for Study Region	33	18.5	11.5	3.5	2.5	13	18

Socio-Economical Value of the Azraq Water Basin

Socio-economic benefits and values of the Azraq water basin can be divided into tangible and aesthetic values according to the results of the study and **Table 7** shows the rate of values and rate of frequency within the interviewees.

Table 4: Socio-Economic Benefits and Values

Tangible Values	Answering Frequency (Percentage)	Aesthetical Values	Answering Frequency (Percentage)
Important source of water	21	Historical, cultural and natural tourism station	12
Wildlife, birds and fish	18	Natural, historical and cultural richness	5
Rangeland, medicinal plants and date palm trees	16	A unique social diversity	2
Source of salt minerals	15		
Important source for farming	7		
Strategic location for trade	4		

From the table above it is obvious that the tangible values summed up to 81 %, while the aesthetical values summed up 19 %, and this comes back to the priorities and interests of people, local communities look at direct benefits and values that directly contribute to the improvement of their livelihood. While the local communities look at the indirect benefits and values of the basin as the role of the oasis to maintain its ecological balance and other environmental services as second class values because these values do not directly reflect on their economical status and livelihood of the local community. This demands economical investment in these aesthetical values in order for these values to be able to improve the livelihood of local communities with special attention to the advantages of these values without affecting them negatively or changing them.

Health conditions;

Out of the survey findings, it is discovered that a high ratio of people are without health insurance. The ratio reaches to 54.6%. This makes people spend more money on medical treatment. The highest number of those insured is 22% from among the public employees, whereas the ratio of those insured by the military medical services is only 18.8% and the private insurance is only 4.6%

As for the health centers, it was discovered that:

- There is neither a public nor a private hospital in the area, though Azraq is located within the eastern border area that leads to Iraq and the gulf.

- The Azraq comprehensive health center (Policlinic) is just a sign without a real presence of specialized doctors or clinics or maternity section or a renal unit. Even the lab does not perform all the medical tests.
- There are no specialists among the physicians. There are only 2 general practitioners in Azraq south with 3 private dentists.

Therefore, it was found out that the percentage of those unhappy with the health services of the policlinic reaches to 66.6% out of the sample.

Whenever there is a critical health problem, it is referred to Zarqa at a 90 km distance. The cost turns out to be high because the people themselves pay for the trip. Unfortunately, in some cases people lose their lives before reaching Zarqa hospital. It was noted that the ratio of the chronic diseases is high, such as blood pressure, 21.3%, diabetes 20.4% and renal failure 13.5%, this might be caused by water pollution and the sediments in water.

As for the pharmacy attached to the policlinic, it always lacks essential medicines. That is why people are obliged to buy their medicines from 4 other private pharmacies. The private pharmacies are located as follows: 3 in Azraq south and 1 in Azraq north. They also suffer from constant shortage of essential things, especially the children's milk. Health insurance: 45.4% insured and 44.5% not insured

Table 5 is based on a sample of 214 persons/ Health Insurance

Number in village	Gov. insurance and percentage	Military insurance and percent	Private insurance	Without insurance
90 in Azraq North	27 30%	32 35.6%	7 7.8%	24 26.5%
40 in Azraq South	12 30%	7 17.8%	2 5%	19 47.5%
50 in Center	14 28%	11 22%	3 6%	22 44%
34 in Almazari	0	0	0	34 100%
214 in Total	53 88%	50 75.4%	12 18.8%	99 54.5%
	22%	18.8%	4.6%	

Table 6: Illustration of health care in Azraq of a sample 180

Chronic diseases	Percent	Seasonal diseases	percent	Others	No. of cases
Blood pressure	21.3	Sensitivity	48.5	Skin diseases	6
Diabetes	20.4	Inflammations	9.3	Glands	2
Cardiology	10.5	Asthma	12.5	Lung	1
Arthritis	12.5			Stroke	1
handicapped	11				
Renal failure	13.5				
Cancer	1.5				
Sight weakness	3.5				

Environmental Conditions

Out of the Survey results and the data analysis, it was found out that there is one landfill for all the Azraq area located 4 km north of Azraq north. The landfill is 150 dunum in area (dunum is 1000 square meters). However the landfill is scattered without any general safety procedures. Moreover, it is nearby the resident area affecting the residents with bad smell. This is caused by its geology as it is located over rocky land. Unfortunately, the landfill location affects the drinking water wells under the control of the water directorate.

As for the disposal of waste water sucked from the sewer holes, this is done by tankers, which dispose of it in scattered areas less than 3km from residential areas. The ratio pumped from hollow holes is 72.2%, whereas from not hollow holes is 17.8%. Waste water goes to open land affecting the drinking water wells and the irrigation wells. 90% of Azraq inhabitants complain

As concerning whether there is a slaughterhouse or not, the answer is not. There is no licensed slaughterhouse, so slaughtering is carried out at the butchers', restaurants or at the main road leaving bad smell of the left parts as well as insects and rodents, especially in Azraq south, where most of the restaurants and rest houses are located for passengers to the Gulf area.

Desertification, dryness and excessive dust

The cause of the increase of desertification is the growing decrease in rainfall in Azraq Oasis area and the increase in dust. It was found out that 47.8% of dryness and 48.5% increase in dust have been caused by:

- The over pumping of water from Azraq basin by the water authority and the farmers have led to the disappearance of surface water.
- After stopping to excavate salt from the salt water basin, salty water penetrated to the fresh water basin. This caused the increase of salt in the underground water.
- Increase of building scattered dams on valleys that bring water to the bottom. Water in valleys used to feed the basin and diminish dust.
- Climate change and shortage in seasonal rainfalls
- Increase in sand dunes

Rodents

More than 63.6% of the population suffers from rodents because of:

- The big number of open sewer holes
- Warehouses for fertilizers, which are not firmly closed
- Mishandling of organic materials by farmers

- Improper compiling of waste in the landfill
- The passing of lorries carrying cereals and organic food
- Absence of control of insects

Insects and mosquitoes

It was found out that 87.5% of the inhabitants suffer from insects and mosquitoes due to:

- The big number of open sewer holes
- Mishandling of organic materials by farmers
- Scattered water ponds around broken water pumps of the old water net
- Slaughtering of animals at restaurants and butchers'
- Non-frequent campaigns of pest control by spraying.
- Scattered sewer stations

Saline Soil of 60.5%

- Non-excavation of salt from the salt water basin caused penetration of salty water into the fresh water. This has increased salt in the underground water and soil, especially in farms near the bottom.
- Over pumping of fresh water from the basin
- Climate change and decrease in seasonal rainfall

Pollution of drinking water of 25.8%

- 25.8% of the sample population complained of contamination in the drinking water due to the worn out of the water pipes. (old water net)
- The metal house water tanks are old and worn out
- Thick dust storms in the area

Bad smells of 26.3%

26.3% of the sample population complained of bad smells due to:

- Open sewer holes
- Slaughtering of animals in scattered areas leaving parts of the animals
- Waste landfill and waste water station
- Dust and sever wind

Transportation and passengers cause pollution of 45.5%

- Emissions of cars and lorries

- Not enough toilets for passengers, especially at time of Haj
- Throwing litter at the sides of the road

Animals' residue

- Animals residue are used as fertilizers in farming but it causes bad smell and attracts flies and insects
- Shortage in the general services rendered by the municipality 10%, especially in providing containers and carry the solid waste
- Shortage in controlling flies, rodents and mosquitoes 28%
- Fire due dry branches of trees and dry grass 4%
- Cats and Stranded Dogs: 8 families out of the sample said that cats and stranded dogs are causing harm.

Water conditions

The manager of Azraq water basin declared that there is mixing between the fresh water basin and the salt water basin forming a dome-shape in the bottom, which is the lowest point in Al Azraq. The balance between the two basins in Azraq works in such a way that the decrease in the fresh water, due to over-pumping, increases penetration of salt from the salty basin in all directions.

Drinking water to Azraq inhabitants come from artisan water wells under the control of the Water Authority. There are 12 water wells that pump to provide Amman, Zarqa and Azraq with water. The figure reaches 17690597 cubic meters annually. The average usage per family reaches 1566 liters per day at an average of 177 liters per person per day.

Water problems are many. The below is some:

- Absence of a sewer system, which reflects on the quantity per person and affects the quantity spared for irrigation. Over pumping from water wells causes saline soil and saline water in wells.
- Weak pumping into the old water pipes, which is under renovated, increases waste and leakage. Moreover, the inhabitants use pumps to push water to the roofs. In Azraq the waste in water because of the old pipes, reaches 70% leaving 30% to reach the houses.
- The problem of dust and very high degrees in summer oblige people to use more fresh water for bathing, house cleaning, air-conditioning, etc. This lessens their share for drinking water.
- Unlicensed usage of water is a problem, whereby unlicensed water wells are used for irrigation to lesson fresh water and thus increase saline water and saline soil.
- Non-activation of laws and regulations to monitor usage of underground water. Azraq suffers from having unlicensed water wells which raise the level of over pumping of the water basin.

The following tables 6 and 7 shows the analysis of water conditions: quantity of the wasted water, consumption, reaching houses, average of consumption per person, per family, per farm and the number of licensed and unlicensed water wells. Moreover, there are indicators of the quantity of pumping from wells, daily consumption of the person and the family per year.

Table 7: summary of water balance for 2008 in Azraq basin

Type of Wells	Number of wells	Active well	Not active	Pumping / cubic meter
Licensed irrigation	for 266	180	86	5416259
Unlicensed irrigation	for 628	286	342	15536350
Industrial and governmental institutions	and 12	11	1	708403
Drinking water	20	16	4	17690597
Remote are	11	11	0	
Total	937	504	433	39351609

Table 8: Analysis of the sample on water conditions

Area	Sample	Total Consumption / family /day	Number of Family Members	Average Consumption/ family/day	Average Consumption/ person/day
Azraq North	71	11202 Liter	627	1566 Liter	177 Liter
Azraq South	34	56276 Liter	286	1655 Liter	197 Liter
Azraq Centre	52	63368 Liter	475	1340 Liter	134 Liter
Total	157	230846 Liter	1388	4561 Liter	506 Liter
Al-Mazari	25	120500 c/m	482	12050 c/m	?

Agricultural Situation

The agricultural sector in Azraq is the pillar of the economic activity. It is the most important sector for the working force in the district. A high ratio of the inhabitants depends on this sector for employment, marketing of the agrarian products and the industrialization of the agrarian products. However, this sector is facing very complicated problems because of:

- Agriculture in Azraq depends on the underground water wells;
- Azraq receives very little rainfall with high temperature, which raises the water consumption and causes over pumping;
- There are no modern irrigation methods leaving farmers to primitive digging of scattered water wells;
- Farmers choose high-water demand types of plantations.

All this affects the economic situation of the Azraq inhabitants due to:

- Poor marketing
- Central markets are far off
- High prices for materials needed for production
- High wages

Therefore, the inhabitants asked for introducing the Jojoba tree due to:

- Low-cost at the plantation stage
- Low demand for water
- Economic feasibility.

The total area in Azraq is 3500 square meters, whereas the farming land reaches 68082 dunums. Moreover, the figures produced by the Ministry of Agriculture (MOA) speak of 90828 dunums. The fertile land is as high as 290000 dunums. The Azraq inhabitants do not own the farms, except for a few. This is because the land is under clan interface. Most of the farmers (91%) are from outside Azraq.

Azraq farmers totally depend on artisan water wells for irrigation. The number of these wells (licensed and unlicensed) is 894.

The Agriculture Directorate renders the following services to the farmers:

- issuing licenses/certificates for free of fees expatriate workers and cars;
- distribute seedlings of fruit trees;
- Issuing licenses for shops, olive pressers, guidance services, vaccination of livestock, veteran treatment, planting trees on the sides of the road and the protection of the foster trees.

The following table shows the farming areas, fertile land, type of plantation, number of expatriate workers and the livestock quantity.

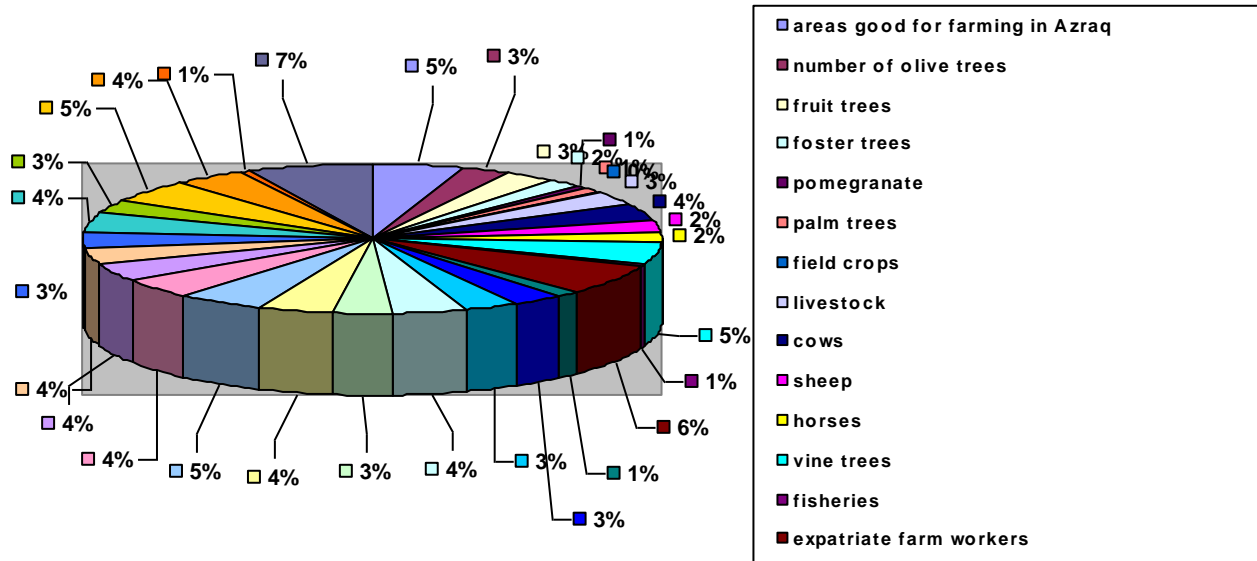
1. There are fertile lands of 65% of Azraq area as it has good soil with rich minerals.
2. Azraq people and the farmers have planted olive trees in 37% of the fertile land because the olive tree relatively needs little watering and yield seasonal fruits
3. Palm trees are commonly planted in 15% of the land. These trees are in the proper climate, as they survive with little water, the soil is good for such trees and they do not need many workers.
4. There are vine farms in 60% of the fertile land. But vine plantation need much water, many workers and pesticides.
5. There are other fruit trees in 38%, such as pomegranate, guava, etc.
6. There are many expatriate workers in Jordan, 85% of which are agrarian workers. The expatriate workers get cheaper wages and thus affect the income Jordanian workers who form 15% of the agrarian workers.

7. Livestock forms 37% of the total livestock. Since Azraq inhabitants live on domestic livestock, there are several kettle farms and a dairy factory run by an NGO.

It is worth mentioning that the ratio of farmers from Azraq inhabitants is only 9%. The outsider farmers are 91%. The number of farms i

Table 9: Analysis of a sample of 175 farms.

Areas good for farming in Azraq	65%
Number of olive trees	37%
Fruit trees	38%
Foster trees	25%
Pomegranate	8%
Palm trees	15%
Field crops	3%
Livestock (cows, sheep and horses)	37% (50%, 32%, 31%)
Vine trees	60%
Fisheries	10%
Expatriate farm workers	85%
Jordanian farm workers	15%
Number of families living in the farms	39%
Soil quality	40% good, 55% satisfactory
Water quality	45% good, 55% satisfactory
Unlicensed water wells	63%
Licensed water wells	55%
Water pumped for irrigation	52%
Water used for drinking	48%
Use of modern irrigation methods	45%
Use of surface canals irrigation	55%
Role of agrarian guidance	34% good, 66% need activation
Knowledge of Agrarian dates	55%
Farmers from among Azraq people (12 farms)	9%
Farmers from outside Azraq (608 farms)	91%



Graph 4: Shows Analysis of the Farms Area

This analysis and sample indicators show the obstacles hindering agriculture in Jordan. The obstacles are as follows:

1. High ration of saline in water and soil, which is reflected in poor quantity and quality of products. Saline is caused by over pumping from water wells and absence of modern methods of irrigation.
2. Azraq is far away from central markets, which tire the farmer to find local market places and make him pay more for workers and transportation.
3. High prices of water increases burden on farmers and lead them to dig illegal wells to avoid irrigation from licensed wells that have meters for payment.
4. Shortage in agrarian guidance, which negatively affects the production cost and lead to plantation of types that do not suit the area. This adds a burden of more cost, not using irrigation method, using excessive pesticides, and spraying insecticides, which increase the cost and affect the environmental conditions in the area.
5. Increase of production inputs like fuel because of the absence of electricity. This increases production cost is added to payment for workers and payment for plastic and fertilizers.
6. There are only few agrarian paved roads and services, which increase cost and yield bad quality.
7. Licensing the land, which is stopped because of “clan interfacing”, could help people to go back to farming.
8. The inactivation of laws in water for irrigation is leading to more digging of water wells, unlicensed wells and not collecting water prices from influential people. The scattered expansion in land cultivation has led to overuse of the water basin and decrease of level and quality of the underground water.

8. CONCLUSIONS

8.1 Problems, Challenges and Restraints and Their Reflection on Socio-Economic Aspects

From the analysis of the problems, challenges and restraints it is obvious that the main problem is represented in regression of economical situation and the changes in demography and the social status of Azraq area.

Due to the dryness specially in the natural oasis and the increase of desertification rates and degradation of salt production, and the regression of rangelands and productivity of farming, most of the interviewees believe that the over exploitation of water in the Azraq basin, weaknesses in planning and implementation of strategies and policies and law enforcement on powerful groups is bigger than the root causes of the problem. 35 % of the participants think that the responsible people for this problem are out of the local community.

The absence of clear vision to manage the components and values of the Azraq water basin by the ministries and different organizations, the weaknesses of inapplicable strategies and lack of monitoring of law enforcement made the water of Azraq as a primary axel of conflict between all stakeholders without pushing enough for the other values of components, whether economical, social or environmental. As well as the demand of water from the Azraq basin for farming and potable water purpose cause the degradation of natural rangeland which increased the burden on the government to subsidize forage for livestock. The decrease in the level of the underground water increased the capital cost of farming and contributed to the increase to the level of salinity of soil and irrigated water, which in turn reflected negatively on farming production feasibility and hundreds of farmers were subjected to the dangers of drought.

It has become clear that the degradation of natural resources which were the primary income source to the local people was a reason for the degradation of living standards and increase of poverty averages which caused the increase in the number of beneficiaries from the National Welfare Fund which sums up to what is paid to the eligible local people around 18.000 JDs monthly. The percentage of demand of public employment increased and this demand forms an economical burden on public budget. The drought that happened in the oasis caused the decline in the number of visitors to the Azraq area which caused a decline in economical benefits for the local community from ecotourism. The question is raised here is the price that cost the government budget to compensate and alleviate the regression of socio-economic values for the Azraq basin due to over exploiting is bigger or less than the real economical value of the quantity of water that is pumped for potable and farming purposes?

8.2 **Level of Awareness and Level of Participation of Local Communities in Development Initiatives**

83 % of interviewees were fully aware of the Azraq basin problems and the causes of these problems which indicate that the level of awareness within the local communities is considerable. 35 % of them believe that the causes of the problems are out of the local communities, while 41 % of them believe that the local community has interests in participating in initiatives that seek solutions for the basin if these initiatives are practical and serious. It is obvious from the above that the intense forums and studies

conducted in cooperation with the local communities were comprehensive enough to raise awareness among them and they are now in need to see practical initiatives that produce change on the ground with the consideration of minimizing high expectations within the local communities to ensure that they don't lose interest in any other initiatives and increase their frustration. The participatory base should be expanded and higher participation should be guaranteed to represent all layers of the local community where 5 % of them believe that the representation in any initiative is not sufficient and participation is limited to certain groups such as elders and village deputies.

8.3 Analysis from the Decision Makers perspective:

It is obvious from the meetings with the decision makers that all of them realize the existence of strategic problems, challenges facing the socio-economical development and their roles varied between the coordination and the development of strategies and their implementation. The RSCN is considered as one of the local organization that implements integrated socio-economical development initiatives, while conserving fragile natural resources of Azraq water basin. All decision makers consider that Azraq has an environmental, economical and social importance and it is exposed to environmental and social changes represented in over exploitation of its natural resources and also the increase in the rate of migration. It was also noticed that and agreed upon by interviewed by decision makers that the unique diversity of its environmental and social structure and natural, cultural and social richness of the area makes it a tourism station. The tourism sector should be developed to become an alternative source of income for the local community. However, there is an insufficient role for the Ministry of Tourism to develop this sector in Azraq and the ministry does not give enough interest in developing this sector. Most of the decision makers believe that the solutions for the Azraq problems come from the clear and practical vision where all the stakeholders participating in setting it up. The question is which institution or ministry should take the initiative, coordinate and facilitate the development of such vision?

8.4 Water Demand and Water Management

There are real problems related to water management issues in the selected sites and deserve to work with local communities and farmers mainly to familiarize them with water managing techniques and methods in a developed and applicable manner.

It is very obvious that these communities lack the main meaning and the ideas behind aiming for protecting and managing the water sources as being poor communities with simple exposure to the outside world. They are frustrated and complain that no one is interested or concerned about them or about their problems

People are anxious for those who extend a helping hand to them and they are ready to interact and change their attitudes to improve their performance towards better behavior and protect the water source, to return life to it and to them.

People showed their real interest and will to follow up any intervention activities offered by the project in a form of restoration of their oasis.

8.5 Awareness Raising & Capacity Building

It was clear that Azraq community is poor-medium where their first and last concern is achieving better income. They feel themselves marginalized and with no contact with extension services. The extension officers do not reach farmers and farmers do not trust disk officials. Farmers and local community members believe in live actions that are practiced directly with them. They believe in real demonstrations illustrating technical new ideas.

People/farmers are interested to interact with any model demonstrations that would be executed with them and they are ready to learn and improve. They stated that: they will do all they can to guarantee its success and sustainability.

It was recognized that targeted communities practice ordinary traditional agriculture methods and depend on the information from their experiences. They believe the crops they cultivate are suitable to Azraq area and do not need new technologies and modern methods and the basin is a recharged so will not lose water storage in it. But with little open discussion they realize their need to learn more and exchange experience and still there are various other techniques and technologies that they can learn and adopt in addition to the changing a their crop pattern to low water need to adapt the shortage and climate change results in Azraq.

Throughout field visits, it was perceived that farmers stand in need of proper farm management methods which are represented in the preservation of farm records and therefore, the research team recommends establishing training programs for farmers related to proper management methods since this aspect is very important in good planning and hence upgrading farmers' revenues and decreasing risks in agricultural ventures

The idea of applying technical demonstrations within their households or farms is very acceptable to them and they are ready to adopt technical ideas with alternatives put forward after application and prove their effectiveness and economical situation. They are also interested in participating in all of the outreach activities associated to this issue.

6 8 Institutional Setup

Populations in these areas suffer from the lack of communication - Contact with officials and other stakeholders and even among themselves-. They wish to have a body that can represent them and facilitate their technical performance on solid foundations and sustainable manners.

People said that they wish to have a local association or group structure for the implementation of the proposed activities under the head of the Azraq district. Perhaps at this stage they lack the experience and support but they need to institutionalize their local committee. They have the determination and dedications. They hope the formation or adoption of this institutional body to defend their rights and represent so as to coordinate developmental efforts in Azraq area between all local institutions and civil societies and networking between projects and find an umbrella of common will between these organizations

Agencies have their own technical views that are in certain cases entirely absent from local communities' participation and representation this is due to the nonexistence of a strong institutional link between the community and relevant institutions, and this is a fundamental and important.

8.7 Gender Issues

The social organization of Azraq area has tribal features and varies between the nomadic and rural life style, however most of the families show big commitment and loyalty to their tribes so as to provide social safety and support whenever needed. This is very obvious in different social events such as weddings and mourning.

Concerning women benefits and participation, they are active in local activities especially through the municipality board and after formulating the Azraq local resources management committee under the head of the district and participating in all project activities; they can address their rights & interest of others in their community cause the farmers always consider themselves as the main group who complaint from the high cost of irrigation water and its shortage which will effect on their economic situation. This because of raising the public awareness on environmental issues, water resources management and other related subjects helps to give the opportunity to the local community to be part of the problem and think of solutions. At the same time the local community mainly women is willing to introduce new ideas that would enhance their living standards and will add value to their well being.

Discussions and brainstorming with locals indicate that woman participation in the field of awareness raising and encouraging the change of attitudes and practices is very important. Local community from both sexes appreciate woman's role in communication and outreach activities.

9. Recommendations

9.1 General Recommendations

Because of the low level of awareness/outreach of all target groups, it is very important to give special consideration for the extension and awareness raising activities for local communities in all sites.

Awareness and capacity building programs should be formulated and executed, that is targeting all community categories including CBOs and administrative groups.

Strengthen the relation-communication between local communities and local government is recommended. This is possible through establishing-encouraging local communities' representations in front of the government bodies and other stakeholders.

The over all pilot project(s) aim should not affect the irrigation water government policy, which indicates that there should be no encouragement on increasing the size of the agricultural area in Jordan or more pumping water and digging new agricultural wells.

Develop agricultural extension guide that explains best practices in the field of farming in dry areas, the types of suitable crops and modern irrigation methods

Develop and implement long term program to build up institutional capacities of Azraq civil societies with the goal of activating their development roles and help them in converting these institutions and societies of patriarchal features into institutional features built on mission statements and goals

9.2 Specific Recommendations for Pilot Projects

- Water for school project which implement by RSCN and IUCN should target social educational programs in Azraq area to create initiatives that solve environmental problems and deal with poverty issues and unemployment but at the same time conserves the cultural legacy of the local people
- Land allocation by the government to local community members and tenure it to achieve social equity
- Decrease the amount of water pumping from Azraq Water Basin as potable water and agricultural purposes to the annual permissible amount for the basin
- Reinforcing these laws and regulations and especially those pertaining to digging artesian wells effectively and achieving social equity in reinforcing these laws among all beneficiary parties including powerful individuals in the society
- Providing technical support to Azraq community on the feasibility of reviving salt production to rehabilitate cultural context for the Azraq citizens and enhance their livelihood situation
- There is a great need to raise farmers' awareness levels about the problems pertaining to the depletion of underground water basins in Jordan and the main reasons that led to it such as the randomness of water over-exploitation by most related stakeholders in the basin area in addition to climate change and the successiveness of drought periods in the area
- Benefiting from experiences and knowledge available at the Ministry of Agriculture and the Ministry of Water and Irrigation in water management especially in the Jordan Valley region through communication with water consumer management societies spread throughout the Jordan valley which have proven beneficial
- Establishing a detailed study pertaining to economical feasibility of agricultural crops in the area and suggesting new agricultural patterns that will increase farmers' revenue and decrease risks
- Design educational and awareness programs for local communities to raise their awareness in relation to environmental risks surrounding them and the methods of mitigation of their impacts
- Raise environmental awareness for local community staff working in governmental and civil society organizations in the fields of natural resources conservation that works on everlasting of natural resources of Azraq