

PN-ACE-755
101061

Water Awareness Study

Water Quality Improvement and Conservation Project



Water Awareness Study
Final Report - Phase II

Funded by United States Agency
for
International Development

Conducted by
Environmental Resources Management
Consultants (ERMC)
January 18, 1998

Table of Contents

Executive Summary		4
List of Acronyms		10
Section 1 0	Introduction	11
1 1	Background	11
1 2	Behavioral Impact Study-Phase I Summary and Summary of the Public Awareness Activities	12
1 3	Behavioral Impact Study-Phase II	12
1 4	Organization of the Report	14
Section 2 0	Methodology	15
2 1	Overview	15
2 2	Sampling	15
2 3	Design of Research Tools	16
2 4	Focus Groups Methodology	16
2 4 1	Logistics and Coordination	16
2 4 2	Focus Group Implementation	16
2 5	Survey Implementation Methodology	17
2 5 1	Pre-test	17
2 5 2	Survey Implementation	17
2 6	Data Analysis	18
Section 3 0	Results	19
3 1	Descriptive Results For Overall Sample	20
3 1 1	Summary of Descriptive Results	23
3 2	Focus Groups Results	23
3 2 1	Ajloun Focus Group Results	23
3 2 1 1	Knowledge	23
3 2 1 2	Attitudes	25
3 2 1 3	Practices	26
3 2 2	Amman Focus Group Results	27
3 2 2 1	Knowledge	27
3 2 2 2	Attitudes	28
3 2 2 3	Practices	29
3 2 3	Aqaba Focus Group Results	30
3 2 3 1	Knowledge	30
3 2 3 2	Attitudes	31
3 2 3 3	Practices	32
3 2 4	Irbid Focus Group Results	33
3 2 4 1	Knowledge	33
3 2 4 2	Attitudes	34
3 2 4 3	Practices	35
3 2 5	Madaba Focus Group Results	36
3 2 5 1	Knowledge	36
3 2 5 2	Attitudes	37
3 2 5 3	Practices	38
3 2 6	Mafraq Focus Group Results	39
3 2 6 1	Knowledge	39

	3 2 6 2 Attitudes	40
	3 2 6 3 Practices	41
	3 2 7 Overall Summary/Knowledge, Attitude, and Practices	42
	3 2 7 1 Overall Interpretations	42
	3 2 7 2 Overall Implications	43
3 3	Survey Results	44
	3 3 1 Survey Knowledge Section	44
	3 3 2 Survey Attitudes Section	49
	3 3 3 Survey Practices Section	53
	3 3 4 Overall Survey Results	57
3 4	Large Consumers Survey Results	58
	3 4 1 Overview of APW Activities	58
	3 4 2 Survey Results	59
	3 4 3 Interpretations	60
	3 4 4 Implications	60
	3 4 5 Summary	60
Section 4 0	Overall Summary and Implications for Focus Groups and Survey	
	4 1 Overall Summary	61
	4 2 Overall Implications	66
	4 3 Recommendations	67
Appendices		70
	A Descriptives	
	B Survey Results of the Knowledge Section	
	C Survey Results of the Attitudes Section	
	D Focus Group Summary	
	E Results of Practices Section	
	F Large Consumers Survey Results	
	G Survey (Marked with correct answers)	
	H Interview Schedule for Large Consumers of Water (in Arabic)	
	I Focus Group Interview Schedule	
	J Typical Focus Group Agenda	

EXECUTIVE SUMMARY

1 0 BACKGROUND

The Water Quality and Improvement Conservation (WQICP) public awareness component is designed to implement sustainable "information, education and communications (IEC) campaigns and activities throughout Jordan with the specific targets of decision makers businesses public and private organizations, community leaders women, university students, and children Public awareness activities as part of this Awareness Project in Water (APW) are being implemented by the Jordan Environment Society (JES) and the Ministry of Water and Irrigation (MWI) to help inform people that Jordan's water resources are scarce and to persuade them to adopt practices which will use the water efficiently

Public awareness in the WQIC Project is a unique and comprehensive concept which includes both a process and a product The process is the development of staff and local community leadership in the target groups by training and involvement in development and implementation of educational community activities The product is the efficient use, reuse, and conservation of water by participants

The public awareness campaign strategy has been to use mass communications to create interest and promote information on the need to use water more efficiently Slogans like 'Every Water Drop Counts' have been especially effective with school children Mass communication techniques are effective in creating interest but seldom do they persuade people to change their habits Personal contact has been found to be more effective in helping people adopt new ideas

Personal contact in workshops has been used to train leaders to implement water conservation campaigns by working with others in their communities University students used the slogan 'Each One Teach One' This slogan best describes the effects seen in the local communities where one person trained creates a 'ripple' effect by impacting others with information and peer pressure to save the scarce water of Jordan and adopt more efficient ways of using water

Community activities implemented by staff and trained local leaders (over 1,000) target young and old, rich and poor, decision makers industry leaders, housewives and students The messages and information convey that Jordan has limited water resources and everyone must use water efficiently and protect it Posters, stamps, films, brochures and stickers contain messages that encourage people to save water for future generations, use water saving devices, protect water from pollution, collect rainwater, and other themes which encourage water conservation

Over 45,000 people throughout the Kingdom in women's organizations industries, schools mosques and local communities have attended workshops lectures seminars and special events to learn about water conservation and discuss local needs Three demonstration sites have recently been established and 9 more will be completed to

show the application of water saving devices, recycling, reuse, water harvesting, and other water conservation efforts

In order to design the most effective campaigns aimed at domestic water users and measure impact of the campaigns, a Behavioral study was designed to be completed in two phases. The pre-campaign study - Phase I was completed in 1995 and this mid-campaign - Phase II of the study

2 0 PRE-CAMPAIGN STUDY - PHASE I

This phase collected data using questionnaires and focus group discussions to document water use knowledge, attitude, behavior and practices of the general public as a base to develop and monitor the public awareness activities. Information was also obtained to distinguish the type of mass media and programs which people find useful. The Phase I study used a survey and focus group discussions to collect data in local targeted communities.

3 0 BEHAVIORAL STUDY-PHASE II

The objectives of this Phase II of the Study are to *review the activities which were conducted since the beginning of the Project, document the beginning effects and impact of the public awareness activities, and, develop recommendations for further enhancement of activities*

3 1 Methodology

To achieve these objectives the study used two approaches: the qualitative approach represented by focus groups discussions, analyzing and interpreting their results and concluding general trends regarding knowledge, attitudes and practices of participants, and the quantitative one using surveys that also measure knowledge, attitude and practices of participants with the aim of supporting the findings of the qualitative approach.

3 2 Implementation

The areas covered included Ajloun, Amman, Aqaba, Irbid, Madaba and Mafraq. The communities were selected according to different priorities outlined in the campaign. In all areas, a total of 24 focus groups were held for 247 participants to discuss the relevant issues and 235 interviews were conducted by survey. Participants of the focus groups had also filled out the survey. In addition, 12 large consumers were interviewed of which 11 had already used water saving devices at their institutions.

3 3 Report Objectives

The main purpose of this report is to present the focus group and survey information and data, the analysis of each, interpretations, recommendations and implications. To determine the effectiveness of the campaigns which were begun in June 1994, the analysis concentrates on analyzing the differences between individuals previously exposed and non-exposed to the public awareness activities. The design of the study allowed both qualitative and quantitative data to be collected through focus group

discussions and survey data in the six areas to assess the beginning impact that the APW has had in the areas in which activities have been implemented since July 1994

3 4 Assumptions

One of the basic assumptions is that the implementation of water awareness campaigns will help create interest and inform people about using water efficiently. As people gain new and more knowledge, they will be able to develop more positive attitudes and finally they will adopt new practices that make sense to them. Basically it is easier to promote ideas and knowledge but it is harder and takes more time to change attitudes and habits which people have acquired over their lifetime.

The study, both in the focus groups and supporting evidence in the survey, shows that people who were exposed to information have acquired knowledge and in most places have better knowledge about the subjects which were stressed by the Project. As expected, it is important to note that not as much change in attitudes was expected and in fact this is validated through the study. The exposed groups show improvement towards more positive attitudes but not in all cases. Lastly, it is expected that people will begin to change some practices, but that it will require more time, repeated messages, personal contact and peer pressure to see major changes. The study indicates that some practices have been affected but acquired habits are not changed easily.

3 5 Summary of Results

Exposed and non-exposed groups in all six locations showed a rather good level of knowledge on basic water issues. However, the exposed groups in all locations were more knowledgeable and could identify specific information and exact figures on the various water issues. The exposed groups in the locations where water saving devices campaigns were conducted showed an impressive level of knowledge regarding the devices, how they work and the water savings that can be achieved by using them. The exposed groups in locations where these campaigns were not conducted showed some knowledge on water saving devices but could not identify specific features. The non-exposed groups on the other hand in all locations were almost ignorant about them.

Both exposed and non-exposed groups in all locations showed rather positive attitudes toward water problems and their roles in conserving water. The exposed groups in most locations however, attached more significance to personal attitude and responsibility regarding conservation.

In all six locations exposed members reported a noticeable change in their behavior as a result of their exposure to the water campaign.

4 0 PHASE II INTERPRETATIONS

Although both exposed and non-exposed groups showed a similar level of knowledge on general water issues, the exposed displayed more knowledge on specific issues. The exposed group could give more details and approximate figures which shows that they have retained part of the content of the material that was presented to them through APW activities and publications. This also shows that the interpersonal

communications methods used by the APW in cooperation with the JES branches in the various locations were effective and needed

All exposed groups in locations where water saving devices campaigns were conducted had good knowledge on water saving devices whereas almost all of the non-exposed did not hear about them. This shows that the water saving devices campaign conducted by the APW was highly effective since APW is the first and the only project in the country that has conducted information activities in this field. The fact that the majority of the exposed participants who had been exposed to the water saving devices campaign could identify how the devices work and how much they can save shows that members retained a large portion of what was presented in the activities. This can be explained by the fact that APW has developed a complete package on WSDs which includes a working model, display boards, film and brochures which were used in the activities. People were able to see for themselves the devices and the way they work, the quantity of water which is saved. This is in line with the Adult Learning Theory in that adults are more apt to learn and to retain what they learn when

- They can use what they learn
- It relates directly to their immediate and actual needs, and,
- The learning is presented to them in as many forms of delivery as possible audio visual tactile etc

Although both groups in almost all locations had positive attitudes towards water problems and water conservation a greater tendency was observed on the part of exposed groups to attach more significance to personal commitment and positive attitudes in the field of water conservation. This signifies that exposure to water awareness activities was in fact effective in changing people's attitudes which coincides with the increase in knowledge level. Both groups in almost all locations emphasized the importance of using the media and several interpersonal communication based activities

Exposed groups reported a positive change in their practices as a result of the campaigns conducted in their communities which shows that the campaign has been successful in bringing about a change in practices which was preceded by a change in awareness level and attitudes

5.0 IMPLICATIONS AND RECOMMENDATIONS

The following implications and recommendations emanated from the study

- *Continue Regular Activities* - In order to maintain the momentum of APW's activities in bringing about a higher level of knowledge and an improved trend in attitudes in the different locations and among the various target groups, APW should continue its regular activities based on inter-personal communications through its branches where they exist or other community groups in the different parts of the country

- *Adult Learning Theory* - APW should employ the techniques and principles of Adult Learning Theory in designing its campaigns and activities since using some of these principles and techniques by the APW has already proven to be very effective
- *Mass Media* - APW needs to use the media more than in the past phase as most participants of both groups believed that it is very effective in increasing knowledge and changing attitudes
- *Water Quality* - Continued emphasis needs to be given to water quality in APW activities making sure that specialized staff from official agencies dealing with this issue are present to give their professional opinions on this issue
- *Religion* - Since almost all members of both exposed and non-exposed categories believed that religious beliefs had a strong effect on people's water consumption behavior, APW should focus on this and use this factor to enhance the effectiveness of its activities. This implies working with people in the Ministry of Awqaf and the Christian clergy in this field. The Project needs to continue the efforts with both the religious organizations and will be able to use the demonstration sites at the King Abdullah mosque and Madaba church to illustrate effective methods in water conservation
- *Focus on Women* - Women should be a major target in the campaigns because the efforts show an improvement over the non-exposed participants but that they are still not as knowledgeable as the men. The women have also the ability to influence other family members as shown in the focus group discussions where most members suggested focusing APW's activities towards younger generations and women
- *Focus on Younger Generation* - The campaigns should target the younger generation because they can be easily influenced, are readily reached through schools and teachers. However, rather than just reaching individuals, campaigns need to train and target the teachers also. Resource material needs to be developed which can be used by schools, and target mass media efforts to this age with films and educational material
- *Specific Location Needs* - APW should be looking at each location's specific needs and concerns in order to be able to design the appropriate type of activity and develop the content of materials presented in that activity to make sure that it will affect people's attitudes and practices
- *Target Areas where Need is Greatest* - As the result of this study and information gained in the monitoring of the Project, APW needs to develop or target communities where the need is greatest for example Women, children, and large consumers of water. Special effort needs to be made in those communities where the awareness is low and the need is the greatest

- *Implementation Activities* - In the next phase of the Project, more activities need to move to an implementation phase where more activities are based on actual practices. Since people responded positively to the water saving devices information, the APW should incorporate demonstration models, sites, field tours when possible. The activities should be based on real needs and be community focused. Since leaders in the branches and other organizations have been trained on how to implement community campaigns and they have received training in assessing community needs, they should be used more in the communities to determine the interests and needs of the people.
- *Plan for the Future* - As shown in the study, if areas are targeted heavily, changes are evident. Through the study and further investigation in the communities, a plan needs to show which communities need the information and the subjects which are most important.
- *Training of Volunteers* - The leaders in the JES branches and other community organizations in these target communities need to be trained and used to implement the activities. Since it is not possible to hire staff to implement all of these needed activities, volunteer efforts must be maximized.
- *Develop Learning Experience* - The success of the WSDs campaign using the lecture method accompanied by the model and film shows that when information is structured so people can hear about the subject, see actual models and demonstrations, receive specific information with corresponding films and mass communications, they are more apt to learn and retain the information which is given. APW needs to develop more of the learning experience for participants using this method. Demonstration models and sites need to be used in the campaigns as field tours for school children, religious organizations and other community special events.
- *Large Consumers* - APW needs to continue working with large consumers of water because the effect of one hotel or large business saving water will have a correspondingly great effect on water savings.
- *Community-Based Campaigns* - One of the advantages to using community based campaigns is that the information is more targeted to individual needs and positive peer pressure can be used to persuade people to change practices and thereby multiply the effects. As people become more involved, they usually feel more responsible. In many of the campaigns as people worked in identifying the problems, they decided that many of the problems are caused by behavior of the individuals. In this case, again developing workshops, forums, and personal contacts will help persuade citizens to take responsibility for their actions and help them to identify how to convince government entities to also be responsible in their roles.

LIST OF ACRONYMS

APW	Awareness Project in Water
DAI	Development Alternatives Inc
ERMC	Environmental Resources Management Consultants
JES	Jordan Environment Society
m ³ /day	Cubic meters per day
MCM	millions of cubic meters
MWI	Ministry of Water and Irrigation
RSCN	Royal Society for the Conservation of Nature
USAID	The United States Agency for International Development
WAJ	The Water Authority of Jordan
WQICP	Water Quality Improvement and Conservation Project
WSD	Water Saving Device
FOE	Friends of Environment

SECTION 1.0

INTRODUCTION

1.1 BACKGROUND

The issue of water conservation may be defined in several ways, depending upon which schools of thought one agrees with. For environmentalists, water conservation means undertaking measures which would decrease water demand and use per capita, use less water per irrigated area, use less water per unit of industrial products or services needing water, i.e., decreasing demand for water. For water engineers, water conservation means the decrease of water losses in unproductive directions, i.e., increasing supply from lost resources. In the Awareness Project in Water activities water conservation was defined as using the amount of water available in the most efficient way since many households are already using less water than most surrounding countries.

The use of water per capita in domestic water supply varies widely from city to city across different countries. The figures also suggest a level of standard of living of the population and a hygienic water use level. Therefore to conserve water by sacrificing living standards or health standards is misleading. It is generally accepted now that a combination of water savings from unnecessary uses (especially for large consumers) and decreasing water losses in physical systems must be adopted hand-in-hand for effective conservation programs that ensure adequate levels of hygiene and standard of living.

The water crisis (or the imbalance between limited supply and growing demand) in Jordan has been given a great deal of attention by the private and public sectors, as indicated by the widespread calls for water conservation and wastewater reuse, as well as for an increase in public awareness concerning the matter. Based on the view that water conservation may positively help consumers use water more efficiently and ultimately affect the supply-demand imbalance, the Awareness Project in Water was initiated in 1994 as part of the Water Quality Improvement and Conservation Project (WQICP).

WQICP is a project funded by the United States Agency for International Development (USAID) to improve the quality and increase the quantity of water available for use in Jordan. The project is being conducted by the Ministry of Water and Irrigation with the technical assistance of Development Alternatives Inc. (DAI). USAID provided a grant to the Jordan Environment Society (JES) to implement the public awareness component of WQICP in cooperation with MWI.

APW is designed to implement information, education, and communications activities throughout Jordan with specific target audiences as decision makers, business, public and private organizations, community leaders, women, university students, and children. In order to achieve these objectives, JES initiated public awareness

campaigns in the fields of water through its different branches in the Kingdom and in cooperation with MWI

A number of studies were completed to enhance and further focus the awareness campaigns conducted by APW. The studies included (i) the Water Use Behavior Study Phase I, which determined participants' knowledge, attitudes, and practices of water use behavior by using questionnaires and focus group discussions, and (ii) Water Saving Devices and Methods Study and Implementation which identified water saving devices and methods for both domestic and industrial use.

The public awareness campaign strategy has been to use mass communications to create interest and promote information on the need to use water more efficiently. Slogans like 'Every Water Drop Counts' has been especially effective with school children. Mass communications are effective to create interest but seldom do they persuade a person to change their habits. Personal contact has been found to be more effective in helping people adopt new ideas.

Personal contact in workshops has been used to train leaders in to implement water conservation campaigns by working with others in their communities. University students used the slogan 'Each One Teach One'. This slogan best describes the effects seen in the local communities where one person trained creates a 'ripple' effect by impacting others with information and peer pressure to save the scarce water of Jordan and adopt more efficient ways of using water.

1.2 BEHAVIORAL IMPACT STUDY - PHASE I SUMMARY AND SUMMARY OF PUBLIC AWARENESS ACTIVITIES

Phase I of the campaign studied the water awareness of the general populace. That Phase focused on three areas in particular: (i) general water knowledge, (ii) attitudes towards water, and (iii) water practices. The survey included all socio-economic classes and education levels in six areas of Jordan (Amman, Aqaba, Irbid, Mafraq, Deir Alla, and Safawi). The results showed that most people have a limited knowledge of the water situation in Jordan, and that they have not begun to systematically conserve water.

Based on (i) the study results, (ii) the gaps discovered in knowledge, and (iii) the perceived potential of changing behavior and attitudes based on increased knowledge, the awareness in water campaign was further refined and enhanced.

1.3 BEHAVIORAL IMPACT STUDY-PHASE II

This present Phase II of the Water Use Behavior Study consists of a mid-campaign assessment of the impact of the activities which have occurred since the pre-campaign study.

Tables 1, 2, and 3 present a summary of the number of participants in Focus Group discussions, Field Surveys, and Large Water Consumers Surveys, respectively.

Table 1 Percentages of Individuals in Focus Groups by Location and by Exposure to Campaigns

LOCATION	EXPOSED		NON-EXPOSED	
	Group 2	Group 3	Group 1	Group 4
Ajloun	16 %	19 %	14 %	20 %
Amman	12 %	8 %	14 %	10 %
Aqaba	18 %	13 %	16 %	19 %
Irbid	24 %	19 %	20 %	16 %
Madaba	16 %	19 %	21 %	20 %
Mafraq	14 %	22 %	15 %	15 %
TOTAL (Number)	50	48	76	69

Table 2 Percentages of Individuals Surveyed by Location and by Exposure to Campaigns

LOCATION	EXPOSED	NON-EXPOSED
Ajloun	19 %	14 %
Amman	14 %	15 %
Aqaba	10 %	18 %
Irbid	19 %	19 %
Madaba	22 %	17 %
Mafraq	16 %	17 %
TOTAL (Number)	210	271

Table 3 Large Water Consumers Survey

Type of Large Water Consumer	Using Water Saving Devices	Not Using Water Saving Devices
Hotels	Forte Grand - Amman Regency - Amman Amra - Amman Marriott - Amman	Geneva - Amman Intercontinental - Amman Taybet Zaman - Petra
Hospitals	-----	Arab Center for Heart and Special Surgery - Amman
Pharmaceutical Industries	-----	Dar Al Dawa - Naour Arab Center Pharmaceutical Company - Amman
Other Industries	-----	Elba House - Amman Spartan Industries - Amman
TOTAL	4	8

1 4 ORGANIZATION OF THE REPORT

This report is organized as follows. Following this introduction, Section 2 presents

- The approach for results presentation,
- Overall evaluation methodology
- The procedure followed to conduct each particular element in Phase II, and,
- Brief description of the statistical analysis tools used in analyzing the raw data

Section 3 presents

- The results obtained from analyzing the data collected from both focus groups and field questionnaires for exposed and non-exposed participants
- Presents the general findings and relations of different categories measured during the focus groups and questionnaires implementation

Section 4 presents an overall summary of results and interpretations and concludes the report with implications and recommendations for further work. The appendix contains detailed tables of survey data along with samples of the surveys and the focus group discussions schedules used in Phase II.

SECTION 2 0

METHODOLOGY

2 1 OVERVIEW

The work of public awareness campaigns covered the entire Kingdom through sponsored lectures, workshops, seminars, special activities (e.g., camps, award ceremonies, exhibits, and field visits). Over 45,000 people across the Kingdom attended workshops, lectures, seminars and special events to learn about water conservation and discuss local needs and problems. This report provides an overview of the types of events and the number of people involved throughout this ambitious campaign. A total of over 300 separate events were held for the general public. In the second half of 1994 and in 1995, almost 4,000 individuals were addressed and participated in APW activities. That number increased to over 17,000 in 1996 and approximately 7,000 during the first 6 months of 1997. Female to Male ratio has also been increasing from under 40/60 in 1995 to around 50/50 in 1997.

This part of the APW project (Phase II) has as its objective the assessment of the previous activities of water awareness that took place since the second half of 1994. In order to present a comprehensive and detailed outcome, this Phase II Study began with a preparation phase. During the preparation phase, all previous project documents and campaigns were reviewed. It was believed that the combined effort of the review would guarantee maximum reliability and validity. Also during this phase, the orientation of focus group moderators, the logistics coordinator, and research assistants took place.

Following the initial preparation phase, the questionnaire and interview schedules were designed and the six areas determined based on the activities which had been implemented in the campaign, areas which had been targeted in the first survey, and areas which the campaign activities are most likely to continue.

2 2 SAMPLING

After determining the six areas, the sampling frame utilized for each area was set as follows:

Sampling Frame for Focus Group Discussions - The following two sub-populations in each determined location were included:

- Community members who participated in public awareness activities through the Awareness Project in Water being implemented by JES and MWI
- Community members who did not previously participate in organized public awareness activities

Sampling Frame For the Survey - The following sub-populations, in each determined location were included:

- All focus group participants whether they did, or did not participate in the

previously organized public awareness activities

- Local community members who do not attend the focus groups, but who did participate in the previously organized public awareness activities
- Local community members who neither participated in the focus groups, nor the previously organized public awareness activities

The overall sampling frame as it is presented above utilized various documented and scientific sampling methods a deliberate sampling frame for the focus groups and a stratified non-random sampling frame for the survey

2.3 DESIGN OF RESEARCH TOOLS

Six target locations were set out in the project terms of reference. These included Ajloun, Amman, Aqaba, Irbid, Madaba, and Mafraq. The six target groups included farmers, housewives, public sector officials, teachers, university students, and business people. The following procedure was adopted in the conduct of interviews through questionnaires.

An interview schedule was designed by the ERMC team based upon individual consultants' knowledge of water issues, social research background, and the content of Phase I questionnaire. The questionnaire was prepared in a simple, clear, concise, and easily reproducible manner.

The focus group agenda was designed to build upon the questionnaire and go further by refining the discussion of water in a small setting. The focus group agenda and schedules are included in Appendix J.

2.4 FOCUS GROUPS METHODOLOGY

2.4.1 Logistics and Coordination

The procedure adopted for focus groups involved logistics and coordination by all ERMC team members. In order to conduct the focus groups discussion in a timely manner, team members were divided into two groups preparing for logistics and coordination in two different areas simultaneously.

Information on previously exposed and non-exposed individuals was collected from JES branches, the Ministry of Education, and data available at MWI. A total of 24 small focus group discussions were conducted by organizing groups of 10 people on average from the six target groups in the six locations.

2.4.2 Focus Group Implementation

The focus group agenda built upon the questionnaire and refined the discussion of water in a small setting. The focus group agenda and schedules are included in Appendix J. The Focus Group Discussion was typically initiated with a welcome and general opening remarks by Dr. Maher Abu-Taleb. This was followed by a review of the JES/MWI Awareness in Water Campaign, presented by Mr. Abdul Salam Kamal, ERMC lead moderator. Dr. Bashar Kloub then presented the organization of the session to everyone and discussed some pertinent issues in water knowledge, attitudes, and behavior. It was decided not to present a general

discussion on water, since this could greatly bias the entire focus group work. The groups were then split into four, with an average of 10 in each group, an ERMC moderator, and a JES recorder. The groups were divided into those that had been exposed to the campaign and to those that had not been exposed. Earlier in the meeting, distributing and filling out the questionnaire by all groups were conducted.

At each of the four focus groups in each location, the group agenda was presented and comments invited for enlargement of the agenda within the time frame allowed (which is 2 hours). The ERMC moderator then used a flip chart and recorded all the discussion points and the JES recorder assisted in documenting the entire session. Community concerns and problems along with community responses were also discussed, since it was felt that such information would be valuable in evaluating initial objectives achievement for each of the selected areas.

Then groups were brought together and each of ERMC moderators then presented their general findings and impressions in 10 minutes. A general discussion followed where all attendees were given the chance to participate and summarize.

2.5 SURVEY IMPLEMENTATION METHODOLOGY

This part of the work consisted of two steps: first, pre-testing of the research tool, and second, actual implementation.

2.5.1 Pre-testing of Research Tools

Before the survey work was implemented, it was pre-tested with respect to a number of important factors:

- the overall quality of the research tool,
- the interviewer's and interviewees' level of ease with the tool
- the interviewer's and interviewees' level of comprehension for the tool
- the socio-cultural sensitivity of the research tool,
- the adherence of the questions to the project's aims and objectives

The questionnaire interview schedule was pre-tested with a sub-sample for two areas. Pre-testing was conducted by the field logistics coordinator and the research assistants and moderator since those individuals would be closely involved in undertaking the representative surveys.

The pre-test was conducted in Swieleh and Baqa'a. All interviewers and social researchers attended a familiarization session after which the pretest was undertaken. After pre-testing, feedback from DAI was developed. Based upon the feedback, the questionnaire and interview schedules were finalized for application.

Once approval had been received by ERMC the process began. The random identification of exposed and non-exposed individuals in the six selected communities from the six target groups set out in the scope of work.

2.5.2 Survey Implementation

An interview schedule was designed by the ERMC team based upon individual consultants' knowledge of water issues, social research background, and the content of

Phase I questionnaire The questionnaire was prepared in a simple, clear, concise, and easily reproducible manner

Questionnaires were completed in the six areas across Jordan in the form of face-to-face interviews It also covered the six target groups mentioned earlier

In addition the team implementing the survey had focused on conducting twenty interviews with participants who had already been exposed to the water awareness campaign and another twenty participants who had never participated in the campaign

In addition, a second questionnaire was developed to evaluate the potential effect of the campaign on large consumers The interview form appears in Appendix B For this questionnaire, large users such as hotels, hospitals, and industrial plants were approached to evaluate the perceived benefit of installing water saving devices and to provide a comparison between businesses that have been exposed and those that have not been exposed during the campaigns

2.6 DATA ANALYSIS

Once the questionnaire and interview schedules were finalized they were applied to the 6 different areas across Jordan within the above specified sampling frame Data entry took place directly following the data collection in each area to implement consequent location based analysis, before the overall data analyses At this point, the data trends were determined

Data analysis involved two different approaches a qualitative data analysis approach for the focus group results and a quantitative data analysis approach for the survey results A thematic approach was used to analyze the focus group data while *SPSSWin* was used for the survey analysis Analysis was undertaken separately for every sub-population and for every location before it was undertaken for the overall group

The effects of variables such as age, gender, occupation, literacy and education and exposure to public awareness activities are measured in relation to participants' knowledge, attitudes and practices of water behavior and consumption The procedures used permit the comparison of the different attitudes and practices resulting from a certain background (knowledge) between a group of people who were exposed to the water awareness campaign to another group that has never been exposed to such campaigns

To test the significance between variables obtained, in some instances, we used the Chi-Square measure Chi square is defined as a statistical test reflecting the level of significance between two ordinal and/or nominal variables A significant score is reflected through the range of 0.000 - 0.010 where 0.000 is a perfect correlation 0.010 is significant at 90% level and 0.050 is significant at the 95% level When the Chi-Square reflects a level of significance, this implies a representative trend for the overall population from which the sample was drawn

Ideally for a Chi-Square significance result to reflect a representative trend empty cell frequency (zero values) should be kept to a minimum cells with frequency of less than five, should contribute no more than 20 % Because of this, in most instances comparisons were made in percentages to develop trends rather than significance

SECTION 3 0

RESULTS

This section identifies the results obtained from the focus groups and the survey

Focus Groups

Data from the focus groups is presented in descriptive themes as they reflect the Knowledge Attitudes and Practices for each location. A summary of the themes is given for each location with implications and interpretation. At the end of the focus group sub-section an overall summary appears with interpretations and implications according to the themes developed.

Survey

In the survey, many of the tables which are presented in the appendices are provided in frequencies, except where percentages are indicated. Frequency totals vary from table to table reflecting the total number of responses for the specific variable only. The purpose of presenting the results obtained from both the focus groups and the survey in this manner is to highlight the overall trends achieved, qualitatively, and shed further light on these trends quantitatively, since all focus group members were members of the survey also.

All data is presented in the form of Knowledge Score Attitudes and Practices. These three overall variables were calculated for the survey results through the questionnaire design, as follows:

- The Knowledge Score reflects the percentage of CORRECT answers on the questionnaire in the Knowledge section (questions 16 - 26, see appendix G)
- The Attitude Scale extending from negative to positive was also arrived at based on the responses to the questions in the Attitude section of the questionnaire, (questions 27 - 34, see appendix G)
- The Practices section was analyzed differently. Each question in the survey was dealt with separately. The implications and interpretations of the overall, combined practices were then given (see appendix E)

The initial design of the questionnaire tool permitted for such development for the results section. Such a presentation allows for the overall cross-tabulation between knowledge, attitudes and practices in a manner that would not have objectively been possible otherwise.

The labels "E" and "NE" are consistently used throughout the report. "E" refers to those participants who were exposed to water awareness activities and "NE" those who were not exposed.

The results of the study are presented below in five consecutive inter-related sections highlighting the findings obtained from the focus group sessions and the survey Sample Description - presenting the distributions of the overall sample per area, for focus group attendance, participation in water awareness activities, gender, age, religion marital status education occupation home ownership monthly income, water bills, and availability of various utilities within the household - for the survey participants only

Focus Groups Section Results - This sub-section presents tables which show a summary of the themes in knowledge attitudes and practices according to location. The summaries are compared according to exposed and non-exposed groups. At the end of each table concerning knowledge attitudes, and practices respectively, by location the interpretations and implications are discussed

Survey Section Results - This sub-section presents the results obtained for the survey three parts of knowledge attitudes and practices. The knowledge and attitudes parts presents the results of the overall survey sample per area by exposure to water awareness activities gender, education, age, and monthly income. The results obtained are analyzed according to defined criteria (score above or below 70 % for knowledge and positive and negative attitudes). The practices results are analyzed according to exposure to the water awareness campaign. Each question in the practices part was analyzed separately. At the end of this sub-section, overall summary of the three parts previously mentioned is presented

Overall Results - presenting the conclusive deductive results reflecting the overall survey sample's knowledge, attitudes and practices. Also presented here are the overall results for the exposure to water awareness activities along with summaries and interpretations

3.1 DESCRIPTIVE RESULTS FOR OVERALL SURVEY SAMPLE

The results presented in this section provide a detailed description of the overall participating sample in the survey only. Although Table 4 reflects the number of non-focus group participants the rest of the analysis totally excludes this differentiation since the focus group members were provided with the questionnaire at the beginning of the session. Thus any activity undertaken during the focus group discussion did not play a determining or effective role in the results obtained for the questionnaire from the focus group participants. Needless to say however, all data gathered through the focus group discussions and presented below, excludes all non-focus group participants

It will be evident that sums and totals in the survey results do not always add up to 100%. Reasoning for this is as follows

- 1 All missing data or 'no answer' codes have been omitted from the analyses presented
- 2 Respondents could choose more than one option on various items therefore all items should be considered as independent entities

Table 4 presents the numbers of participants by locality. Almost half the sample were participants in water awareness activities undertaken by JES, in activities including workshops, reading of published literature such as pamphlets and brochures and viewing of television advertisements. This data is presented in Tables 5 and 6.

Table 4 Participation by Locality

	Ajloun	Amman	Aqaba	Irbid	Madaba	Mafraq	Total
Focus Group Participants	36	32	41	54	49	35	247 (51%)
Non-Focus Group Participants	48	40	30	35	41	41	235 (49%)
Total Number of Participants	84	72	71	89	90	76	482

Table 5 Participation in Water Awareness Activities, Organized by JES in Cooperation with MWI

	Ajloun	Amman	Aqaba	Irbid	Madaba	Mafraq	Total
Yes	40	31	22	40	45	32	210 (45%)
No	43	41	49	50	45	44	271 (55%)

Table 6 Types of Water Awareness Activities Participated In

	Ajloun	Amman	Aqaba	Irbid	Madaba	Mafraq	Total
Workshops	2	2	2	4	6	4	20 (10%)
Exposure to Literature and media	12	10	9	10	17	9	68 (32%)
All of the above	26	19	11	26	21	19	122 (58%)
None	43	41	49	50	45	44	271

In Appendix A (Descriptives), detailed information is presented regarding age, gender, religion, marital status, education level, occupation distribution, house ownership, monthly income, average water bill, number of available bathrooms in household, the availability of swimming pool, garden, backyards, and cars. All the above information is presented according to distributions of exposed and non-exposed participants. Below is a description of each distribution.

In terms of the gender distribution of exposed and non-exposed participants, although there were relatively more female participants than there were males, the sample was almost split in half (Table A1).

The age range of all participants ranged from 16 to 73, the mean was 32.16, the median was 32, and the mode was 25 years. For exposed participants, however, the median of age distribution was 18-30 years and the mode 18-30 as well, while for the non-exposed participants, the age median was 31-40 years, and the mode 18-30 years (Table A2)

Regarding the religious denomination of the participants, the overwhelming majority were of the Muslim faith, and less than 10% were of the Christian faith. For the exposed participants the percentage of Christians was 13%, while it was about 12% for the non-exposed groups. It can be seen from this table that in Madaba there was an exceptional participation by Christians (47% in the exposed groups, and 52% in the non-exposed groups) which is expected because of the large number of Christians living in Madaba (Table A3)

As for the exposed and non-exposed participants' distribution according to their marital status and location, an overwhelming majority (over 50%) of participants were married, rather than divorced or widowed. Approximately one quarter of all participants were single. The percentage of married exposed participants was 60%, while for the non-exposed participants, it was 67% (Table A4)

Considering the education distribution of participants, over 75% of the participants were educated at the secondary, or above levels. Of this 75% sub-population, the majority were holders of Bachelors degrees (Table A5)

The occupation range of participants was extremely varied, extending from non-income generating occupations such as student, housewife, retired and unemployed persons at one end, to private profit making professionals such as engineers, medical practitioners, business persons, and accountants. Many of the participants however belonged to the government sector and the teaching sector (Table A6)

As for house ownership for the exposed and non-exposed participants, generally, in every location, the majority of participants rented their homes, rather than owned them (Table A7)

Regarding average monthly income per household, the overwhelming majority in every location earned over JD 200. A relatively insignificant number (29) of the overall participants had a family monthly income of less than JD 100 (Table A8)

As for the water bills per cycle for each of the exposed and non-exposed respondents, half the overall sample reported an average figure ranging between JD 5 - 15, followed by less than JD 5. Overall, only 88 participants reported an average water bill per cycle being over JD 15 (Table A9)

In relation to the number of available bathrooms per household for exposed and non-exposed participants, approximately half the overall respondents sample owned two bathrooms at their residences (Table A10)

The data on the availability of swimming pools, gardens, back yards, and information on the number of cars owned for both exposed and non-exposed participants is shown in Table A11

3 1 1 Summary of Descriptive Results

- By design, approximately half the survey sample participated in focus groups across the six locations whilst the other half did not
- Almost half the overall sample were participants in water awareness activities undertaken by JES
- Approximately half the sample consisted of females
- The median age of exposed participants was 18-30 years. The mode for exposed participants also fell within that range. For non-exposed participants, the median was 31-40 years, while the mode was 18-30 years
- The overwhelming majority of both the exposed and non-exposed participants were of the Muslim faith
- Over half of exposed and non-exposed participants were married
- Over 75% of the overall participants sample were educated at the secondary, or above levels
- The occupation range of participants was extremely varied. Many of the exposed and non-exposed participants however belonged to the government sector and the teaching sector
- The overwhelming majority in every location earned over JD 200 for both exposed and non-exposed attendees
- Half the overall sample reported an average figure ranging between JD 5 - 15 for water cycle bills

3 2 FOCUS GROUPS RESULTS

This sub-section presents tables which show a summary of the themes in knowledge, attitudes, and practices according to location. The summaries are compared according to exposed and non-exposed groups. For a more complete record of the results please refer to appendix D. At the end of each table concerning knowledge, attitudes, and practices, respectively, by location, the interpretations and implications are discussed.

3 2 1 AJLOUN FOCUS GROUP RESULTS

3 2 1 1 Knowledge/Ajloun

Table 7 below identifies the recurring themes within the Ajloun Focus Groups as a comparison in knowledge between exposed and non-exposed participants

Table 7 Knowledge Comparative Results, Interpretations, and Implications for Exposed and Non-exposed Focus Groups in Ajloun

Theme	Exposed	Non-Exposed
Climate Features	<ul style="list-style-type: none"> • Mediterranean (Arid) • Rainfall ranges from 150 to 700 mm/yr • High rate of evaporation • Rainwater goes to the Dead Sea 	<ul style="list-style-type: none"> • Arid to semi-arid • Rainfall ranges from 100-600 mm/yr • Forests increased the amount of rainfall in Jordan
Water Pollution	<ul style="list-style-type: none"> • Agreed that there is a water pollution problem • Defined 7 sources of water pollution* 	<ul style="list-style-type: none"> • Agreed that Jordan has a water pollution problem • Defined 7 sources of water pollution*
Treated Wastewater	<ul style="list-style-type: none"> • Can be used for irrigation non-food industries vegetable crops which are cooked • Able to discuss polluted water problems and the act of natural filtration in groundwater recharge • Knew that treated wastewater can be used for artificial recharge through natural filtration 	<ul style="list-style-type: none"> • Can be used in irrigation while some agreed that it could be used for industries and drinking • Although some agreed it could be used for drinking psychologically they would reject it • Some participants said that it could not be used for any purpose
Water Resources	<ul style="list-style-type: none"> • Identified major water resources in Jordan with the main for drinking water being groundwater then dams 	<ul style="list-style-type: none"> • Identified major water resources in Jordan with the main for drinking water being groundwater then surface water
Sustainability of Water Resources	<ul style="list-style-type: none"> • Till the year 2050 • Others said 50-100 years • Some said it will never vanish 	<ul style="list-style-type: none"> • Some said till the year 2000 however the majority does not know
Water Consumption per Capita	<ul style="list-style-type: none"> • Less than other countries 	<ul style="list-style-type: none"> • Less than other countries • Ranged from 2-35 l/c/d
Water Saving Devices (WSD)	<ul style="list-style-type: none"> • Heard of it but only 50% saw it • Saves 30-35 % of water consumption • Not available in Ajloun 	<ul style="list-style-type: none"> • Largest water consuming sectors are household agriculture and industries • Did not hear of it Thought it is brought from the Gulf States
Water Conservation Methods	<ul style="list-style-type: none"> • Defined 7 major methods for the conservation of water* • A combined responsibility of both the government and citizens although the majority believe that citizens responsibilities are the overwhelming 	<ul style="list-style-type: none"> • Not mentioned
<p>Interpretations</p> <ul style="list-style-type: none"> • Although both exposed and non-exposed groups showed a similar level of knowledge on general water issues the exposed displayed more knowledge in specific issues and they could give more details and approximate figures This also shows that the interpersonal communications methods used by the APW in cooperation with the Ajloun branch were effective and needed • Exposed groups were highly knowledgeable in the field of wastewater reuses and different causes of pollution • All exposed groups had good knowledge on water saving devices whereas the non-exposed did not hear about them All exposed participants could identify how the devices work and how much they can save <p>Implications</p> <ul style="list-style-type: none"> • Regular awareness campaigns should continue in this location in order to reach people who were not affected by the campaign and increase their level of awareness • APW should focus on using real models and diversify the learning methods it uses in order to achieve the best possible results 		

* See page 84 for details

3 2 1 2 Attitudes/Ajloun

Table 8 demonstrates the results obtained by focus group participants attitudes in Ajloun

Table 8 Attitudes Comparative Results, Interpretations, and Implications for Exposed and Non-exposed Focus Groups in Ajloun

Theme	Exposed	Non-Exposed
Water Crisis	<ul style="list-style-type: none"> Majority said that Jordan is facing a water crisis 	<ul style="list-style-type: none"> All agreed that there is a water crisis
Reasons	<ul style="list-style-type: none"> Defined 14 reasons for the increase in water crisis 6 of which were major reasons* 	<ul style="list-style-type: none"> 50% of participants defined 4 major reasons*
Consequences	<ul style="list-style-type: none"> 50% will lead to degrading agriculture and industry Eventually lead to the vanish of living species 	<ul style="list-style-type: none"> 50% will look for places where water is available or will resort to water harvesting 50% stated it will hurt the economy and lead to total drought and disease Will lead to proper use of water
Government	<ul style="list-style-type: none"> Defined 15 major different actions that should be taken by the government* 	<ul style="list-style-type: none"> Defined 7 duties at the government that have not been conducted properly*
Citizens	<ul style="list-style-type: none"> Defined 9 actions that should be taken by citizens where 5 are major actions* Citizens need to take major responsibility 	<ul style="list-style-type: none"> Defined 9 citizens responsibilities where 4 are major* Citizens and government have their responsibilities
Effect of Religion on Water Saving	<ul style="list-style-type: none"> 100% agreement on the effect however 50% see that personal beliefs have the same effect 	<ul style="list-style-type: none"> 50% believe that religious and personal beliefs positively affect water saving practices 50% believe that water should be furnished free
Awareness Campaigns	<p>Should focus on</p> <ul style="list-style-type: none"> Creating Leaders Children and students Media Competitions 	<p>Should focus on</p> <ul style="list-style-type: none"> Lectures Field visits to housewives Responsible government officials TV & Radio Schools & Universities
<p>Interpretation</p> <ul style="list-style-type: none"> The difference in the levels of knowledge between exposed and non-exposed and that between their respective attitudes confirms what behavioral sciences state about the relationship between knowledge and attitudes. For example, as a person's knowledge increases, it is likely that the attitudes also will improve. <p>Implications</p> <ul style="list-style-type: none"> APW should continue its activities focusing more on the methods and communication means suggested by members in order to affect the attitudes of the people who were not reached by its activities and enhance positive attitudes of those who have been reached. 		

* See page 91 for details

3.2.1.3 Practices/Ajloun

Table 9 demonstrates the results obtained for Ajloun focus groups participants practices

Table 9 Practices Comparative Results, Interpretations, and Implications for Exposed and Non-exposed Focus Groups in Ajloun

Theme	Exposed	Non-Exposed
Drinking Water	<ul style="list-style-type: none"> Majority boil or filter tap water before drinking the rest drink from the tap Majority have rainwater storage tanks which is used for drinking directly 	<ul style="list-style-type: none"> Tap water rainwater
Water Shortage <ul style="list-style-type: none"> Practices which group suggested to reduce consumption 	<ul style="list-style-type: none"> Were affected by shortages Increasing storage capacity Rainwater collection Reuse of kitchen wastewater Postponing house work to the day of water pumping Reduce amount of irrigation water used Use shower instead of bath tap Informing any observed water leakage 	<ul style="list-style-type: none"> Majority affected Repair water networks Using a bucket to wash the car and water plants Construct rainwater reservoirs Postpone water activities until water is pumped Increase water storage Use low water consuming plants Minimize extra cleaning duties Control water use at schools Irrigate plants in proper times
Water Awareness Campaign	<ul style="list-style-type: none"> Has a great affect in influencing ideas Suggestions were made to have joint efforts of government and citizen and concentrate on schools and NGO s 	<ul style="list-style-type: none"> Some saw television spots
<p>Interpretations</p> <ul style="list-style-type: none"> The effect that the water awareness campaign have had on the exposed groups is very significant and shows that water awareness campaign has been successful in changing people's practices This is shown by the fact that most exposed group boil or filter water for drinking which relates to the fact that they know more about how water can be purified for drinking purposes The fact that both groups cited several positive practices that should be done to conserve water shows that water shortages do affect people's behavior but whether this effect would continue if water was available to them is questionable <p>Implications</p> <ul style="list-style-type: none"> More activities should be carried out in order to achieve the change in behavior that the exposed groups experienced with as many people as possible Campaigns should focus on bringing to the people's attention the fact that they should conserve water not only as a response to water shortage but rather as a necessary measure to conserve the scarce natural resources available to the country for present and future generations 		

3 2 2 AMMAN FOCUS GROUPS RESULTS

3 2 2 1 Knowledge/Amman

Table 10 demonstrates the results obtained for Amman focus groups participants knowledge

Table 10 Knowledge Comparative Results, Interpretations, and Implications for Exposed and Non-exposed Focus Groups in Amman

Theme	Exposed	Non-Exposed
Climate Features	<ul style="list-style-type: none"> • Climate is arid to semi arid • Rainfall goes mainly to evaporation 	<ul style="list-style-type: none"> • Climate is arid to semi arid
Water Pollution	<ul style="list-style-type: none"> • Identified 4 sources water pollution* • Low water consumption increases the organic loading to treatment plants 	<ul style="list-style-type: none"> • Identified four reasons of water pollution*
Treated Wastewater	<ul style="list-style-type: none"> • Can be used for restricted irrigation garden irrigation and industry 	<ul style="list-style-type: none"> • Can be used for drinking but citizens not ready to use it • Can be used for industrial and agricultural purposes
Water Resources	<ul style="list-style-type: none"> • Groundwater is the main source of drinking water 	<ul style="list-style-type: none"> • Rainfall is a source of water but groundwater is the main source of drinking water
Sustainability of Water Resources	<ul style="list-style-type: none"> • Will become unsuitable for use by 2020 - 2030 • Increasing water pressure by mixing with air 	<ul style="list-style-type: none"> • Not known exactly but a rough guess mentioned 20 years later
Water Consumption per Capita	<ul style="list-style-type: none"> • Lower than international limit - 80 l/c/d 	<ul style="list-style-type: none"> • Low but not the least • None gave a figure for consumption
Water Saving Devices	<ul style="list-style-type: none"> • Not adaptable to all kind of water valves 	<ul style="list-style-type: none"> • Did not hear of it
Water Conservation Methods	<ul style="list-style-type: none"> • Combined responsibility of government and citizens • Defined six major methods of water conservation and three minor ones * 	<ul style="list-style-type: none"> • Identified three minor methods of water conservation*
<p>Interpretations</p> <ul style="list-style-type: none"> • Exposed groups displayed a higher level of knowledge on specific water issues namely drinking water resources sustainability per capita consumption and water saving devices This can be explained by the concentration of APW s activities in Amman Non-exposed groups however had a fairly good knowledge on basic issues relating to climate features pollution and wastewater <p>Implications</p> <ul style="list-style-type: none"> • More work needs to be done to reach groups which have not been reached till now with more concentration on the different learning techniques which showed effectiveness as in the case of the water saving devices model which in Amman has proved its effectiveness 		

* See page 85 for details

3 2 2 2 Attitudes/Amman

Table 11 demonstrates the results obtained for Amman focus groups participants attitudes

Table 11 Attitudes Comparative Results, Interpretations, and Implications for Exposed and Non-exposed Focus Groups in Amman

Theme	Exposed	Non-Exposed
Water Crisis	<ul style="list-style-type: none"> There is real water crisis in Jordan 	<ul style="list-style-type: none"> There is a water crisis
Reasons	<ul style="list-style-type: none"> Defined 6 reasons of the crisis* 	<ul style="list-style-type: none"> Defined 2 causes of the crisis*
Consequences	<ul style="list-style-type: none"> The crisis will lead to the spread of pollution desertification and dryness 	<ul style="list-style-type: none"> The crisis will affect the present life patterns
Government duties	Identified 9 actions to be taken by the government*	<ul style="list-style-type: none"> Defined 5 government duties and 6 combined duties with citizens*
Citizens duties	<ul style="list-style-type: none"> Defined 2 major duties of citizens* 	<ul style="list-style-type: none"> Defined 6 citizens duties*
Effect of religion on water saving	<ul style="list-style-type: none"> Religion greatly emphasizes water conservation 	<ul style="list-style-type: none"> Religious beliefs will not affect all water use
Awareness Campaign	<ul style="list-style-type: none"> Can be increased by adopting certain media policies especially that directed towards the new generations 	<ul style="list-style-type: none"> Should target housewives teachers and the young generation
<p>Interpretations</p> <ul style="list-style-type: none"> Both groups have fairly positive attitudes towards water issues Amman is one of the locations that faces most water shortages especially during the summer which makes the people aware of the water problem and ultimately affects their attitudes As implied by participants, there is a possibility that both groups were exposed to other sources of awareness activities working in the country (especially TV and Radio programs which are prepared by MWI, RSCN, and NEIEP of JES) <p>Implications</p> <ul style="list-style-type: none"> APW should focus more on using the media in its attempts to change people's attitudes focusing on younger generations and women as suggested by both groups Since positive attitudes were detected in Amman where many activities were conducted, it can be deduced that in order to maintain the momentum of the campaign, even more and diverse activities should be conducted in this location which are targeted to those groups who are least aware 		

* See page 92 for details

3.2.2.3 Practices/Amman

Table 12 demonstrates the results obtained for Amman focus groups participants practices

Table 12 Practices Comparative Results, Interpretations, and Implications for Exposed and Non-exposed Focus Groups in Amman

Theme	Exposed	Non-Exposed
Drinking water	<ul style="list-style-type: none"> • Few use filters while others drink tap water directly 	<ul style="list-style-type: none"> • All participants use tap water
Water shortage <ul style="list-style-type: none"> • Practices which group suggested to reduce consumption 	<ul style="list-style-type: none"> • Affected by shortages • Increasing water storage capacity • Using water saving devices • Maintenance of the interior water net work and tanks • Changing practices in car washing and garden irrigation 	<ul style="list-style-type: none"> • Affected by shortages • Construction of water collection reservoirs • Buying water from tankers • Using water saving devices • Shorter shower period • No filling of bath tub • Irrigate the garden at night
Awareness Campaign	<ul style="list-style-type: none"> • Campaigns had positive effect • New practices encouraged by Project have been developed by citizens (ex. washing car with bucket using cup for shaving and use of water saving devices) • Water shortage is the main reason for reducing consumption 	<ul style="list-style-type: none"> • Did not hear of it
<p>Interpretations</p> <ul style="list-style-type: none"> • The fact that most people use tap water for drinking can be explained by the fact that citizens are officially assured that it is of a good quality. Furthermore, in APW activities where a specialist from the Ministry of Health is usually invited to talk about water quality. Assurances to this effect are usually given by him/her • The positive effect of the awareness campaign on the exposed group is significant to some extent <p>Implications</p> <ul style="list-style-type: none"> • In order to maintain the effect that APW had on people's practices, activities need to continue and improve since the largest population in Jordan is in Amman • Continued emphasis needs to be given to water quality in APW activities, making sure that specialized staff from official agencies working with this issue are present to give their professional opinions on this issue 		

3 2 3 AQABA FOCUS GROUPS RESULTS

3 2 3 1 Knowledge/Aqaba

Table 13 demonstrates the results obtained for Aqaba focus groups participants knowledge

Table 13 Knowledge Comparative Results, Interpretations, and Implications for Exposed and Non-exposed Focus Groups in Aqaba

Theme	Exposed	Non-Exposed
Climate Features	<ul style="list-style-type: none"> • Arid to semi arid (Aqaba is arid) • Rainfall is 50-100 mm/yr in the desert 300-500 in northern areas, and 600 - 800 mm/yr in the west • Majority agrees that most rainfall of water goes to evaporation and groundwater recharge 	<ul style="list-style-type: none"> • Semi arid • Rainfall is around 0 - 20 mm/yr in Aqaba half estimated 300 to 700 in mountainous, some 5000 mm/yr • More than 50% of rainfall goes to evaporation
Water Pollution	<ul style="list-style-type: none"> • Has devastating effect on life • Identified 5 sources of pollution * 	<ul style="list-style-type: none"> • Has devastating effect on life • Identified 6 sources of pollution *
Treated Wastewater	<ul style="list-style-type: none"> • Treated wastewater can be used for irrigation and restricted drinking 	<ul style="list-style-type: none"> • Treated wastewater can be used for irrigation industrial cooling process and reforestation • 16% said it can be used for drinking
Water Resources	<ul style="list-style-type: none"> • Groundwater is the main source for drinking • 50% said surface water can be used for irrigation 	<ul style="list-style-type: none"> • Identified all of the main water resources in Jordan as well as desalination*
Sustainability	<ul style="list-style-type: none"> • Ten to hundred years 	<ul style="list-style-type: none"> • One to fifty years at most
Water Consumption per Capita	<ul style="list-style-type: none"> • In Jordan 40-50 l/c/d In Aqaba 70-100 l/c/d 	<ul style="list-style-type: none"> • 10-30 l/c/d
Water Saving Devices (WSD)	<ul style="list-style-type: none"> • All had heard or knew about WSD • 50% said that it saved 15-30% while the rest stated 10-20% • Knew about 2 types and majority knew how it operates 	<ul style="list-style-type: none"> • 16% of participants had only recently heard of W S D through a television program done by the Project
Water Conservation Methods	<ul style="list-style-type: none"> • Combined responsibility of government and citizens • Defined nine major and seven minor methods for water conservation 	<ul style="list-style-type: none"> • Defined five major and five minor methods of water conservation
<p>Interpretations</p> <ul style="list-style-type: none"> • Exposed groups displayed a higher level of knowledge regarding specific water issues which means that the water awareness campaign had been successful in conveying the various messages on water resources climate features and water saving devices • The fact that most exposed groups could define the way water saving devices work and the amount of water they save shows the effectiveness of the method used in APWs activities that promote them <p>Implications</p> <ul style="list-style-type: none"> • Again as shown in other locations activities need to continue and expand with special emphasis on water saving devices to maintain the results achieved until now and achieve more awareness among the public 		

* See page 87 for details

3 2 3 2 Attitudes/Aqaba

Table 14 demonstrates the results obtained for Aqaba focus groups participants attitudes

Table 14 Attitudes Comparative Results, Interpretations, and Implications for Exposed and Non-exposed Focus Groups in Aqaba

Theme	Exposed	Non-Exposed
Water Crisis	<ul style="list-style-type: none"> • Complete agreement upon the existence at a water crisis 	<ul style="list-style-type: none"> • Agreement on existence of water crisis in Jordan but not in Aqaba • Water crisis is concentrated in certain areas
Reasons	<ul style="list-style-type: none"> • 50% defined 7 reasons of the water crisis while 50% did not address the issue* 	<ul style="list-style-type: none"> • 100% defined 5 major reasons of the crisis however 50% of the group defined 6*
Consequences	<ul style="list-style-type: none"> • 50% agreed will result in emigration and social problems • 50% said the ultimate result is death after famine 	<ul style="list-style-type: none"> • 100% agreed that crisis will lead to water scarcity and drought • 50% identified 6 other major consequences*
Government	<ul style="list-style-type: none"> • Defined 14 responsibilities* • Awareness in water is more effective than raising prices • Joint responsibility of government and citizens 	<ul style="list-style-type: none"> • Defined 11 responsibilities* • Awareness in water is more effective than raising prices
Citizens duties	<ul style="list-style-type: none"> • Defined 9 actions to be taken by citizens to solve the problem* 	<ul style="list-style-type: none"> • Joint responsibility of government and citizens • Defined 4 actions to be taken by citizens*
Effect of religion on water saving	<ul style="list-style-type: none"> • 100% agreement that religion positively affects water consumption 	<ul style="list-style-type: none"> • 100% of participants believe that religion beliefs positively affect water consumption
Awareness Campaign	<p>Should focus on</p> <ul style="list-style-type: none"> • Community activities especially for housewives • More posters and pamphlets • Media • Field work • Schools competitions and religion centers 	<p>Should focus on</p> <ul style="list-style-type: none"> • TV and Radio • Educational curricula • Sessions for housewives • Posters • Competitions • Religious Centers
<p>Interpretations</p> <ul style="list-style-type: none"> • Both groups displayed fairly positive attitudes, although the exposed were able to identify more responsibilities and duties that the government and the citizens should do in order to conserve water. This means that the APWs and other water awareness initiatives in the country have been successful in affecting people's attitudes and helping them to define needed actions which should be taken to solve important problems <p>Implications</p> <ul style="list-style-type: none"> • The fact that all participants believed that religious beliefs affect water consumption shows that it is necessary to use this factor in the campaigns. Water awareness activities need to continue focusing on the media and interpersonal contact in all community activities in all forms 		

* See page 92 for details

3 2 3 3 Practices/Aqaba

Table 15 demonstrates the results obtained for Aqaba focus groups participants practices

Table 15 Practices Comparative Results, Interpretations, and Implications for Exposed and Non-exposed Focus Groups in Aqaba

Theme	Exposed	Non-Exposed
Drinking water	<ul style="list-style-type: none"> • Tap water (Boiled only for babies) 	<ul style="list-style-type: none"> • Tap water (high quality) Some boil it before drinking if suspicious of the quality
Water shortage <ul style="list-style-type: none"> • Practices which group suggested to reduce consumption 	<ul style="list-style-type: none"> • 50% said that shortage does not affect in Aqaba residents • Increasing storage capacity • Buying water from tanks • Construction of water collecting wells • Cleaning the car by bucket • Reuse of kitchen water • Periodical maintenance of network • Regulate water level in the flush tank • Monitor children's water use 	<ul style="list-style-type: none"> • 50% said that shortage does not affect in Aqaba residents • Irrigating at night • Monitoring water consumption and leakage • Washing cars with bucket • Using new techniques for irrigation • Restrict tap water flow • Reuse washing water for irrigation • Reusing wastewater in common
Awareness Campaign	<ul style="list-style-type: none"> • Has a great influence but limited to people participating directly in its activities and became aware of water crisis and shortage • The main reason of water saving is the high water bill 	<ul style="list-style-type: none"> • None participated but some had seen television information
<p>Interpretations</p> <ul style="list-style-type: none"> • The fact that people in Aqaba believed that the main reason for saving is the high water bill can be explained by the fact that they are not exposed to water shortages, however the exposed groups reported having been affected positively by the awareness campaign even though Aqaba does not have a water shortage at this time <p>Implications</p> <ul style="list-style-type: none"> • APW should continue its activities in this location since it proved quite successful in affecting people's practices regardless of the fact that Aqaba is not currently facing water shortages They need to be prepared in the future if water is diverted to other areas like Amman or the government decides to put them on a rotation basis as is done in other parts of the country 		

3 2 4 IRBID FOCUS GROUPS RESULTS

3 2 4 1 Knowledge/Irbid

Table 16 demonstrates the results obtained for Irbid focus groups participants knowledge

Table 16 Knowledge Comparative Results, Interpretations, and Implications for Exposed and Non-exposed Focus Groups in Irbid

Theme	Exposed	Non-Exposed
Climate Features	<ul style="list-style-type: none"> • Semi arid • Rainfall 300-500 mm/yr in the north west and 50-150 mm/yr in the south and east • Most rainfall goes to evaporation 	<ul style="list-style-type: none"> • Semi arid • Rainfall ranges from 100-550 mm/yr • Didn't mention anything about where rainfall goes
Water Pollution	<ul style="list-style-type: none"> • Can not be used for drinking nor irrigation • Fatal to all life species • Gave some examples of diseases caused by polluted water 	<ul style="list-style-type: none"> • Identified five sources • Affect all life forms
Treated Wastewater	<ul style="list-style-type: none"> • Can be used for irrigation and industry 	<ul style="list-style-type: none"> • In irrigation and drinking • Can not replace pure water
Water Resources	<ul style="list-style-type: none"> • Groundwater and dams are the important resources 	<ul style="list-style-type: none"> • Groundwater and rainfall are equally important
Sustainability of Water Resources	<ul style="list-style-type: none"> • Not mentioned 	<ul style="list-style-type: none"> • Some of the participants said three to one hundred years (the majority does not know)
Water Consumption per Capita	<ul style="list-style-type: none"> • Around 40 l/c/d 	<ul style="list-style-type: none"> • Some mentioned 5-10 l/c/d others mentioned 80-100 l/c/month
Water Conservation Methods	<ul style="list-style-type: none"> • Defined five important methods 	<ul style="list-style-type: none"> • Defined four important methods
Water Saving Devices (WSD)	<ul style="list-style-type: none"> • 50 % knew about them • Mix water with air to reduce water flow • Save 16 - 33% of water use • Need more campaigns on WSD 	<ul style="list-style-type: none"> • 15% heard of it but doesn't know how it works • Saves 30 - 50% • Very expensive
Water Conservation Methods	<ul style="list-style-type: none"> • Major responsibility of citizens • Defined five major and four minor methods of water conservation 	<ul style="list-style-type: none"> • Combined responsibility • Defined four major and five minor methods for conservation of water
<p>Interpretations</p> <ul style="list-style-type: none"> • Exposed groups showed a rather higher level of knowledge than the non-exposed groups especially when specifics were concerned • Exposed participants are more aware of the work and savings of water saving devices <p>Implications</p> <ul style="list-style-type: none"> • In order to maintain the successful results of the campaigns, APW needs to continue its activities and try to expand them to cover more people. The water saving devices campaign needs to continue 		

* See page 88 for details

3 2 4 2 Attitudes/Irbid

Table 17 demonstrates the results obtained for Irbid focus groups participants attitudes

Table 17 Attitudes Comparative Results, Interpretations, and Implications for Exposed and Non-exposed Focus Groups in Irbid

Theme	Exposed	Non-Exposed
Water Crisis	<ul style="list-style-type: none"> 17 out of 21 participants agreed that Jordan is facing a water crisis 	<ul style="list-style-type: none"> Complete agreement that Jordan is facing a water crisis
Reasons	<ul style="list-style-type: none"> Defined 7 reasons for the increase in water crisis* 	<ul style="list-style-type: none"> Defined 4 reasons for the increase in the crisis*
Consequences	<ul style="list-style-type: none"> The crisis will lead to limitation of the overall development the spread of diseases and the reduction in the individual share 	<ul style="list-style-type: none"> The crisis will lead to plagues desertification, and immigration
Government	<ul style="list-style-type: none"> Defined 9 duties of the government in facing the crisis* 	<ul style="list-style-type: none"> Defined 7 duties of the government*
Citizens duties	<ul style="list-style-type: none"> Joint responsibility of government and citizens Defined 6 duties of citizens* 	<ul style="list-style-type: none"> Joint responsibility of government and citizens Define 5 duties of citizens*
Effect of religion on water saving	<ul style="list-style-type: none"> Important in water conservation However, the basic factor is the personal responsibility 	<ul style="list-style-type: none"> Plays great role in reducing consumption
Awareness Campaign	Should focus on <ul style="list-style-type: none"> Women through media Seminars & brochures Children Competitions Water need is the major reason for reducing consumption 	Should focus on <ul style="list-style-type: none"> Media Workshops & Seminars Societies & Unions Field visits Prizes & incentives
<p>Interpretations</p> <ul style="list-style-type: none"> Exposed members showed a more positive trend in their attitudes than non-exposed though basically both of them had a positive trend This shows that the campaign have had a positive impact on people's attitudes <p>Implications</p> <ul style="list-style-type: none"> APW should continue working to change people's behavior by continuing activities and diversifying them and spreading them to other target groups as suggested by participants More focus should be given to using the media to convey campaign messages 		

* See page 93 for details

3 2 4 3 Practices/Irbid

Table 18 demonstrates the results obtained for Irbid focus groups participants practices

Table 18 Practices Comparative Results, Interpretations, and Implications for Exposed and Non-exposed Focus Groups in Irbid

Theme	Exposed	Non-Exposed
Drinking Water	<ul style="list-style-type: none"> • The majority uses tap water directly • Some boil or filter water before use and only one uses disinfection tablets 	<ul style="list-style-type: none"> • Tap, filtered, and boiled water Some add a spoon of chloride to the drinking water for disinfection
Water Shortage <ul style="list-style-type: none"> • Practices which group suggested to reduce consumption 	<ul style="list-style-type: none"> • Participants agreed they were affected by it • Increase storage capacity • Postponing house works to the day of water pumping • Reusing kitchen wastewater • Using rain water • Reducing water flow during washing • Using pumps to get water to the tanks • Buying water from tanks • Irrigation at proper times to reduce evaporation 	<ul style="list-style-type: none"> • Participants agreed they were affected by it • Collecting rainwater • Guiding children at home • Organization of house work • Irrigation at proper time • Using shower instead of bath • Using less water to flush toilet • Reusing of washing water for irrigation • Using bucket for car washing • Select garden plants • Check water networks • Turn of taps firmly
Water Awareness Campaign	<ul style="list-style-type: none"> • Has a great effect on changing water practices • Water scarcity and bills are the main reasons for reducing consumption 	<ul style="list-style-type: none"> • Some knew about it by press and posters (29%)
Interpretations <ul style="list-style-type: none"> • Although the exposed groups reported having been positively affected by the awareness campaign in as far as their practices are concerned, it seems that the water shortages experienced in Irbid also have strong effect on practices 		
Implications <ul style="list-style-type: none"> • Water conservation practices such as the use of rain water may be illustrated by APW through the demonstration model which the Project has helped develop in the Eidoun Natural Park, in which rain water collecting wells were used to irrigate the herbal plants and other plants in the park using a drip irrigation system, in cooperation with the Eidoun Women's Society 		

3 2 5 MADABA FOCUS GROUP RESULTS

3 2 5 1 Knowledge/Madaba

Table 19 demonstrates the results obtained for Madaba focus groups participants knowledge

Table 19 Knowledge Comparative Results, Interpretations, and Implications for Exposed and Non-exposed Focus Groups in Madaba

Theme	Exposed	Non-Exposed
Climate Features	<ul style="list-style-type: none"> • Semi arid • Rainfall is 300-400 mm/yr In the north west and 50 mm/yr in the southern east • Most rainfall goes to evaporation 	<ul style="list-style-type: none"> • Arid to semi arid • Rainfall varies from area to another, (without quantities)
Water Pollution	<ul style="list-style-type: none"> • Identified 4 sources of water pollution* 	<ul style="list-style-type: none"> • Were able to identify 7 sources of water pollution while the others identified *
Treated Wastewater	<ul style="list-style-type: none"> • 50% stated that it can be used for irrigation 	<ul style="list-style-type: none"> • Can not be used for any purpose • Has a negative impact on vegetation • Jordan needs more wastewater treatment plants
Water Resources	<ul style="list-style-type: none"> • Groundwater is the major resource 	<ul style="list-style-type: none"> • Identified all major resources
Sustainability of Water Resources	<ul style="list-style-type: none"> • Depends on the amount of rainfall and population increase 	<ul style="list-style-type: none"> • 50% stated until Year 2000-2050
Water Consumption per Capita	<ul style="list-style-type: none"> • May reach 50 l/c/d • Less than surrounding countries 	<ul style="list-style-type: none"> • 50% said it may reach 120 m³/Year (329 l/c/d) • Others did not know
Water Saving Devices (WSD)	<ul style="list-style-type: none"> • Not known by participants 	<ul style="list-style-type: none"> • Not known by participants
Water Conservation Methods	<ul style="list-style-type: none"> • Although combined responsibility between citizens and government more focus on government responsibility only • Defined four major and four minor methods 	<ul style="list-style-type: none"> • Combined responsibility • Defined four major and another four minor methods of water conservation
<p>Interpretations</p> <ul style="list-style-type: none"> • Although both exposed and non-exposed groups showed a similar level of knowledge on general water issues the exposed displayed more knowledge in specific issues and they could give more details and approximate figures • The fact that the exposed groups members in Madaba have not heard about water saving devices can be explained by the fact that only one activity on water saving devices was conducted in Madaba and for a specific target group which was the educational counselors <p>Implications</p> <ul style="list-style-type: none"> • Interpersonal communication activities need to be continued and diversified in order to cover as many people as possible WSDs campaigns should be expanded to cover target groups which have not yet been reached by the activities 		

* See page 89 for details

3 2 5 2 Attitudes/Madaba

Table 20 demonstrates the results obtained for Madaba focus groups participants attitudes

Table 20 Attitudes Comparative Results, Interpretations, and Implications for Exposed and Non-exposed Focus Groups in Madaba

Theme	Exposed	Non-Exposed
Water Crisis	<ul style="list-style-type: none"> • Jordan is facing a water crisis 	<ul style="list-style-type: none"> • Jordan is facing a water crisis
Reason	<ul style="list-style-type: none"> • 50% defined 7 reasons for the crisis and the rest did not address the issue* 	<ul style="list-style-type: none"> • 100% addressed 2 major reasons * • 50% addressed 5 other major issues *
Consequences	<ul style="list-style-type: none"> • 50% said crisis will lead to 6 reasons while the rest did not address the issue 	<ul style="list-style-type: none"> • 50 % said that the crisis will lead to 3 issues while 50 % said the priority should be for drinking water and there is no future for agriculture in Jordan
Government	<ul style="list-style-type: none"> • Should share between government and citizens • Defined 10 duties for the government * 	<ul style="list-style-type: none"> • Should share between government and citizens • Defined 6 duties of the government *
Citizens Duties	<ul style="list-style-type: none"> • Defined 6 duties of the citizens to fulfill * • Citizens should develop a personal feeling of responsibility to reduce water consumption and use WSD's 	<ul style="list-style-type: none"> • Defined 3 duties of citizens *
Effect of religion on water saving	<ul style="list-style-type: none"> • Religion and personal beliefs positively affect water saving 	<ul style="list-style-type: none"> • Only religion affects less use of water
Awareness Campaign	<ul style="list-style-type: none"> • Not mentioned 	<ul style="list-style-type: none"> • 50% recommend media and field visits • Conduct lectures and seminars to MWI • Expand general activities to inform people about scarcity of water
<p>Interpretations</p> <ul style="list-style-type: none"> • Basically the results above show that both groups had positive attitudes towards water problems and water conservation. However, we can see a greater tendency on the part of the exposed groups to attach more significance to personal commitment and positive attitudes in the field of water conservation. • Both groups emphasized the importance of using the media and several interpersonal communication based activities. <p>Implications</p> <ul style="list-style-type: none"> • APW should try to use the media more than in the past phase as most participants of both groups believed that it is very effective in increasing knowledge. 		

* See page 93 for details

3 2 5 3 Practices/Madaba

Table 21 demonstrates the results obtained for Madaba focus groups participants practices

Table 21 Practices Comparative Results, Interpretations, and Implications for Exposed and Non-exposed Focus Groups in Madaba

Theme	Exposed	Non-Exposed
Drinking Water	<ul style="list-style-type: none"> • Tap water is OK but some use filtration 	<ul style="list-style-type: none"> • 50% felt that water is not clean and water needs boiling while the others feel it needs boiling and filtration
Water Shortage <ul style="list-style-type: none"> • Practices which group suggested to reduce consumption 	<ul style="list-style-type: none"> • Participants affected by shortages • Collecting rainwater • Reducing consumption • Using additional water tanks • Water harvesting for irrigation purposes • Using kitchen wastewater for irrigation and yards cleaning • Rainwater harvesting 	<ul style="list-style-type: none"> • Most of participants affected by the water shortage (80%) • Present practices is learned from previous generations • Women naturally conserve water because of shortage in supply • Rainwater harvesting • Wash cars by bucket
Water Awareness Campaign	<ul style="list-style-type: none"> • Helped in increasing water awareness of people who directly participated in its activities • Changed practices in washing cars clothes monitoring children's use of water and housework • Spreading the ideas to others is difficult 	<ul style="list-style-type: none"> • Could play an important role in water use
<p>Interpretations</p> <ul style="list-style-type: none"> • Mostly all exposed members felt that tap water was safe and only 50% of the non-exposed felt it was not clean. The reason for this could be that in most of APW's activities a specialist from the Ministry of Health is usually invited and he/she give their assurances regarding quality of water pumped by the Water Authority • Exposed groups reported the positive impact which the water campaign has had on their practices and listed some of the ones that they have adopted as a result to the campaign. This shows that the campaign was effective and that what the behavioral science tells us on the relationship between knowledge attitudes and practices is clearly displayed in the case of APW <p>Implications</p> <ul style="list-style-type: none"> • Again APW's activities should go on confirming the positive change achieved in knowledge attitudes and practices and attempting to extend the campaigns to yet un-affected target groups • APW should make use of the demonstration model that is being developed in a Madaba Church to illustrate effective methods in water conservation 		

3 2 6 MAFRAQ FOCUS GROUPS RESULTS

3 2 6 1 Knowledge/Mafraq

Table 22 demonstrates the results obtained for Mafraq focus groups participants knowledge

Table 22 Knowledge Comparative Results, Interpretations, and Implications for Exposed and Non-exposed Focus Groups in Mafraq

Theme	Exposed	Non-Exposed
Climate Features	<ul style="list-style-type: none"> • (Mediterranean) arid to semi arid • Most of rainfall goes to evaporation • Rainfall is 400-670 mm/yr in the highlands and 100-250 mm/yr in the south and east and less than 100 mm/yr in the desert 	<ul style="list-style-type: none"> • Jordan Climate is arid to semi arid • Rainfall range 150-200 mm/yr in Mafraq and 250-600 mm/yr in other regions of the kingdom • Most rainfall goes to Syria as streams in the valleys and river course • Rate of evaporation is high but the amounts varied from 6-80%
Water Pollution	<ul style="list-style-type: none"> • Identified 4 Sources* • Polluted water causes diseases • Affects the quality of industrial and agricultural products • In general causes harm to the environment 	<ul style="list-style-type: none"> • Identified 7 sources*
Treated Wastewater	<ul style="list-style-type: none"> • Can be used for irrigation of cooked plants industry and drinking • In addition sludge can be used as fertilizer 	<ul style="list-style-type: none"> • Can be used for restricted irrigation 1 out 10 would drink well-treated wastewater
Water Resources	<ul style="list-style-type: none"> • Groundwater is the major source of water • Surface water can be used for irrigation • There are renewable and non-renewable water resources in Jordan 	<ul style="list-style-type: none"> • Identified major resources as rainwater and dams of water in Jordan
Sustainability of Water Resources	<ul style="list-style-type: none"> • Will cover 50 60 % of our needs till the year 2006-2010 	<ul style="list-style-type: none"> • 30% said water will be available for ever and the rest did not know
Water Consumption per Capita	<ul style="list-style-type: none"> • Very low in comparison to world average • Half gave figures in the range of 5-100 l/c/d • Half the participants said 70 l/c/d 	<ul style="list-style-type: none"> • Less than neighboring and developed countries • Gave figures of 20 200 l/c/d
Water Saving Devices (WSD)	<ul style="list-style-type: none"> • All participants heard of it but few saw it • They save 16 30% • It reduces water flow • Not available in Mafraq 	<ul style="list-style-type: none"> • Expensive • Do not know it works
Methods of Water Conservation	<ul style="list-style-type: none"> • Defined six methods * 	<ul style="list-style-type: none"> • Defined six methods *
<p>Interpretations</p> <ul style="list-style-type: none"> • Exposed groups showed a higher level of knowledge on water issues especially on specifics however the non-exposed groups had a fair knowledge of water issues which can be attributed to other sources of information • Specific activities on water saving devices have not yet been conducted in Mafraq, therefore members of the exposed group were not fully aware of all details regarding them 		
<p>Implications</p> <ul style="list-style-type: none"> • Regular APW activities need to continue with emphasis on water saving devices 		

* See page 90 for details

3 2 6 2 Attitudes/Mafraq

Table 23 demonstrates the results obtained for Mafraq focus groups participants attitudes

Table 23 Attitudes Comparative Results, Interpretations, and Implications for Exposed and Non-exposed Focus Groups in Mafraq

Theme	Exposed	Non-Exposed
Water Crisis	<ul style="list-style-type: none"> • Complete agreement on the existence of a water crisis 	<ul style="list-style-type: none"> • 95% agreement about the existence of a water crisis
Reasons	<ul style="list-style-type: none"> • Defined 9 reasons* 	<ul style="list-style-type: none"> • Defined twelve reasons of the crisis*
Consequences	<ul style="list-style-type: none"> • The crisis will result in <ul style="list-style-type: none"> • Social problems • Development retardation • Spread of diseases 	<ul style="list-style-type: none"> • 50% said crisis will result in water scarcity while the others did not address the issue
Government duties	<ul style="list-style-type: none"> • Defined 9 duties that could be applied by the government* 	<ul style="list-style-type: none"> • 50% believe that it is the responsibility of the government and not the citizens • Defined ten responsibilities of the government*
Citizens duties	<ul style="list-style-type: none"> • Defined 6 responsibilities of the citizens* • Citizens need to take responsibility 	<ul style="list-style-type: none"> • Defined 3 citizens responsibilities that are not fulfilled*
Effect of religion on water saving	<ul style="list-style-type: none"> • 100% agreement that beliefs positively affect water saving 	<ul style="list-style-type: none"> • 50% agreement that beliefs positively affect water saving, while 20% say it doesn't The rest do not know
Awareness Campaign	<p>Every one should start with himself</p> <p>The campaign should focus on</p> <ul style="list-style-type: none"> • Media • Religions centers • Schools and Societies lectures • Personal efforts • Competitions and brochures 	<p>Should focus on</p> <ul style="list-style-type: none"> • Media • Adults before children • Housewives • Field visits • Incentives
<p>Interpretations</p> <ul style="list-style-type: none"> • A clear difference can be noticed in the attitudes of exposed groups as opposed to that of the non-exposed though initially non-exposed do have a fairly positive attitude towards the water problem This may be attributed to the fact that people in this location are well aware of several incidents where the citizens abuse water and water networks without being properly punished by the authorities for one reason or the other which may lead them to feel rather frustrated <p>Implications</p> <ul style="list-style-type: none"> • APW should study the different needs of the communities to address their needs properly in the activities The project needs to match the capabilities and specialties of the officials from the Ministry of Water and Irrigation or the Water Authority who might be able to focus on or address the area specific concerns and problems of the people 		

* See page 93 for details

3 2 6 3 Practices/Mafraq

Table 24 demonstrates the results obtained for Mafraq focus groups participants practices

Table 24 Practices Comparative Results, Interpretations, and Implications for Exposed and Non-exposed Focus Groups in Mafraq

Theme	Exposed	Non-Exposed
Drinking Water	<ul style="list-style-type: none"> • Tap water 	<ul style="list-style-type: none"> • Tap water, filtered water and bottled water
Water Shortage <ul style="list-style-type: none"> • Practices which group suggested to reduce consumption 	<ul style="list-style-type: none"> • Majority affected by shortages • Building collection wells • Increase storage capacity • Buying motors to pump water to storage tanks • Irrigation at specific times • Reuse of cleaning wastewater for irrigation • Reduce taps opening • Collect rain water • Gathering washing and house work • Minimize amount of water for cleaning • Washing car with bucket • Use bucket for bath rather than shower • Reduce water in tanks for toilets • Use WSD's 	<ul style="list-style-type: none"> • 70 % of the participants affected by the water shortage • Buying water from tanks • Improve water storage • Reuse of bath and washing water • Decreasing water flow from taps • Reducing water consumption • Using drip irrigation • Irrigation at proper time • Collecting rainwater • Monitoring water bills • Add capacity for water storage
Water Awareness Campaign	<ul style="list-style-type: none"> • Had a positive influence in changing practices like monitoring children's water use and improved behavior and practices which reduced water consumption and amount of money spent 	<ul style="list-style-type: none"> • 60% heard about campaigns through newspaper and posters however has no effect in practices
<p>Interpretations</p> <ul style="list-style-type: none"> • Most group members of both categories use tap water for drinking which may be attributed to people's trust in water quality or unwillingness or inability to do otherwise In almost all APW's activities conducted in Mafraq a presentation was given on the water quality • Exposed groups reported a positive change in their practices as a result of the campaign which shows that the campaign had been successful in bringing about a change in behavior which was preceded by a change in awareness level and attitudes <p>Implications</p> <ul style="list-style-type: none"> • More efforts need to be made to achieve even better results in the practices area especially for those groups who have not yet been exposed to APW's activities Specialized professional opinion on water quality should always be sought in order to assure the people of water quality and what they can do in cases when it is of bad quality 		

3 2 7 OVERALL SUMMARY/ KNOWLEDGE, ATTITUDES, AND PRACTICES

Both exposed and non-exposed groups in all locations showed a rather good level of knowledge on basic water issues. However, the exposed groups in all locations were more knowledgeable and could identify specific information and exact figures on the various water issues. The exposed groups in the locations where water saving devices campaigns were conducted showed an impressive level of knowledge regarding the devices, how they work and the water savings that can be achieved by using them. The exposed groups in locations where these campaigns were not conducted showed some knowledge on water saving devices but could not identify specific features. The non-exposed groups on the other hand and in all locations were almost ignorant about them.

Both exposed and non-exposed groups in all locations showed rather positive attitudes toward water problems and their roles in conserving water. The exposed groups in most locations however, attached more significance to the personal attitude and responsibility regarding conservation.

In all six locations, exposed members reported a significant change in their behavior as a result of their exposure to the water campaign.

3 2 7 1 Overall Interpretations

The fact that although both exposed and non-exposed groups showed a similar level of knowledge on general water issues, the exposed displayed more knowledge in specific issues. The exposed could give more details and approximate figures, which shows that they have retained part of the content of the material that was presented to them through APW's activities and publications. This also shows that the interpersonal communications methods used by the APW in cooperation with the JES branches in the various locations were effective and needed.

All exposed groups in locations where water saving devices campaigns were conducted had good knowledge on water saving devices whereas almost all of the non-exposed did not hear about them. This shows that the water saving devices campaign conducted by the APW was highly effective since APW is the first and the only project in the country that has conducted information activities in this field. The fact that the majority of the exposed participants who had been exposed to the water saving devices campaign could identify how the devices work and how much they can save shows that members retained a large portion of what was presented in the activities. This can be explained by the fact that APW has developed a complete package on WSD's which includes a working model, display boards, film and brochures which were used in the activities. People were able to see for themselves the devices and the way they work, the quantity of water which is saved. This is in line with the Adult Learning Theory in that adults are more apt to learn and to retain what they learn when

- They can use what they learn,

- It relates directly to their immediate and actual needs, and,
- The learning is presented to them in as many forms of delivery as possible, audio, visual, tactile etc

Although both groups in almost all locations had positive attitudes towards water problems and water conservation, we can see a greater tendency, on the part of the exposed groups, to attach more significance to personal commitment and positive attitudes in the field of water conservation. This shows that exposure to water awareness activities was in fact effective in changing people's attitudes which coincides with the increase in knowledge level. Both groups in almost all locations emphasized the importance of using the media and several interpersonal communication based activities.

Most group members of both categories in all locations use tap water for drinking, which may be attributed to people's trust in water quality or unwillingness or inability to do otherwise. In most of APW's activities conducted in the various locations, a specialist from an official agency was present and assured the people of the quality of water and the soundness of water testing measures conducted by the official agencies.

Exposed groups reported a positive change in their practices as a result of the campaigns conducted in their communities which shows that the campaign has been successful in bringing about a change in practices which was preceded by a change in awareness level and attitudes.

3.2.7.2 Overall Implications

- In order to maintain the momentum of APW's activities in bringing about a higher level of knowledge in the different locations and among the various target groups, APW should continue its regular activities based on interpersonal communications through its branches where they exist or other community groups in the different parts of the country.
- APW needs to use the media more than in the past phase as most participants of both groups believed that it is very effective in increasing knowledge and changing attitudes.
- In order to maintain the effect that APW had on people's attitudes activities need to continue and improve.
- Continued emphasis needs to be given to water quality in APW activities making sure that specialized staff from official agencies dealing with this issue are present to give their professional opinions on this issue.
- Since almost all members of both exposed and non-exposed categories believed that religious beliefs had a strong effect on people's water consumption behavior, APW should focus on this and use this factor to enhance the

effectiveness of its activities. This implies working with people in the Ministry of Awqaf and the Christian clergy in this field. The Project needs to continue the efforts with both religious organizations and will be able to use the demonstration sites at the King Abdullah mosque and Madaba church to illustrate effective methods in water conservation.

- Most members suggested focusing APW's activities towards younger generations and women.
- APW should employ the techniques and principles of Adult Learning Theory in designing its campaigns and activities since using some of these principles and techniques by the APW has already proven to be very effective.
- APW should be looking at each location's specific needs and concerns in order to be able to design the appropriate type of activity and develop the content of materials presented in that activity to make sure that it will affect people's attitudes and practices.
- As a result of this study and information gained in the monitoring of the Project, APW needs to develop or target communities where the need is greatest, for example, Women, children, and large consumers of water. Special effort needs to be made in those communities where the awareness is low and the need is the greatest.
- In the next phase of the Project, more activities need to move to an implementation phase where more activities are based on actual practices. Since people responded positively to the water saving devices information, the APW should incorporate demonstration models, sites, field tours when possible. The activities should be based on real needs and be community focused. Since leaders in the branches and other organizations have been trained on how to implement community campaigns and they have received training in assessing community needs, they should be used more in the communities to determine the interests and needs of the people.

3.3 SURVEY RESULTS FOR KNOWLEDGE

3.3.1 SURVEY KNOWLEDGE SECTION

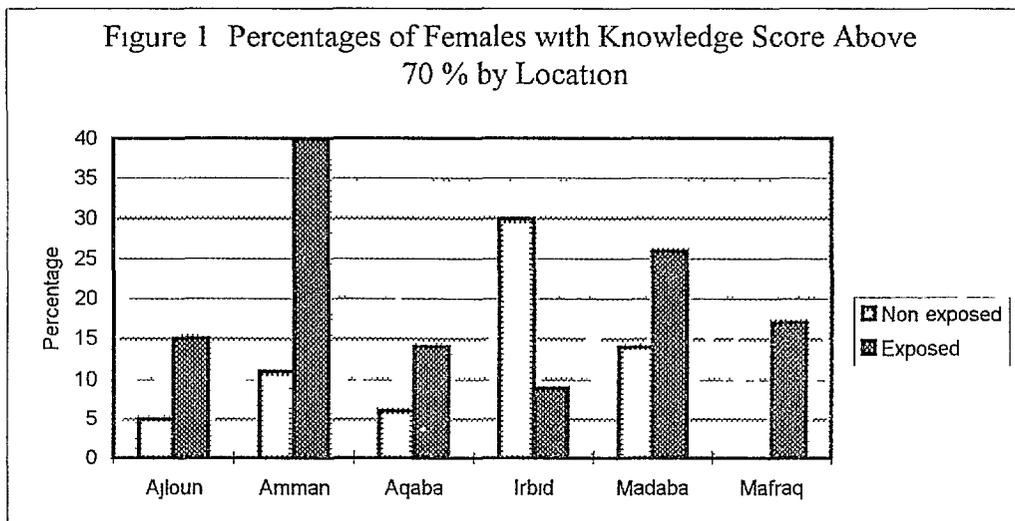
Table 13 illustrates the knowledge score by exposure to water awareness activities. Examining the table below, it is evident that for those scoring above 70%, the majority were exposed to water awareness activities in all locations, except Irbid where the majority scoring above 70% were not exposed to water awareness activities. The chi-squares obtained here reflected (0.000) for Amman and (0.079) for Ajloun.

Table 25 Percentages of Obtained Knowledge Score by Exposure to Water Awareness Activities

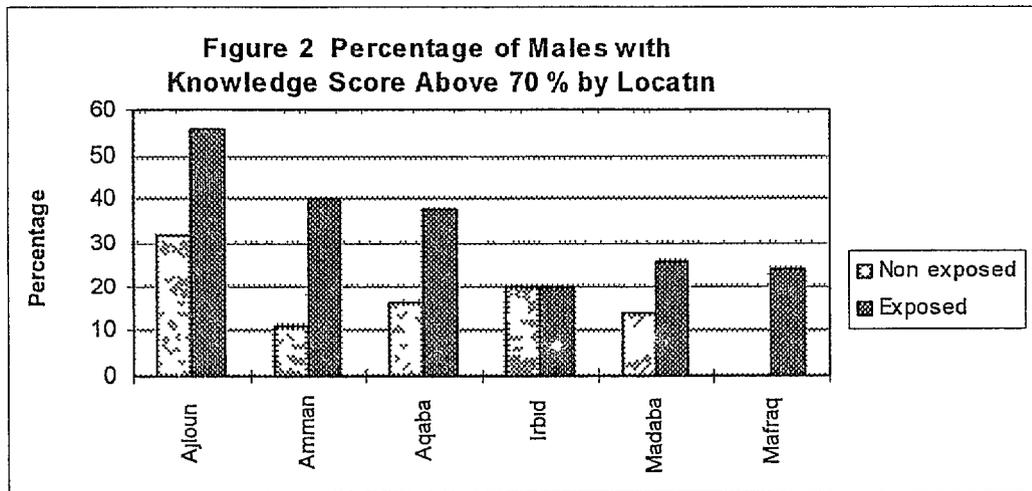
Knowledge Score	Ajloun		Amman		Aqaba		Irbid		Madaba		Mafraq	
	E	NE	E	NE	E	NE	E	NE	E	NE	E	NE
below 70%	63%	80%	48%	83%	71%	88%	83%	73%	64%	80%	69%	79%
Above 70%	37%	20%	52%	17%	29%	12%	17%	27%	36%	20%	31%	21%
Total (Number)	40	41	31	41	21	49	40	48	45	45	32	42

(E Exposed NE Non-Exposed)

Figures 1 and 2 below present a more detailed illustration for knowledge scores attained amongst the women’s population (Figure 1) and the men’s population (Figure 2) It is clear from Figure 6 that more women in the exposed group rather than the non-exposed group scored above 70% in all locations except Irbid



From Figure 2 below it is evident that more men in the exposed group, than in the non-exposed group scored over 70% in all locations Interestingly in Irbid, there was an equal percentage of exposed and non-exposed men scoring over 70%



In Appendix B (Knowledge Section Results), detailed information is presented regarding knowledge score by gender, age, education and monthly income according to exposure and non-exposure to water awareness campaigns

Table B1 in appendix B demonstrates the scores obtained for men and women in the various locations. It is evident that whilst the majority of women scored below 70%, the majority of men scored above 70%. This trend is evident for both exposed and non-exposed samples. For example, in Ajloun 13% of the non-exposed women and 20% of the exposed women scored above 70%. A chi-square of (0.009) was obtained for this location. Similarly in Mafraq, whilst 45% of the non-exposed women and 86% of the exposed women scored below 70%, 100% of the non-exposed men and 40% of the exposed men scored above 70%. A chi-square of (0.050) was obtained for this location.

Figure B1 in appendix B presents the gender results for the overall knowledge scores attained, regardless of exposure to water awareness activities. From this figure, it is evident that whilst the majority of men scored above 70%, the majority of women scored below 70%.

More detailed results pertaining to these trends can be obtained from Tables B2 and B3 in appendix B.

Regarding the effect of education levels on knowledge scores attained, Table B4 in appendix B shows that the majority in both the exposed and non-exposed groups, scoring above 70% had an education level of community college or above. This trend however was not consistent in Ajloun, as 57% of those scoring above 70% in the non-exposed group, had an education level of secondary school or below.

Following are snapshots of findings from the trends observed between education levels and knowledge score attainment.

For the secondary school or below group

1. A larger percentage of the exposed participants in this group scored below rather than above 70%.

- 2 For the non-exposed participants in this group, a larger percentage scored above rather than below 70% in Ajloun and Madaba

For the community college and above group

- 1 A larger percentage of the exposed participants here scored above, rather than below 70% in all locations except Madaba where it was equally represented
- 2 For the non-exposed participants in this group a larger percentage also scored above rather than below 70% in all locations except Ajloun

Significant chi-squares for education levels and knowledge score attainment were obtained for Ajloun (0.000) and Aqaba (0.009)

Table B5 in appendix B illustrates the relationship between the age of the participants in all locations and the knowledge scores they attained. This relationship was further divided into participants exposure / non-exposure to water awareness activities

If we consider the age group 'less than 30 years old', it is clear that

- 1 for the exposed group, the majority scored below, rather than above 70% in all locations
- 2 for the non-exposed group, the majority scored below, rather than above 70% in all locations except Aqaba where they scored above 70%

Considering the age group '30 - 50 years old' Table B5 in appendix B shows that

- 1 for the exposed group, the majority scored above, rather than below 70% in all locations
- 2 for the non-exposed group the majority also scored above rather than below 70% in all locations except Amman

Considering the age group 'above 50 years old', the following trends were obtained in Table B5 in appendix B

- 1 the majority of exposed participants in this age range scoring above 70% were in the locations of Ajloun, Madaba and Mafraq
- 2 the majority of non-exposed participants here scored below rather than above 70% in all locations except Amman

Significant results for knowledge scores according to age and exposure to the water awareness campaign was obtained for Aqaba only (0.050). For the non-exposed population significant relationships were obtained for Amman (0.040), Ajloun (0.080) and Mafraq (0.080)

Table B6 in appendix B demonstrates the knowledge score by average monthly income and exposure to the water awareness campaign. Significant chi-squares were obtained for Madaba (0.045) for the non-exposed participants and in Mafraq for both exposed (0.055) and non-exposed (0.030) groups

When examining the relationship between average monthly income and knowledge scores attained Table B6 in appendix B shows the following trends

For the income category 'less than JD 100'

- 1 the majority of exposed participants in this income bracket, scored above 70% in all locations
- 2 the majority of non-exposed participants in this income bracket, scored below, rather than above 70% in all locations except Mafraq

For the income category ' JD 100 - 200'

- 1 the majority of the exposed participants in this income bracket scored below, rather than above 70% in all locations
- 2 for the non-exposed participants in this income bracket, the same trend was evident as for the exposed participants. That is, the majority of participants scored below, rather than above 70% in all locations

For the income category 'JD 200 and above'

- 1 for the exposed participants in this income bracket, the majority scored above, rather than below 70% in all locations
- 2 for the non-exposed participants in this income bracket, the trend was similar to the exposed participants' in that the majority here scored above rather than below 70% in all locations

Summary for Survey Knowledge Section

- 1 When comparing the knowledge of both exposed and non-exposed groups who scored over 70%, both the exposed women and exposed men had a higher percentage of knowledge than the non-exposed women and men, respectively. This was true in all of the other categories of age, education, and income
- 2 The only area in which the exposed women when compared to non-exposed women did not score over 70% was in Irbid. The exposed women in Amman and Mafraq were remarkably higher in percentage than the non-exposed
- 3 When comparing exposed men to non-exposed men who scored over 70%, the exposed men scored higher in all locations except Irbid where they were equal
- 4 From the survey results, it is evident that for both exposed and non-exposed groups, when comparing men to women, a large percentage of men overall scored over 70%, as compared to the women overall,
- 5 Regarding the variable of education, it was found that the majority of participants scoring above 70%, for both the exposed and non-exposed groups fell into the education category of community college and above

- 6 Considering the variable of age, interestingly, the majority of participants scoring above 70% for both exposed and non-exposed groups fell into the age range of 30 - 50 years, rather than below 30, or above 50
- 7 Interestingly, when average monthly income was analyzed for knowledge scores attained, it was found that for those earning less than JD 200, the majority of participants scored below 70% in the non-exposed groups. In the exposed groups the results were generally similar. In the income bracket JD 200 and over, it was found that the majority of exposed participants scored above 70%, while the majority of non-exposed also scored above 70%

3.3.2 SURVEY ATTITUDES SECTION

In this section the survey results are presented for the attitudes of the exposed and non-exposed participants towards water issues. The results discussed below show the comparison between the exposed and non-exposed groups in relation to location, gender, education, age and monthly income. A brief summary is given for all tables in Appendix C. At the end of this subsection a summary is provided which highlights the finding for exposed and non-exposed attitudes.

In Appendix C (Attitudes Results Section) Tables 1 through 6 give the detailed information regarding attitude score by location, gender, education, age, and monthly income according to exposure and non-exposure to water awareness campaigns.

When reviewing the table for the overall sample related to attitudes for the exposed group, it is evident that the exposed groups have a more positive attitudes than the unexposed group. Table 26

Table 26 below illustrates the attitude score by exposure to water awareness activities. When analyzing the data in four of the six areas, a higher percentage of the participants who were exposed as compared to non-exposed had positive attitudes, with the highest percentage of positive attitudes being in Amman. In Irbid and Aqaba, a higher percentage of the non-exposed group had positive attitudes.

Table 26 Attitude by Exposure to Water Awareness Activities

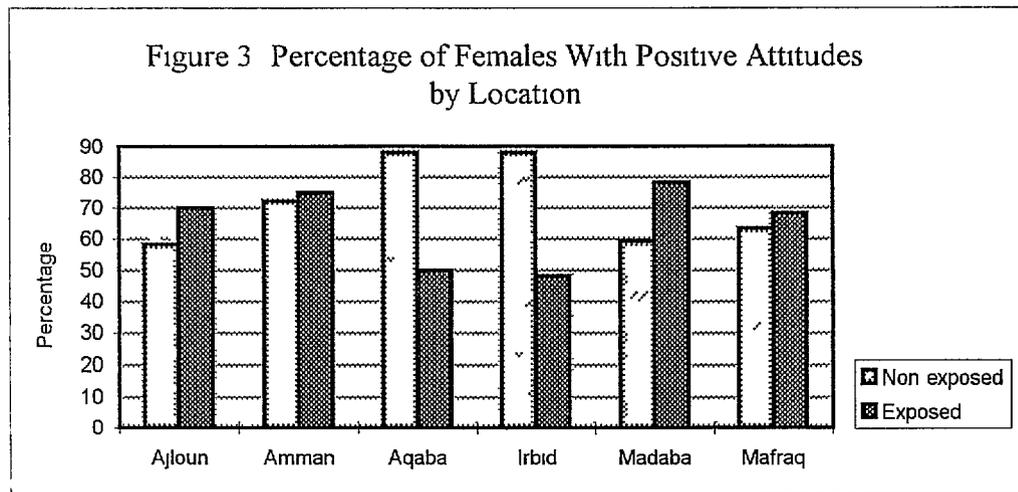
Attitude Scale	Ajloun		Amman		Aqaba		Irbid		Madaba		Mafraq	
	E	NE	E	NE	E	NE	E	NE	E	NE	E	NE
negative %	28	39	19	34	59	39	38	31	24	40	34	36
positive %	72	61	81	66	41	61	62	69	76	60	66	64
Total (number of people)	40	41	31	41	22	49	40	48	45	45	32	42

Table C1 in Appendix C demonstrates the comparison of scores obtained for men and women in the various locations. It is evident from the table that the exposed women in Amman and Madaba have the largest percentage of positive attitudes overall when

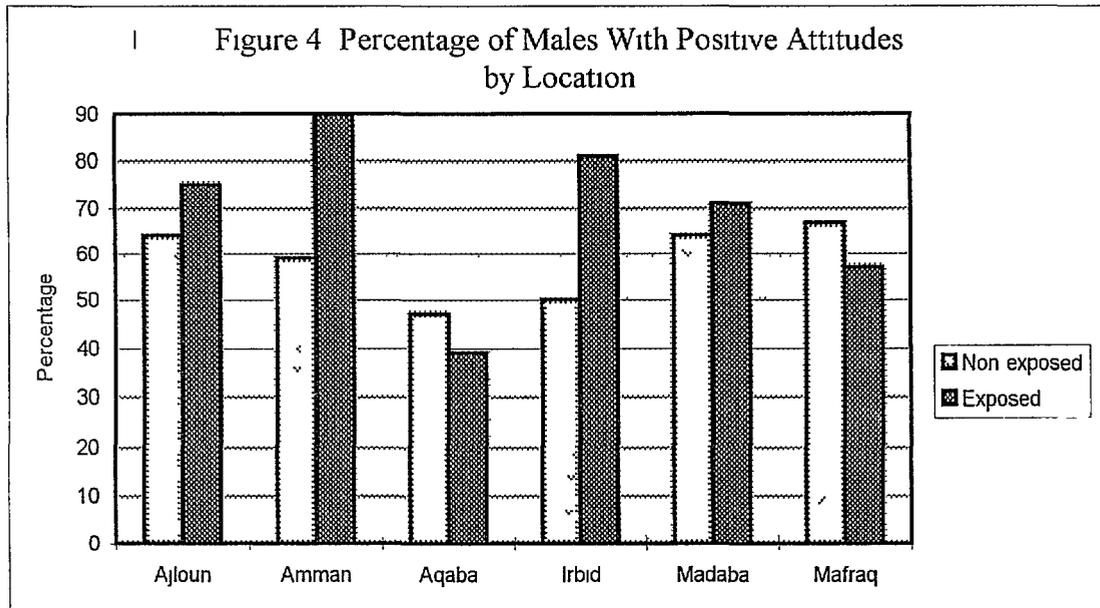
compared to the men. However, when comparisons were made between women and men, women scored highest in three areas, but the differences between women and men in the three areas where men scored the most percentage of positive attitudes were not great.

Figure 3 and 4 below illustrate the attitude scores attained among the women's and men's population respectively. More detailed results pertaining to these trends can be obtained from Tables C2 and C3 in Appendix C.

Figure 3 shows the comparison of females who were exposed to the campaigns and females who were not exposed. In four locations out of six, the exposed group had a higher percentage of positive attitudes than the non-exposed. The females in Madaba showed the most contrast between the two groups while the other three in Ajloun, Mafraq, and Amman do not show as great a contrast. However, the attitudes of the non-exposed females in Aqaba and Irbid showed the highest percentage of attitudes as a whole and showed a much higher percentage of positive attitudes when compared to the exposed females.



When comparing the male exposed groups to the male non-exposed groups in Figure 4, four out of six groups who were exposed to the campaigns showed a higher percentage of positive attitudes. Amman and Irbid exposed males showed the highest percentage of positive attitudes while in Ajloun and Madaba, the contrast was less prominent. In Aqaba and Mafraq, the non-exposed groups showed a higher percentage of positive attitudes but the contrast is not great when compared to the exposed group.



Regarding the effect of education levels on attitude scores attained, Table C4 demonstrates the findings for exposed and non-exposed participants' attitudes in relation to their level of education. The majority in both the exposed and non-exposed groups, who have positive attitudes have a community college and above education except in the Mafraq non-exposed group.

Following are examples of information shown in Table C4

- 1 Exposed participants in Amman (96%), and Ajloun (86%), with community college education and above had the highest percentage of positive attitudes in the whole sample

All locations in the community college education or above levels had more positive attitudes than those with secondary education and below in the exposed and non-exposed groups

- 2 In the negative attitudes, the exposed group participants with community college education or above scored less negative attitudes than the participants of secondary education or below except in Amman where there were no participants in the secondary education and below category

In the non-exposed group with negative attitudes, the participants with community college or above education levels scored more negative than those with secondary education and below in all locations except Aqaba

Table C5 in Appendix C illustrates the results for exposed and non-exposed participants' attitudes by age when compared to location and exposure to campaigns. When participants' age and location are compared to exposure to campaigns, Amman

participants (64%) who were 30-50 years of age and exposed to the campaigns scored the highest percentage of positive attitudes. The other trends are:

1. The majority of participants in the exposed groups scoring positive attitudes fell in the age range of 30 to 50 years in the Amman and Aqaba locations. For those in the non-exposed groups with positive attitudes, the majority fell in the same age group in Ajloun, Amman, Aqaba, Irbid and Madaba.
2. The majority of participants in the exposed groups who scored negative attitudes in the age range of 30 to 50 were in Ajloun and Madaba only. The age range of less than 30 contained the majority of those with negative attitudes in the locations of Amman, Aqaba, Irbid and Mafraq.

For those in the non-exposed group with negative attitudes, Mafraq and Amman were equally split for the age categories of less than 30 and 30 to 50. In Ajloun and Aqaba, the majority here fell within the less than 30 age group, while Irbid and Madaba fell within the 30 to 50 age group.

Table C6 in Appendix C shows the results of the analysis for exposed and non-exposed participants' attitudes in relation to average family monthly income. When examining the relationship between average monthly income and attitude score obtained, the following trends were identified:

For the income category 'less than JD 100'

1. The majority of the exposed and non-exposed participants scored negative scores.
2. There were no participants in this category in Amman.

For the income category 'JD 100-200'

1. The majority of those in the non-exposed group with negative attitudes fell into this income bracket for the locations of Ajloun, Madaba, and Mafraq.
2. The most positive in the exposed group was Ajloun at 64%.

For the income category 'More than JD 200'

1. For the exposed participants with positive attitudes the majority fell into this income bracket in all locations. This trend is replicated for the non-exposed group also scoring positive attitudes.

On average, the frequency of those with positive attitudes within the non-exposed and exposed groups scored similarly.

Summary for Survey Attitudes Section

- 1 When comparing the overall attitudes of both exposed and non-exposed groups who had positive attitudes, both the exposed women and exposed men had a higher percentage of positive attitudes than the non-exposed women and men, respectively. This was true in all of the other categories of age, education, and income.
- 2 Overall, when females exposed were compared to non-exposed females, the percentage of the exposed was higher while it was the reverse for men. The non-exposed male overall had a higher percentage of positive scores.
- 3 Generally, the majority of both men and women held positive attitudes, rather than negative ones. This was so for both exposed and non-exposed groups.
- 4 Regarding education levels, it was found that the majority of participants with a positive attitude for both the exposed and non-exposed groups had an education level of community college or above.
- 5 Considering the variable of age, it was generally found that the participants in the age category of 30 - 50 years held positive attitudes for both exposed and non-exposed groups.
- 6 As far as the income brackets are concerned, it was generally found that the majority of participants with a positive attitude in all locations, for both exposed and non-exposed groups fell into the income bracket of JD 200 and above.

3 3 3 SURVEY PRACTICES SECTION

Table 27 shows the participants' practices by exposure to the water awareness campaign. From this table, it is evident that exposure to water awareness activities had an impact on participants' water practices in Amman (0.059) and Madaba (0.010). This finding, similarly to others presented in the Knowledge and Attitudes Sections above brings to light the question of replicability of water awareness activities in the different locations. That is, were the water awareness activities implemented the same throughout the six locations or not? If yes (or no) it would be worth investigating further the 'why' this exposure has had different effects in different locations.

Table E1 demonstrates the participants' practices towards reading the water meters and water bill. It clearly shows that the majority of both exposed and non-exposed participants read the water meter occasionally. Only in Madaba it was observed that the non-exposed participants read the water meter more periodically than the exposed. However, in Amman and Mafraq, the difference was not highly noticeable regarding the number of exposed and non-exposed participants reading the water meter periodically.

In Amman, Aqaba, and Irbid, the number of exposed participants examining the water bill was higher than that of the non-exposed participants. In the three other locations, the observation is reversed.

The overwhelming majority of exposed participants tend to reduce their water consumption in order to face the previously observed water shortage. On the other hand, the majority of the non-exposed participants overcome the water shortage by buying water from tanks except in Aqaba where the majority use methods other than discussed to face this problem, however, not reducing their water consumption. This trend is demonstrated in Table 27.

Table 27 Practices Conducted in Case of A Water Cut

	Buy Water From Tanks		Add Tanks at the Roof		Reduce Consumption		Others	
	NE	E	NE	E	NE	E	NE	E
Irbid	31	10	6	3	4	22	4	4
Madaba	34	7	1	3	2	26	1	3
Amman	12	6	19	5	3	15	3	4
Aqaba		1	1	4	4	8	38	2
Ajloun	25	13	6	4	2	13	3	6
Mafraq	18	7	21			21	2	2

In Irbid, the highest percentage of the non-exposed participants check their water tanks 3-4 times a year while the majority of the exposed participants check the tanks twice a year. In Madaba, however, the majority of non-exposed participants check the water tanks only once a year compared to twice a year by the majority of the exposed participants. It is worth mentioning that in Madaba the highest percentage of participants that check their tanks frequently is observed and was in the non-exposed groups. In Amman and Ajloun, the trend of both exposed and non-exposed participants was similar by checking the water tanks once a year. The majority of non-exposed participants in Aqaba check the water tanks once a year. However, Aqaba's exposed participants were almost split into two halves, one checking the water tanks once a year and the other 3-4 times a year. In Mafraq, non-exposed participants tend to check their water tanks once a year, however, the exposed participants tend to check them twice a year. As a total, the highest percentage of both exposed and non-exposed participants tend to check the water tanks once a year. Table E3

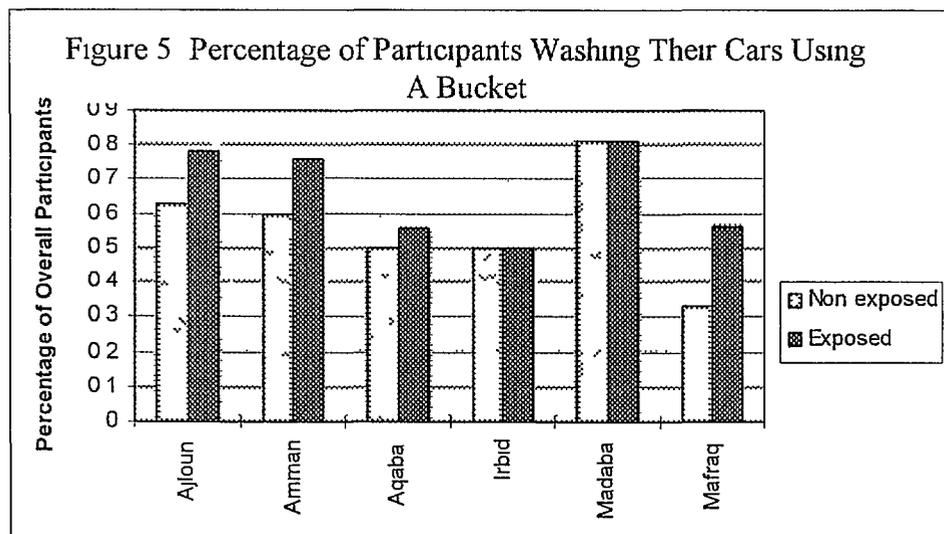
Although in Mafraq the non-exposed participants are split almost in half between those who check the pipe connections once and twice a year, and in Irbid the highest percentage of the non-exposed participants check their pipe connections once a year, the majority of the exposed participants in both Irbid and Mafraq, check the pipe connections twice a year. In Madaba, Amman, and Aqaba, the trend of both exposed and non-exposed participants was similar by checking the pipe connections once a year. The majority of non-exposed participants in Aqaba check the water tanks once a year. In Ajloun, non-exposed participants tend to check their pipe connections once a year however the exposed participants tend to check them frequently. As a total, the highest percentage of both exposed and non-exposed participants tend to check the pipe connections only once a year. Table E4

In Irbid the trend of both exposed and non-exposed participants was similar by checking the flush tanks once a year. In Madaba, the highest percentage of the exposed participants check their flush tanks frequently, however, the majority of the non-exposed participants are split in half between those who check the flush tanks twice a year and frequently. In Amman the trend of both exposed and non-exposed participants was similar by checking the flush tanks frequently, however, it is noticed that most of the participants in Amman did not answer this part of the survey questions. A very noticeable variation can be observed in Ajloun since the majority of the non-exposed participants check the flush tanks once a year, while most of the exposed participants check them frequently. Although in Mafraq the non-exposed participants are split almost in third between those who check the flush tanks once and twice a year, the exposed participants are split in half between those who check the flush tanks once and twice a year. As a total, the highest percentage of the non-exposed participants tend to check the flush tanks only once a year, while the majority of the exposed participants tend to check them frequently. However, in this part, there was a lot of data missing which makes generalizing a conclusion inaccurate. Table E5

The overwhelming majority of both exposed and non-exposed participants use direct tap water for drinking. In addition, almost the same percentage of both the exposed and non-exposed participants drink filtered water. However, a slightly higher percentage of non-exposed participants drink bottled or mineral water. Table E6

The majority of both exposed and non-exposed participants wash their cars weekly as can be detected from Table E7. As well, minority of both exposed and non-exposed participants wash their cars twice a week.

Most of the exposed and non-exposed participants wash their cars using a bucket, however, the percentage of exposed participants doing so is higher than that for the non-exposed. On the other hand, the percentage of non-exposed participants who are washing their cars either by hose or at a service station is higher than that for the exposed group. Figure 5 demonstrates the exact percentages of both exposed and non-exposed participants who wash their cars by a bucket in each location of the survey. Table E8 illustrates the complete data obtained for this part.



In general, the percentage of people trying to make use of rainwater is higher than that for those who do not for both exposed and non-exposed participants. Although, the percentage of the non-exposed participants who collect rainwater is higher than that for the exposed. Table E9

Although most of the exposed and non-exposed participants collect rainwater, 31 % of the non-exposed and 29 % of the exposed participant use this collected water for irrigation. Only in Madaba and Ajloun, the number of exposed participants using rainwater for irrigation is higher than that for the non-exposed. Table E10

As for using rainwater for drinking, it was observed that the percentage of exposed participants doing so is higher than that for the non-exposed participants although the non-exposed participants collect rainwater more than the exposed. Interestingly, in Aqaba none of the non-exposed participants would drink collected rainwater. On the other extreme it is observed that in Mafraq, the percentage of non-exposed participants drinking rainwater is higher than that for the exposed participants. Table E11

In surveying the use of rainwater for household works, it was observed that the percentage of exposed participants doing so is higher than that for the non-exposed participants. However, in Amman and Madaba the situation is reversed. Table E12

The majority of both exposed and non-exposed participants use tap water for gardens irrigation. However, the percentage of exposed participants using tap water is lower than that for the non-exposed participants. Interestingly, none of the non-exposed participants in Aqaba use other than tap water for gardens irrigation, while 2 out of 8 exposed participants having a garden in Aqaba use kitchen wastewater for irrigation. Despite this, in Amman and Ajloun, the percentage of exposed participants using tap water for irrigation is higher than that for the non-exposed.

Summary for Survey Practices Section

- 1 Generally, the exposed survey participants' practices towards water issues and consumption were more positive than those of the non-exposed participants. The exposed participants tend to reduce their water consumption to overcome the water shortage while the non-exposed participants tend to increase the water storage capacity or buy water from tanks.
- 2 The focus group results for both the exposed and non-exposed participants indicate that participants face water shortages, they welcome water awareness activities, and recommend the reduction of water consumption in the domestic arena, that is households.

- 3 Both exposed and non-exposed participants try to make use of rainwater. The percentage of exposed participants that would use rainwater for drinking or house works is higher than that of the non-exposed.
- 4 Common practices were mentioned by both exposed and non-exposed focus group participants for overcoming observed water shortages. Moreover, a number of non-exposed focus group participants mentioned using water saving devices, which means that they could be exposed to some extent to the water awareness campaign.
- 5 Generally, it was found that most of the practices of both exposed and non-exposed focus group participants do not conserve water, but rather as a means to cope with water cutoffs.
- 6 Most of the exposed participants who implemented practices changes after the awareness campaign have noticed a reduction in the value of the water bill.

3.3.4 OVERALL SURVEY RESULTS

From the survey results, overall exposed participants' knowledge scores were higher than those of the non-exposed participants whose majority scores were below 70%. Relatively few exposed participants (19 in total) scored over 85% across all locations, as was the case for the non-exposed participants (10 in total) across the locations. In other words, participants who had been exposed to the awareness campaign have a better knowledge of water issues than those who were not exposed to the campaign. This note is true regarding all variables of gender, age, monthly income, and education in almost all locations.

In general, exposed participants have a more realistic point of view regarding the volume of the crisis and the expected consequences. Therefore, they developed a sense of the crisis and few practices that would help in reducing water consumption. On the other hand, non-exposed participants try to overcome the water shortage by adopting some practices that do not reduce water consumption but rather to cope with forced water cutoffs.

Generally, both exposed and non-exposed survey participants' attitudes towards water issues were positive rather than negative. However, the variables of exposure to water awareness activities, gender, education, age, and monthly income were only partially indicative and influential on exposed and non-exposed survey participants' attitudes.

Both exposed and non-exposed participants here call for intensive public awareness campaigns as they all reported the extent to which personal and religious beliefs play a role in determining individuals' water consumption rates. Participants here suggested measures to be implemented by both the government and the public.

Regarding the water awareness campaign, although exposed and non-exposed focus groups showed contradictory views towards this, again this was repeated within the two groups themselves

3.4 LARGE CONSUMERS SURVEY

Large consumers have been surveyed with a special schedule due to the importance of conserving water in relation to the huge amounts of water consumed at their institutions. Exposure in this subsection is related to the use of water saving devices at the institution.

3.4.1 Overview of the Awareness Project in Water Activities in Regard to the Use of Water Saving Devices

One of the main objectives of the awareness project in water (APW) was to introduce water saving devices to the Jordan's public and to persuade consumers who consume large amounts of water to use these devices. In achieving this goal, the APW team conducted 86 activities this year, 1997, out of which 35 activities (29 seminars, 2 workshops, 4 special events) were concerned with water saving devices among which 14 seminars addressed large consumers of water. Table 28 summarizes the impact of these activities as reflected by the response of the different sectors in Jordan community.

Table 28 Results of APW Activities on the Use of Water Saving Devices

No	Activity	Individuals/ Public	Large Consumers	Total
1	Workshops seminars and special events conducted by APW in regard to the use of water saving devices (WSD's)	21	14	35
2	Exploration visits made by APW team for the use of WSD's	12	53	65
3	Planned exploration visits in the future	-	12	12
4	Individuals who paid visits to JES for additional information on WSD's	18	9	27
5	Site owners/managers contacted JES by phone for additional information on WSD's	61	22	83
6	Feasibility studies prepared by APW team on the use of WSD's	7	31	38
7	Sites using WSD's	16	12	28
8	Sites that are going to use WSD's	1	55	56

3 4 2 Survey Results

The total sample of the survey is twelve large water consumers in which industries, businesses, hotels and hospitals were included and categorized according to the use of water saving devices as shown in the following table

Table 29 Distribution of the surveyed participants

Category of Large Consumer	Total
Unaware of the use of WSD's	1
Already aware of the use of WSD's before APW activities started	2
Aware as a result of attending APW activities on WSD's	4
Aware by contacting others who attended APW activities	4
Heard of WSDs but not aware of any details	1

On average the size of the industry sampled consisted of over 200 employees. In all cases the water authority was the main source of water, followed by water tankers. On average the water bill per cycle was over JD 2,000. In 80 % of the exposed and 86 % of the non-exposed cases, water was a primary factor in the production process.

Interestingly 50 % of the participants here, participated in water awareness activities organized by JES, and MWI, such as workshops, reading literature and pamphlets, and water saving devices usage programs. Four participants heard from others about the water saving devices.

Although 41 % of the overall participants stated that they did not know what the largest water consuming sector in Jordan was, 33 % stated that it was agriculture, followed by industry (17 %), then domestic household uses (8%). Added here too is that 92 % of the overall participants agreed that a water crisis does exist in Jordan. Surprisingly, none of the exposed participants knew that agriculture is the largest water consuming sector in Jordan.

Finally although participants stated that they could reduce water consumption by employing water saving devices (80 % of exposed and 29 % of non-exposed), only 20 % of the exposed participants stated that the reduction would amount to an average between 15-30 % in water consumption while 57 % of the non-exposed participants did not. 80 % of exposed participants and 43 % of non-exposed do not use recycled water. All exposed participants rely on the sewage system for the disposal of polluted water while 57 % of non-exposed participants do.

The complete results of the large consumers survey are presented in Appendix F.

3 4 3 Interpretations

APW activities as well as personal visits has affected 28 site owners/managers to use WSD's out of which 12 large consumers listed in appendix F, and 16 individuals who were constructing private villas. Moreover, 56 large consumers listed in appendix F are in the process of using these devices. The results of the study conducted by APW on the use of WSD's has shown that the estimated water saving with use of these devices range around 15-33 % of the water consumption. The large consumers as categorized by APW team are those who consume more than 2,000 cubic meters of water per cycle. From this survey and the previous activities, the result of the use of these devices could result in around 22,000 m³ per year which amounts to about 30 000 JD for the total sample of survey participants. It is important at this point of time to assert that customs is a deterrent now to the use of these devices in businesses as well as the non availability of pressure free WSD's at the wholesalers stocks.

3 4 4 Implications

- APW needs to continue in its activities specially in the area of large water consumers and business because of large saving of water
- APW needs to work with contractors, Ministry of Tourism, Ministry of Trade and Commerce, Ministry of Water and Irrigation, Chamber of Industry and Chamber of Commerce, Engineers Association, engineering design and consulting firms, and the department Standards and Specifications to encourage new businesses to use these devices
- APW needs to work towards getting customs removed so that large businesses use them
- The following activities are to be intensified
 - ◆ Films to be shown on television
 - ◆ Brochures that are useful for specific target areas (e.g. Hotels existing and under construction)
 - ◆ Personal visits, feasibility studies, and follow up are necessary to persuade and convince large water consumers to adopt these devices and the use of other water conservation methods
 - ◆ Encourage local industries to manufacture WSDs locally, especially those working with 0-Pressure

3 4 5 Summary

The survey results as well as the activities conducted by APW has shown that there is a progressing trend of awareness with the use of WSD's specially in the area of large water consumers where eleven sites had already used WSD's and practically proved to be feasible in terms of water and money saving.

However, these results has also shown that the APW should be affiliated and intensified in the large consumers areas and to the Jordan public in general by means of television spots, seminars, brochures, personal site visits, development of demonstration sites and feasibility studies. Moreover, businesses will be much encouraged to use these devices by getting customs removed.

SECTION 4 0

OVERALL SUMMARY AND IMPLICATIONS FOR FOCUS GROUPS AND SURVEY

This section first presents a summary of the different results for the focus groups and survey in the areas of knowledge, attitudes, and practices

4 1 OVERALL SUMMARY

The design of the study allowed both qualitative and quantitative data to be collected through focus group discussions and survey data in the six areas to assess the beginning impact that the APW has had in the areas in which activities have been implemented since July 1994

One of the basic assumptions is that the implementation of water awareness campaigns will help create interest and inform people about using water efficiently. As people gain new and more knowledge, they will be able to develop more positive attitudes and finally they will adopt new practices that make sense to them. Basically it is easier to promote ideas and knowledge but it is harder and takes more time to change attitudes and habits which people have acquired over their lifetime

The study, both in the focus groups and supporting evidence in the survey, shows that people who were exposed to information have acquired knowledge and in most places have better knowledge about the subjects which were stressed by the Project. As expected it is important to note that not as much change in attitudes was expected and a fact that these is validated through the study. The exposed groups show improvement towards more positive attitudes but not in all cases. Lastly, it is expected that people will begin to change some practices, but that it will require more time, repeated messages, personal contact and peer pressure to see major changes. The study indicates that some practices have been affected but acquired habits are not changed easily

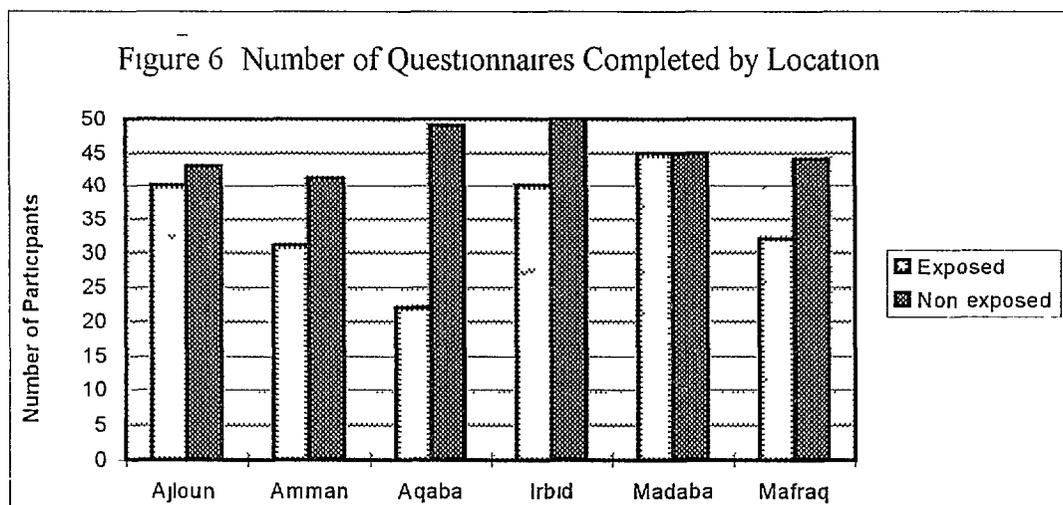
Overall results of focus groups meetings showed that exposed and non-exposed groups in all locations had a rather good level of knowledge on water issues, with the exposed being more knowledgeable and more able to identify specific details and information. This result was confirmed by the overall result of the survey on the knowledge section, which showed that both exposed women and exposed men had a higher percentage of knowledge, (that is scoring over 70%), than the non-exposed women and men, respectively, which also applied to all other categories of age, education and income

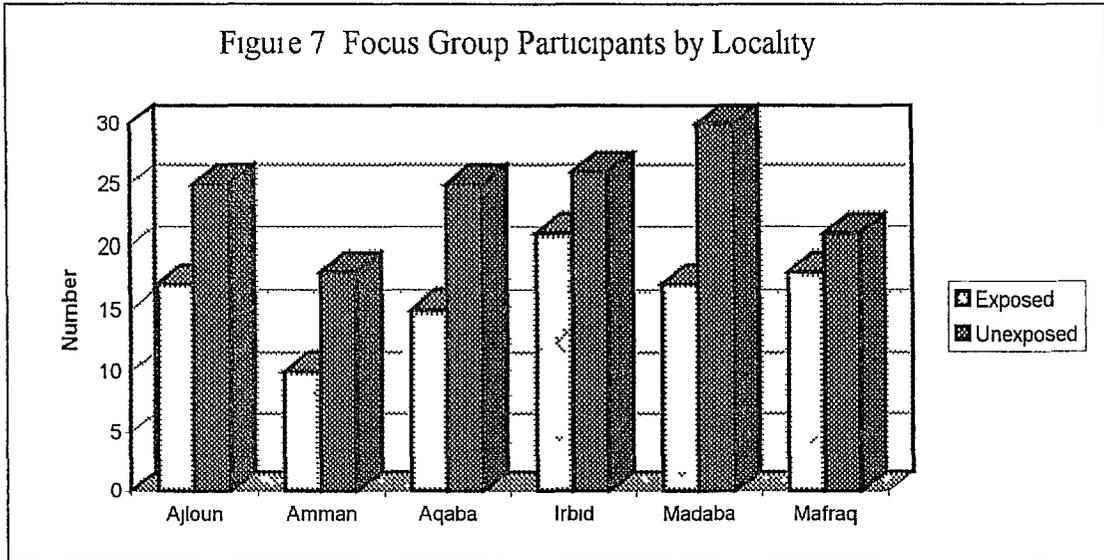
This represents a logical connection between focus groups and survey and which implies that APW's activities have been successful in spreading knowledge on water

issues over the different locations and across the different categories of age, gender, education and income

However, when looking at the differences in some of the survey results, for example in the knowledge section in Irbid, we see that the a higher percentage of the non-exposed groups had scored over 70% as opposed to the exposed ones, whereas the results of the focus groups discussions conducted in Irbid did not reflect this fact The focus groups actually shows that the exposed are rather more knowledgeable in water issues than the non-exposed APW needs to look into these differences and other differences which are reflected in the study in light of the different variables, regarding type and number of activities and the target groups that were conducted in Irbid and in other places which show some contrasting or contradictory results

A number of tables in the text are presented that give a summary of the main data analysis findings for the three different sections of the questionnaire and focus group interviews (knowledge, attitudes and practices) for both non-exposed and exposed groups These include the field and focus groups' survey results with the relevant significance (Chi square)



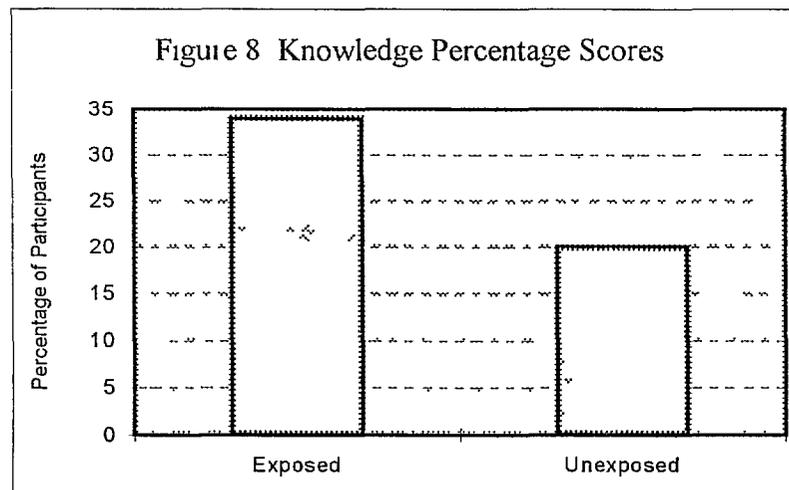


In the analysis of the data, the study focused on the data gained in the focus group interviews to give in-depth information concerning knowledge, attitudes, and practices. The survey is used as supporting data to help clarify the data gained in the focus group. The data gained in the Phase II study also helps to confirm overall trends which were relevant in Phase I in those areas related to age, education, income, and gender.

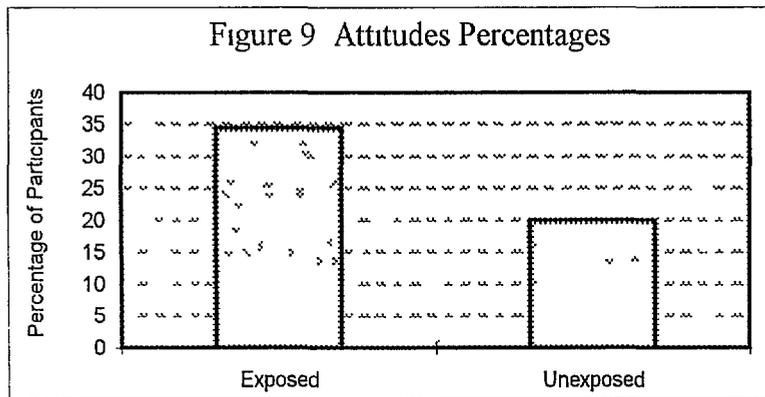
Figures 8 and 9 demonstrate the overall relative scores for exposed and non-exposed participants for the two sections of knowledge and attitudes.

This was achieved as follows:

- For the Knowledge section, those scoring more than 70% were considered to pass. On that basis, the number of those exceeding 70% on the knowledge section constituted 33.5% and 20% for the exposed and non-exposed group, respectively.



- For the Attitudes Section, those respondents with positive scores (based on evaluation measures described in the report) were compared. On that basis, the number of those meeting the positive attitudes thresholds constituted 34 % and 20 % for exposed and non-exposed, respectively.



For the Practices Section, every practice that was measured was analyzed separately. In general, the exposed participants' practices tend to conserve water more than the non-exposed participants.

Summary for Knowledge, Attitudes, and Practices

Both exposed and non-exposed groups in all locations showed a rather good level of knowledge on basic water issues. The exposed groups in the locations where water saving devices campaigns were conducted showed an impressive level of knowledge regarding the devices, how they work, and the water savings that can be achieved by using them.

The exposed groups in locations where these campaigns were not conducted showed some knowledge on water saving devices but could not identify specific features. The non-exposed groups, on the other hand, and in all locations, were almost ignorant about them. This also shows that the interpersonal communications methods used by the APW in cooperation with the JES branches in the various locations were effective and needed.

Both exposed and non-exposed groups in all locations showed rather positive attitudes toward water problems and their roles in conserving water. The exposed groups in most locations, however, attached more significance to the personal attitude and responsibility regarding conservation.

In all six locations, exposed members in the focus groups reported a noticeable change in their behavior as a result of their exposure to the water campaign.

Overall Interpretations of Knowledge, Attitudes, and Practices

All exposed groups in locations where water saving devices campaigns were conducted had good knowledge on water saving devices whereas almost all of the non-exposed did not hear about them. This shows that the water saving devices campaign conducted by the APW was highly effective since APW is the first and the only project in the country that has conducted information activities in this field. This can be explained by the fact that APW has developed a complete package on WSD's which includes a working model, display boards, film and brochures which were used in the activities. People were able to see for themselves the devices, the way they work and the quantity of water which is saved. This is in line with the Adult Learning Theory in that adults are more apt to learn and to retain what they learn when

- They can use what they learn,
- It relates directly to their immediate and actual needs, and,
- The learning is presented to them in as many forms of delivery as possible, audio, visual tactile etc

Although both groups in almost all locations had positive attitudes towards water problems and water conservation, we can see a greater tendency, on the part of the exposed groups, to attach more significance to personal commitment and positive attitudes in the field of water conservation. This shows that exposure to water awareness activities was in fact effective in changing people's attitudes which coincides with the increase in knowledge level. Both groups in almost all locations emphasized the importance of using the media and several interpersonal communication based activities.

Most group members of both categories in all locations use tap water for drinking, which may be attributed to people's trust in water quality or unwillingness or inability to do otherwise. In most of APW's activities conducted in the various locations, a specialist from an official agency was present and to assure the people of the quality of water and the soundness of water testing measures conducted by the official agencies.

Exposed groups reported a positive change in their practices as a result of the campaigns conducted in their communities which shows that the campaign has been successful in bringing about a change in practices which was preceded by a change in awareness level and attitudes.

- Both exposed and non-exposed participants have relatively positive attitudes towards the question of water. This is due to the fact that most of people in Jordan are suffering from water shortage and cutoffs. This is the prime reason for adopting any water conservation technique.
- Amman and Ajloun fared the best in terms of knowledge, attitudes, and practices. This is likely to be due to the more concentrated activities of the JES branches in Amman and Ajloun.

- People of Aqaba are not familiar with water shortages. Moreover, non-exposed participants believe that Jordan is not facing a water shortage crisis. On the other hand, exposed participants know about the water crisis, but do not conserve water since they do not feel that the crisis influences Aqaba residents.

4.2 OVERALL IMPLICATIONS

- In order to maintain the momentum of APW's activities in bringing about a higher level of knowledge in the different locations and among the various target groups, APW should continue its regular activities based on inter-personal communications through its branches where they exist or other community groups in the different parts of the country.
- APW needs to use the media more than in the past phase as most participants of both groups believed that it is very effective in increasing knowledge and changing attitudes.
- In order to maintain the effect that APW had on people's attitudes, activities need to continue and improve.
- Continued emphasis needs to be given to water quality in APW activities, making sure that specialized staff from official agencies dealing with this issue are present to give their professional opinions on this issue.
- Since almost all members of both exposed and non-exposed categories believed that religious beliefs had a strong effect on people's water consumption behavior, APW should focus on this and use this factor to enhance the effectiveness of its activities. This implies working with people in the Ministry of Awqaf and the Christian clergy in this field. The Project needs to continue the efforts with both the religious organizations and will be able to use the demonstration sites at the King Abdullah mosque and Madaba church to illustrate effective methods in water conservation.
- Most members suggested focusing APW's activities towards younger generations and women.
- APW should employ the techniques and principles of Adult Learning Theory in designing its campaigns and activities since using some of these principles and techniques by the APW has already proven to be very effective.
- APW should be looking at each location's specific needs and concerns in order to be able to design the appropriate type of activity and develop the content of materials presented in that activity to make sure that it will affect people's attitudes and practices.

- As the result of this study and information gained in the monitoring of the Project, APW needs to develop or target communities where the need is greatest for example Women, children, and large consumers of water Special effort needs to be made in those communities where the awareness is low and the need is the greatest
- In the next phase of the Project, more activities need to move to an implementation phase where more activities are based on actual practices Since people responded positively to the water saving devices information, the APW should incorporate demonstration models, sites, field tours when possible The activities should be based on real needs and be community focused Since leaders in the branches and other organizations have been trained on how to implement community campaigns and they have received training in assessing community needs, they should be used more in the communities to determine the interests and needs of the people

4.3 RECOMMENDATIONS

In summary, some of the overall major results as shown in the study are highlighted with some corresponding recommendations as indicated below

RESULTS	RECOMMENDATIONS
Behavioral Study Phase I indicated that women had less knowledge than men and should be targeted in the campaigns Through working with women's organizations APW held many activities with women and in the Behavior Study Phase II, the majority of the exposed group of women showed improved knowledge However, the level of women's knowledge was still below that of men	Women should be a major target in the campaigns because the efforts show an improvement over the non-exposed participants but that they are still not as knowledgeable as the men The women have also the ability to influence other family members as shown in the focus group discussions
The study also showed that people both the exposed and unexposed groups generally had positive attitudes about water conservation but the most positive were in the 30-50 year old category There were much less positive attitudes and knowledge in the younger and older groups	The campaigns should target the younger generation because they can be easily influenced, are readily reached through schools and teachers However, rather than just reaching individuals, campaigns need to train and target the teachers also Resource material needs to be developed which can be used by schools, and target mass media efforts to this age with films and educational material

<p>Amman is a good example of a community which has had the most activities and the study shows that the exposed groups in Amman had in fact gained more information and developed more positive attitudes than the non-exposed group</p>	<p>As shown in the study, if areas are targeted heavily, changes are evident. Through the study and further investigation in the communities, a plan needs to show which communities need the information and the subjects which are most important</p>
<p>Participants who were exposed to public awareness campaigns saw the need to develop more awareness and suggested though that the information is hard to spread. The suggestions were made that television and mass media needs to be used but that the communities are very useful and important in spreading information</p>	<p>The leaders in the JES branches and other community organizations in these target communities need to be trained and used to implement the activities. Since it is not possible to hire staff to implement all of these needed activities, volunteer efforts must be maximized.</p> <p>One of the advantages to using community based campaigns is that the information is more targeted to the individual needs and peer pressure can be used to persuade people to change practices and multiply the effects</p>
<p>Results on water saving devices shown a major impact on those people who were exposed to this information in the campaigns. Even though this information has only been targeted since January 1997 the majority of those who had been exposed, knew about the devices, knew how they operated and knew about the amount of water which could be saved</p>	<p>This example shows that when information is structured so people can hear about the subject, see actual models and demonstrations, receive specific information with corresponding films and mass communications, they are more apt to learn and retain the information which is given. APW needs to develop more of the learning experience for participants using this method. Demonstration models and sites need to be used in the campaigns as field tours for school children, religious organizations and other community special events</p>
<p>Effects on large consumers of water shows that when industries and businesses can not only receive information but develop personal contacts and service, they will use the information when it suits their situation or is feasible</p>	<p>APW needs to continue working with the large consumers of water because the effect of one hotel or large business in saving water will have a great effect on water savings</p>

<p>The study also points out that as people learn more about a subject, they can identify possible solutions to solving problems. In this project, people who were more exposed could identify not only the responsibilities needed to be taken by the government but also by the individuals in a joint effort to solve the water crisis.</p>	<p>As people become more involved, they usually feel more responsible. In many of the campaigns as people worked in identifying the problems, they decided that many of the problems are caused by behavior of the individuals. In this case, again developing workshops, forums, and personal contacts will help persuade citizens to take responsibility for their actions and help them to identify how to convince government entities to also be responsible in their roles.</p>
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APPENDIX A

DESCRIPTIVES

Table A1 Gender Distribution of Participants

	Female		Male		Total	
	NE	E	NE	E	NE	E
Irbid	24	23	24	16	48	40
Madaba	22	27	22	17	45	45
Amman	18	20	22	11	41	31
Aqaba	16	8	32	13	49	22
Ajloun	19	20	22	20	41	40
Mafrq	15	25	27	7	42	32
Total	114	123	149	84	266	210

Table A2 Age Distribution of Participants

	Less Than 18 years		18-30 yrs		31-40 yrs		41-50 yrs		51-60 yrs		61-73 yrs		Total	
	NE	E	NE	E	NE	E	NE	E	NE	E	NE	E	NE	E
Irbid	3	2	15	20	21	11	7	2	1	3	1	2	48	40
Madaba		1	18	20	17	11	4	9	3	4	3		45	45
Amman	2	3	13	11	12	17	9		4		1		41	31
Aqaba	2	4	20	7	19	8	5	2	3	1			49	22
Ajloun	3	2	16	15	13	11	7	11	2	1			41	40
Mafrq	1	2	22	18	9	8	8	3	2	1			42	32

Table A3 Religion Distribution of Participants

	Muslim		Christian		Total	
	NE	E	NE	E	NE	E
Irbid	44	40	3		48	40
Madaba	30	29	14	15	45	44
Amman	38	30	3	1	41	31
Aqaba	48	20	1		49	22
Ajloun	36	35	5	5	41	40
Mafrq	40	29	2	3	42	32

Table A4 Marital Status Distribution of Participants

	Single		Married		Divorced		Widowed		Total	
	NE	E	NE	E	NE	E	NE	E	NE	E
Irbid	17	19	29	20		1	2		48	40
Madaba	13	10	31	29			1	3	45	43
Amman	11	10	29	20		1	1		41	31
Aqaba	14	3	35	18					49	22
Ajloun	14	15	26	24		1			41	40
Mafraq	15	18	24	13	1		1	1	41	32
Total	84	75	184	124	1	3	5	4	275	206

Table A5 Education Level Distribution of Participants

	Illiterate		Basic Educ		Second Educ		Comm College		B Sc		Post Graduate	
	NE	E	NE	E	NE	E	NE	E	NE	E	NE	E
Irbid			1	3	9	10	9	9	25	16	4	1
Madaba		2	5		7	15	13	16	19	11	1	1
Amman	1		1		8	1	9	11	19	12	3	7
Aqaba			2	2	21	7	11	8	11	2	4	1
Ajloun	1	1	2		13	9	18	19	7	10		1
Mafraq	3	1	1	3	14	18	8	4	13	5	3	1
Total	5	4	12	8	72	50	68	67	94	56	15	12

Table A6 Occupation Distribution of Participants

	Ajloun	Amman	Aqaba	Irbid	Madaba	Mafraq	TOTAL
Student	19	6	4	9	4	10	52
Housewife	6	9	1	4	11	8	39
Haardresser	0	0	1	1	0	0	2
Nursing	0	0	1	2	0	0	3
Government Employee	18	8	15	18	15	31	105
Retired	1	0	0	1	1	0	3
teacher / counselor	8	23	11	23	27	12	104
farmer	4	4	0	5	2	3	18
unemployed	2	0	0	1	0	0	3
public relations	0	0	0	1	1	0	2
business	0	3	11	2	4	0	23
engineer	5	7	6	6	7	0	33
medical doctor	1	1	0	3	0	0	5
journalist	2	0	0	2	0	0	4
secretary	2	0	3	1	1	2	9
vct	0	1	1	0	1	0	3
sportsman	0	0	1	0	0	0	1
laborer	2	6	8	6	1	0	23
driver	1	0	0	1	0	0	2
pharmacist	1	1	3	1	0	0	6
accountant	2	0	0	0	2	1	5

Table A7 House Ownership

	Rented		Owned		Total	
	NE	E	NE	E	NE	E
Irbid	35	30	10	9	47	40
Madaba	32	32	11	11	45	45
Amman	28	20	10	11	41	31
Aqaba	20	7	29	13	49	22
Ajloun	33	32	7	8	41	40
Maftaq	32	26	9	6	40	32

Table A8 Household Monthly Income

	Less Than 100 JD		100-200 JD		Over 200 JD		Total	
	NE	E	NE	E	NE	E	NE	E
Irbid	2	6	20	15	25	18	48	40
Madaba	3		14	12	28	33	45	45
Amman			12	4	29	27	41	31
Aqaba	1		15	7	32	14	49	22
Ajloun	6	4	17	20	18	16	41	40
Maftaq	3	3	18	15	18	14	42	32

Table A9 Average Water Bill Per Cycle

	Less Than 5 JD		5-15 JD		16-31 JD		More Than 31 JD		Total	
	NE	E	NE	E	NE	E	NE	E	NE	E
Irbid	16	20	29	17	3	2		1	48	40
Madaba	13	13	26	24	3	5	3	2	45	44
Amman	10	8	19	11	7	6	4	6	41	31
Aqaba	17	7	20	10	7	2	5	3	49	22
Ajloun	13	15	21	18	6	3	1	2	41	40
Maftaq	11	8	19	19	8	4	2	1	42	32

Table A10 Number of Available Bathrooms in Household

	One		Two		Three or More		Total	
	NE	E	NE	E	NE	E	NE	E
Irbid	13	14	31	21	4	5	48	40
Madaba	23	18	15	23	7	3	45	45
Amman	14	12	18	11	8	8	41	31
Aqaba	14	10	30	9	5	3	49	22
Ajloun	17	18	21	14	3	7	41	40
Mafrq	20	16	18	12	4	4	42	32

Table A11 Availability of Certain Items in Household

	Swimming Pool		Garden		Backyards		More Than One Car	
	NE	E	NE	E	NE	E	NE	E
Irbid		1	28	17	12	7	3	3
Madaba		2	17	20	10	14	6	4
Amman			11	17	9	10	3	9
Aqaba			13	9	14	8	6	4
Ajloun		1	13	20	8	14		2
Mafrq	2		19	14	16	12	4	1

APPENDIX B

Knowledge Section Results

Table B1 Percentages of Knowledge Score by Gender, Exposure, and Location

Score	≤ 70%		Above 70%	
	NE	E	NE	E
Ajloun				
Female	55 %	68 %	13 %	20 %
Male	45 %	32 %	87 %	80 %
Total (Number)	33	25	8	15
Amman				
Female	47 %	80 %	33 %	50 %
Male	53 %	20 %	67 %	50 %
Total (Number)	34	15	6	16
Aqaba				
Female	35 %	80 %	17 %	17 %
Male	65 %	20 %	83 %	83 %
Total (Number)	43	15	6	6
Irbid				
Female	46 %	21 %	54 %	33 %
Male	54 %	79 %	46 %	67 %
Total (Number)	37	37	13	6
Madaba				
Female	53 %	69 %	33 %	47 %
Male	47 %	31 %	67 %	53 %
Total (Number)	36	29	9	15
Mafrq				
Female	45 %	86 %	0 %	60 %
Male	55 %	14 %	100 %	40 %
Total (Number)	33	22	9	10

Table B2 Percentages of Knowledge Score for Women by Exposure and Location

	Exposed		Non-Exposed	
	≤ 70%	>70%	≤ 70%	>70%
Irbid	91%	9%	70%	30%
Madaba	74%	26%	86%	14%
Amman	60%	40%	89%	11%
Aqaba	86%	14%	94%	6%
Ajloun	85%	15%	95%	5%
Mafrq	83%	17%	100%	0%

Table B3 Percentages of Knowledge Score for Men by Exposure and Location

	Exposed		Non-Exposed	
	=< 70%	>70%	=< 70%	>70%
Irbid	80%	20%	71%	20%
Madaba	74%	26%	86%	14%
Amman	60%	40%	89%	11%
Aqaba	62%	38%	84%	16%
Ajloun	44%	56%	68%	32%
Matraq	76%	24%	100%	0%

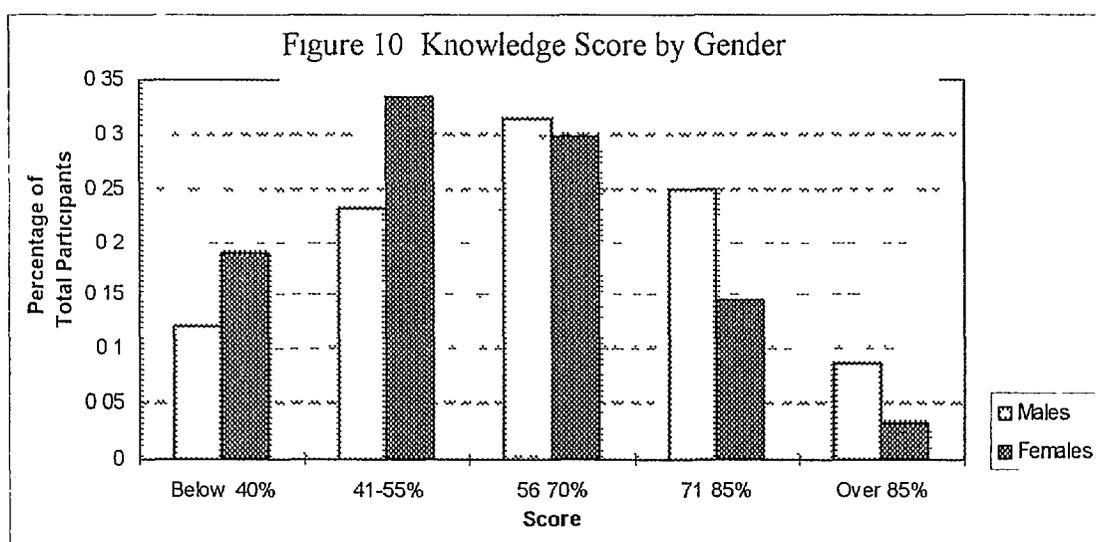


Table B4 Percentage of Knowledge Score by Education, Exposure, and Location

Score	Below 40 %		40-55 %	
	NE	E	NE	E
Ajloun Secondary Education and Below	31 %	28 %	57 %	20 %
Comm College and Above	69 %	72 %	43 %	80 %
Total (Number)	32	25	7	15
Amman Secondary Education and Below	21 %		0 %	6 %
Comm College and Above	69 %		100 %	94 %
Total (Number)	33	15	7	16
Aqaba Secondary Education and Below	53 %		0 %	0 %
Comm College and Above	47 %		100 %	100 %
Total (Number)	43		6	6
Irbid Secondary Education and Below	23 %	36 %	15 %	14 %
Comm College and Above	77 %	64 %	85 %	86 %
Total (Number)	35	33	13	7
Madaba Secondary Education and Below	21 %	38 %	0 %	38 %
Comm College and Above	79 %	62 %	100 %	62 %
Total (Number)	24	29	2	16
Mafraq Secondary Education and Below	45 %	82 %	33 %	40 %
Comm College and Above	55%	18 %	67 %	60 %
Total (Number)	33	22	9	10

Table B5 Percentages of Knowledge Score by Age, Exposure, and Location

Score	≤ 70 %		Above 70 %	
	NE	E	NE	E
Ajloun				
Less than 30	52 %	52 %	25 %	27 %
30 - 50 yrs	42 %	48 %	75 %	67 %
Over 51 yrs	6 %	0 %	0 %	6 %
Total (Number)	33	25	8	15
Amman				
Less than 30	38 %	53 %	29 %	38 %
30 - 50 yrs	53 %	47 %	43 %	62 %
Over 51 yrs	9 %	0 %	28 %	0 %
Total (Number)	34	15	7	16
Aqaba				
Less than 30	44 %	53 %	50 %	33 %
30 - 50 yrs	49 %	40 %	50 %	67 %
Over 51 yrs	7 %	7 %	0 %	0 %
Total (Number)	43	15	6	6
Irbid				
Less than 30	38 %	61 %	31 %	29 %
30 - 50 yrs	54 %	24 %	62 %	71 %
Over 51 yrs	8 %	15 %	7 %	0 %
Total (Number)	37	33	13	7
Madaba				
Less than 30	42 %	57 %	33 %	31 %
30 - 50 yrs	44 %	36 %	56 %	56 %
Over 51 yrs	14 %	7 %	11 %	13 %
Total (Number)	8	28	9	16
Mafraq				
Less than 30	64 %	68 %	22 %	50 %
30 - 50 yrs	33 %	32 %	78 %	40 %
Over 51 yrs	3 %	0 %	0 %	10 %
Total (Number)	33	22	9	10

Table B6 Percentages of Knowledge Scores by Monthly Income, Exposure, and Location

Score	≤ 70 %		Above 70 %	
	NE	E	NE	E
Ajloun				
Less than 100 JD	18 %	12 %	0 %	6 %
100-200 JD	42 %	56 %	38 %	40 %
More than 200 JD	39 %	32 %	62 %	54 %
Total	33	25	8	15
Amman				
100-200 JD	32 %	20 %	14 %	17 %
More than 200 JD	68 %	80 %	86 %	83 %
Total	34	15	7	16
Aqaba				
100-200 JD	36 %	40 %	0 %	0 %
More than 200 JD	64 %	60 %	100 %	100 %
Total	42	15	6	6
Irbid				
Less than 100 JD	6 %	18 %	0 %	0 %
100-200 JD	44 %	39 %	38 %	26 %
More than 200 JD	50 %	39 %	62 %	74 %
Total	34	33	13	7
Madaba				
100-200 JD	42 %	28 %	0 %	25 %
More than 200 JD	58 %	72 %	100 %	75 %
Total	33	29	9	16
Mafraq				
Less than 100 JD	7 %	14 %	11 %	0 %
100-200 JD	50 %	59 %	33 %	20 %
More than 200 JD	43 %	27 %	56 %	80 %
Total	30	22	9	10

APPENDIX C

Attitudes Section Results

Table C1 Percentages of Attitudes Score by Gender, Exposure, and Location

Score	Negative		Positive	
	NE	E	NE	E
Ajloun				
Female	50 %	55 %	44 %	48 %
Male	50 %	45 %	56 %	52 %
Total	16	11	25	9
Amman				
Female	36 %	83 %	50 %	60 %
Male	64 %	17 %	50 %	40 %
Total	14	6	6	5
Aqaba				
Female	11 %	31 %	47 %	44 %
Male	89 %	69 %	53 %	56 %
Total	19	13	30	9
Irbid				
Female	20 %	80 %	64 %	44 %
Male	80 %	20 %	36 %	56 %
Total	15	15	33	25
Madaba				
Female	50 %	54 %	48 %	62 %
Male	50 %	46 %	52 %	38 %
Total	18	11	27	34
Mafraq				
Female	40 %	73 %	33 %	55 %
Male	60 %	27 %	67 %	45 %
Total	15	11	27	31

**Table C2 Percentages of Attitudes Score for Women
by Exposure and Location**

	Exposed		Non-Exposed	
	Positive	Negative	Positive	Negative
Irbid	48%	52%	88%	12%
Madaba	78%	22%	59%	41%
Amman	75%	25%	72%	23%
Aqaba	50%	50%	88%	12%
Ajloun	70%	30%	58%	42%
Maftaq	68%	32%	63%	37%

**Table C3 Percentages of Attitudes Score for Men
by Exposure and Location**

	Exposed		Non-Exposed	
	Positive	Negative	Positive	Negative
Irbid	81%	19%	50%	50%
Madaba	71%	30%	64%	36%
Amman	90%	10%	59%	41%
Aqaba	39%	61%	47%	53%
Ajloun	75%	25%	64%	36%
Maftaq	57%	43%	67%	33%

Table C4 Percentages of Attitudes Score by Education, Exposure, and Location

Score	Negative		Positive	
	NE	E	NE	E
Ajloun				
Secondary Education and Below	44 %	54 %	36 %	14 %
Comm College and Above	56 %	46 %	64 %	86 %
Total (Number)	16	11	25	29
Amman				
Secondary Education and Below	46 %	0 %	11 %	4 %
Comm College and Above	54 %	100 %	89 %	96 %
Total (Number)	13	6	7	5
Aqaba				
Secondary Education and Below	53 %	54 %	43 %	22 %
Comm College and Above	47 %	46 %	57 %	78 %
Total (Number)	19	13	30	9
Irbid				
Secondary Education and Below	33 %	27 %	15 %	36 %
Comm College and Above	67 %	63 %	85 %	64 %
Total (Number)	15	15	33	25
Madaba				
Secondary Education and Below	11 %	64 %	37 %	29 %
Comm College and Above	89 %	36 %	63 %	71 %
Total (Number)	18	11	7	34
Mafraq				
Secondary Education and Below	47 %	64 %	41 %	48 %
Comm College and Above	53 %	36 %	39 %	52 %
Total (Number)	15	11	7	31

Table C5 Attitudes by Age, Exposure, and Location

Score	Negative		Positive	
	NE	E	NE	E
Ajloun				
Less than 30	56 %	27 %	40 %	48 %
30 - 50 yrs	44 %	73 %	52 %	48 %
Over 51 yrs	0 %	0 %	8 %	4 %
Total (Number)	16	11	25	29
Amman				
Less than 30	46 %	83 %	33 %	36 %
30 - 50 yrs	46 %	17 %	55 %	64 %
Over 51 yrs	8 %	0 %	12 %	0 %
Total (Number)	13	6	7	25
Aqaba				
Less than 30	47 %	61 %	43 %	42 %
30 - 50 yrs	42 %	31 %	53 %	58 %
Over 51 yrs	11 %	8 %	4 %	0 %
Total (Number)	6	6	30	7
Irbid				
Less than 30	20 %	53 %	45 %	56 %
30 - 50 yrs	73 %	27 %	52 %	36 %
Over 51 yrs	7 %	20 %	3 %	8 %
Total (Number)	15	15	33	25
Madaba				
Less than 30	44 %	36 %	37 %	50 %
30 - 50 yrs	56 %	55 %	41 %	41 %
Over 51 yrs	0 %	9 %	22 %	9 %
Total (Number)	18	11	7	34
Mafraq				
Less than 30	47 %	64 %	59 %	62 %
30 - 50 yrs	47 %	36 %	37 %	33 %
Over 51 yrs	6 %	0 %	4 %	5 %
Total (Number)	15	11	7	21

Table C6 Percentages of Participants Obtaining Attitudes Score by Income, Exposure, and Location

Score	Negative		Positive	
	NE	E	NE	E
Ajloun				
Less than 100 JD	19	18	12	7
100-200 JD	56	64	32	45
More than 200 JD	25	18	56	48
Total	16	11	25	9
Chi-Square				
Amman				
100-200 JD	43	17	22	12
More than 200 JD	57	83	78	88
Total	14	6	27	25
Chi-Square 0 312 0 621				
Aqaba				
Less than 100 JD			3	
100-200 JD	47	38	20	22
More than 200 JD	53	62	77	78
Total	19	13	30	9
Chi-Square 0 052 0 153				
Irbid				
Less than 100 JD		20	6	12
100-200 JD	47	47	39	32
More than 200 JD	53	33	51	52
Total	15	15	33	25
Chi-Square 0 935 0 756				
Madaba				
Less than 100 JD	11		3	
100-200 JD	50	27	19	26
More than 200 JD	39	73	78	74
Total	18	11	27	34
Chi-Square 0 036 0 384				
Mafraq				
Less than 100 JD	7	18	8	3
100-200 JD	50	55	44	29
More than 200 JD	43	27	48	35
Total	4	11	25	31
Chi-Square 0 344 0 285				

APPENDIX D

FOCUS GROUPS SUMMARY

Below is a discussion of the themes resulting from the focus groups. Themes emanating from the discussions have been italicized to allow for specified ideas to be transmitted into the interpretations and for future reference. At the end of each locality description, a summary of recurring themes for exposed and unexposed participants is presented.

D-1 KNOWLEDGE SECTION

Ajloun Non-exposed Groups - There was variation from the participants in Ajloun regarding Jordan's climate being *arid*, or *semi arid*. Rain intensity was believed to be between *100 - 600 mm per year*, and rates of evaporation varied from *3%, 68% or 90%*. Participants here were also in agreement that *mountains* did affect climate variations and that the presence of *forests* would increase *rain intensity* in some areas. The *unavailability of regional or continental rivers* was also reported as affecting Jordan's climate.

Regarding water pollution, Ajloun participants agreed that Jordan had a *water pollution problem* due to *industrial waste* and *population growth*. The *pollutants* can be biological, chemicals, cesspools, algae, solid wastes, olive oil presses, landfills, fertilizers, wastewater networks, and industry. Besides such water pollution, participants in Ajloun were split about the use of treated waste water, one half agreed that *treated waste water is not suitable for irrigation* in any form whilst the other half suggested that *it should be used for irrigation of forestation plants, and/or mining and industry*.

Participants here also agreed upon Jordan's water resources, *groundwater, surface water, rain water, springs and dams and water harvesting*. The majority however, *did not know* about the sustainability of current water resources. The largest water consuming sector was believed to be the *municipal* (80%) followed by *agriculture* and *industry*. Regarding water consumption per capita, participants in Ajloun agreed that it was *less* than the international average, and lay *between 2 - 35 liters per day*.

The general opinion on water saving devices was that they must be *very expensive* as otherwise they would be available in every household. The majority however, *did not know* what these devices were. Those who had heard of them claimed that they knew of people who brought such devices from Gulf States.

Considering water conservation, the general agreement in Ajloun was that this was *the responsibility of both the government and the public*, and that there should be *a law requiring every household to build its own well*.

Ajloun Exposed Groups - There was variation from the participants in Ajloun regarding Jordan's climate being *arid*, or *semi arid*. Rain intensity was believed to reach *700 mm per year maximum*. It was also agreed that *the highest amount of rain falls over the mountains in the northern part of Jordan*. The *unavailability of big water surfaces and rivers* was also reported as affecting Jordan's climate. Finally, it was also agreed upon that *mainly rain water goes to the Dead Sea*. Also, *rainwater goes equally to evaporation, dams and groundwater*.

Regarding water pollution, Ajloun participants agreed that *the presence of cesspools is due to the absence of a waste water network*. *Industrial waste, agricultural chemicals, fertilizers and pesticides, organic matter dissociation, septic tanks, acid rain, the Demona reactor and solid waste landfills* are all pollution causes in Jordan. Drinking water in Jordan has to be *treated* before it can be used, and most of the participants stated *boiling* the water especially for preparing tea. Participants here also agreed that *the treatment of drinking water was not enough for Jordan since it is a biological treatment, and not a biological and chemical combination*.

Treated waste water, it was agreed, can be used to *irrigate the ornamental crops and the crops that are cooked as well as for non-food industries*. Further, treated waste water could be used to *recharge the ground water due to the filtration that will occur by soil layers*.

Participants here also agreed upon Jordan's water resources, *groundwater, rainfall collecting wells, springs and dams*. Regarding the sustainability of current water resources, the majority of participants agreed that *if consumption remains as it is, there will be a water crisis*. Generally, *water will remain available until the year 2000 - 2050*. Reasons for increasing water consumption was *population growth*, and the *inappropriate use of water resources*. Regarding water consumption per capita, participants in Ajloun agreed that it was *less* than the international average, but were split on the actual quantity. One group suggested *it lay around 80 liters per day* and the other group suggested that it lay *between 100 - 200 liters per day*.

The general opinion on water saving devices was that they were *not* available in Ajloun but anyone who wanted them could find them in Amman. The majority however *did not know* what these devices were. Those who did know stated that water saving devices *reduce water consumption by 30 - 33%*.

Considering water conservation, the general agreement in Ajloun was that this was *the responsibility of both the government and the public*, but the *citizen held the higher responsibility*. Further, *water can be conserved by, pollution prevention, reduction in consumption, water collection, building dams, drip irrigation, water network maintenance, planting crops that require minimum amounts of irrigation, maintaining old water wells and building new ones, and choosing the best time for irrigation*.

Amman Non-exposed Groups - There was variation from the participants in Amman regarding Jordan's climate being *arid*, or *semi arid*. *The average seasonal weather temperature increases the amount of evaporated surface storage water* was also agreed upon by half of Amman's non-exposed focus group participants. This sub-

population also suggested that *the unavailability of regional and continental rivers in Jordan has increased the demand on groundwater resources which are basically dependent on rain water recharge*. Finally, it was agreed upon that *the sudden increase in population as a result of forced immigration from neighboring countries to Jordan, led to the increase in the consumption of water here*.

The existing water pollution problem arises *from industries, dumping of biological and chemical solid wastes, leakage from wastewater networks, and oil containers and transportation of chemicals*.

Regarding waste water treatment, half of the participants here were in agreement *that it is necessary to increase the number of treatment plants, import new technologies, and to more effectively distribute the treatment plants*. It is also necessary *to use raw wastewater in agriculture before it is treated, as well as to monitor dumping sites*.

Participants here also agreed upon Jordan's water resources, *groundwater, surface water, rain water springs and dams and water harvesting*. Although participants agreed that *the water consumption rate per capita in Jordan is less than it is in other parts of the world* they did not report what it was. Eventually no participant had heard of Water Saving Devices.

Amman Exposed Groups - There was variation from the participants in Amman regarding Jordan's climate being *arid, or semi arid*. Amounts of rainfall vary from one area to another however *the largest percentage goes to evaporation* and little for aquifer recharge. Despite the low amount of rain fall, *we can use it more efficiently by increasing the number of soil dams in the desert*, was a suggestion agreed upon by half of the participants.

Water pollution can be caused by industrial wastes fertilizers, pesticides, and wastewater.

Treated wastewater can be reused for restricted agriculture, garden irrigation, and industry. Participants here also agreed that *low water consumption increases the organic loading to treatment plants which will result in operation deficiencies*.

Although participants agreed that by 2020 - 2030 *the water will be unsuitable for use in Jordan* they suggested that the water resources here are primarily *rainfall and groundwater*. Regarding water consumption per capita, participants in Amman agreed that it was *less* than the international average, and suggested that this causes major *problems* when treating domestic wastewater.

Regarding water saving devices, half of the participants here knew what they were and suggested that they could *reduce water consumption by 50%*. Water saving devices were defined as devices that *operate by mixing an amount of air with water to give it a higher pressure with a smaller amount of water*. Participants also agreed that such devices can be used *to decrease the amount of water needed for irrigation*.

Aqaba Non-exposed Groups - Generally, participants here agreed that Jordan's climate was *arid - semi arid*, with an *average rainfall of 5000 mm per year*. However, the rainfall in Aqaba, varied from 0 - 20 mm per year. It was suggested that *evaporation reached 30 - 50%*, and that being far from mountains increases the temperature. Half of the participants also stated that the reason for the low rainfall in Aqaba, is its surrounding mountain range.

Sources of pollutants reported by the Aqaba participants and agreed upon, include *chemical and solid wastes, industrial and agricultural wastes, septic tanks, waste water, industrial pollution, pesticides*.

Treated waste water, it was agreed, could be used for *industry and reforestation*, and most hesitated about suggesting its use for *drinking*.

Regarding the water resources, participants in Aqaba agreed that the two main water resources are *rain water* and *ground water*, followed by *dams, wells* and *surface water*.

Whilst most participants suggested that the largest consumers were *agriculture* and the *industry*, most also agreed that individual water consumption in Jordan is *less* than its neighboring and developing countries. Half the sample suggested that it lay at *10 - 20 liters per day*, whilst the other half suggested that it lay at *50 liters per day*.

Considering water saving devices, the majority of participants *did not know* what these were. The four who did know, stated that they had heard of these through the media, and believe that they *operate by restricting water flow*.

Finally regarding water conservation methods the majority agreed that this would be a joint *responsibility between the government and the public*. Further suggested ways for water conservation reported included *continuous inspection of domestic water networks, monitoring and follow up of public water complaints, periodic monitoring of meter readings, and avoiding exposed installation of water networks*.

Aqaba Exposed Groups - Generally, participants agreed that Jordan's climate varied from *arid to semi-arid* pending on location in Jordan. Participants also agreed that *the northern part of Jordan and the highlands receive the highest amount of rainfall*. One group suggested that the *highest amount per year was 500 mm per year whilst the other group claimed that it was between 600 - 800 mm per year*. Participants were also in agreement that *most rainfall goes to evaporation*.

Polluted water was defined by half of the participants as *water that cannot be used for drinking, irrigation and industry*. Pollutants include *cesspools, chemicals, solid waste landfills, wastewater, and industrial wastes*. Participants also agreed that *treated wastewater can be used for irrigation, agriculture - especially planting forest trees and ornamental plants, and for producing crops that are cooked before eating*.

Participants also agreed that *groundwater* is the main source of water in Jordan for *drinking, municipal and industrial* purposes, whilst half of the sample also stated that

surface water and treated wastewater were the main source for agricultural purposes in Jordan. Regarding the sustainability of water resources in Jordan, participants agreed that it would last for approximately *15 years into the future*.

Although all agreed that water consumption in Jordan per capita was lower than international standards, participants also agreed that it reached about *40 - 50 liters per day*. In Aqaba however, participants suggested that it reached between *70 - 100 liters per day*.

Considering water saving devices, participants knew of them, and suggested that there are two types, *a pump that mixes the air with water to increase the output pressure*, whilst the *other organizes the water flow from the tap*. Participants were also in agreement that these devices *save between 10 - 20% of water consumption*.

Participants also agreed that the responsibility of water conservation fell on *both the government and the public equally*. Suggested ways for water conservation included *placing water networks above ground surface rather than burying them, reducing consumption and informing the public about the water crisis, charging the actual price of water, reusing treated wastewater for agriculture and industry, obliging the public to construct well when building new homes, build desalination units, increase the number of dams, and reuse kitchen water for irrigation*.

Urban Non-exposed Groups - Generally, participants agreed that Jordan is located in a *semi-arid region*, that the rain intensity lies between *400 - 550 mm per year*, or *100 - 300 mm per year*. The existence of *mountains* has an effect on the *humidity and temperature decrease* in some areas. Since there *are no rivers*, we are *dependent on groundwater extraction*. Finally, the *compulsory immigrations* as well as the *natural population growth* add to the *urban expansion* problem by which *water crisis* is highly affected.

The existing *water pollution problem*, referred to by participants has its causes lying in (as suggested by the participants) *dissolved salts, chemicals, solid waste disposal sites, cesspools, leaks from plants, fertilizers and network pumping*.

Participants also agreed that the main water sources in Jordan are *groundwater and rainwater*, followed by *surface water, well, springs, dams and harvesting water*. The majority *did not know* of the sustainability of these resources.

Although all participants agreed that Jordan's per capita water consumption is *less* than international standards, they suggested that it lay between *80 - 100 liters per month*.

As far as *water saving devices* are concerned, only one third of the participants had heard of them or knew what they were.

Finally looking at conservation of water, participants agreed that this was *the joint responsibility of the government and the public*. Ways to enhance water conservation, according to the participants included *control of water valves, construction of rain*

water reservoirs, targeting school children in awareness campaigns, land forestation, and drip irrigation

Irbid Exposed Groups - Generally, there was agreement that Jordan's climate was *semi-arid*, and that the location determines the rain fall quantity - pending on distance from *sea* and *geological* features. It was also agreed that the average rainfall in the north-western part of Jordan is about *400 mm per year*, and that the highest percentage of rainfall goes to *evaporation, dams* and *groundwater*.

Half of the participants here stated that treated wastewater can be used for *irrigation* as well as for *industrial* purposes. Generally, it was also agreed that the most important water resource in Jordan are *dams*, then *groundwater*, followed by *collection wells*. All participants also agreed that Jordan's water consumption per capita is *less* than international standards.

Considering water saving devices, only half the group knew what they were and they defined them to be devices that *mix water with air to give a higher pressure with a lower amount of water*. Regarding their potential for reduction in water consumption participants agreed that it lay *between 16 - 33%*.

Finally concerning water conservation, participants were in agreement that this was *the joint responsibility of the government and the public*. Suggested methods for water conservation included *water network maintenance, maintenance of water tanks, increasing water awareness, using drip irrigation and rainfall collection*.

Madaba Non-exposed Groups - Participants agreed that Jordan's climate was *arid - semi arid* and that rainfall is affected by this. Also, there are *no permanent water resources* such as rivers.

Participants also agreed that the reasons for the existing water pollution problem are *chemical use, existence of cesspools, waste dumping sites, factories, insecticides, plastic wastes, garbage, septic tanks, and radio active materials*. Participants suggested that more *wastewater treatment plants are necessary, as is the monitoring of existing treatment plants, and overcoming acute water shortages*. As far as using treated wastewater, the general opinion was that this would have a *negative impact* on agriculture, it is harmful and not suitable.

Water resources in Jordan were reported to be *rain, surface water, ground water and dams*. However, participants also agreed that these are *continuously decreasing*. Thus, participants were also in agreement that the water resources currently available will *run out in fifty years time*.

Regarding water consumption per capita, like other groups participants here agreed that Jordan's rate was *lower* than the international one, and it was generally agreed that it lay *below 90 liters per day*.

Considering water saving devices, no participant here had heard of them before.

Half of the group provided the following possibilities for water conservation, *building water dams, rain water harvesting, water networks upgrading, and development of irrigation methods*

Madaba Exposed Groups - Jordan's climate is *semi-arid* was agreed upon by participants. It was also agreed upon that the north-western parts of Jordan receive *300 - 400 mm of rain every year*. Participants also agreed that most of the rainfall *evaporates or goes to groundwater recharge*.

Considering polluted water, participants agreed that this was *not suitable for drinking or irrigation*. Participants also suggested that the main causes of water pollution are *wastewater, old water pipes, solid waste landfills and air pollution*.

Participants also agreed that the main sources of water are *groundwater* for drinking water and *renewable aquifers* in Jordan. Again, all participants agreed that Jordan's water consumption per capita, is *lower* than international standards, averaging between *20 - 50 liters per day*.

Concerning water saving devices, *none* of the participants had heard of them, suggesting that this is due to the fact that they are not available on the Jordanian market.

Regarding water conservation, following are the methods agreed upon by them: *building new dams, especially sand dams, rain water collection, encouraging water harvesting, maintenance of old water wells, maintenance of water supply networks, using waste water from kitchen works for irrigation and backyard washing, and using drip irrigation*.

Mafraq Non-exposed Groups - Generally, participants agreed that Jordan's climate is *arid - semi arid* that the *evaporation* ratio is high and that rainfall is approximately *200 mm per year*.

Further regarding water pollutants, participants stated that these *were domestic and industrial wastewater, solid wastes, landfills, cesspools, wastewater treatment plants effluents, agricultural and industrial solid wastes, and defected water networks*. Concerning the use of treated waste water, participants here agreed that this can be used for *non-leaf and fruit irrigation (i.e. restricted irrigation)*.

Jordan's main water resources, according to the participants are *the rain, groundwater, surface water, dams and springs*.

Finally, none of the participants here had heard of water saving devices.

Mafraq Exposed Groups - Participants here were also split about Jordan's climate, being either *arid or semi-arid*. They did state that rainfall occurs in the *north and west highlands* - receiving more *than 400 mm per year*. Whilst this is so in the north and

west highlands, participants also agreed that in the *eastern parts*, rainfall is as low as *100 mm per year*. Participants also agreed that most rainwater goes to *evaporation*, followed by *groundwater recharge* and then for *dams*.

Water pollution is caused by defective water networks, solid waste landfills, and wastewater networks. Majority of the group felt that the main water contains pollutants. Water pollution results from *defected water networks, solid waste landfills, polluted main water resources, and wastewater networks*.

Whilst all participants also agreed that polluted water causes *disease* in all life forms, they stated that treated waste water can be used for *irrigation* and *drinking*.

The most important water source in Jordan was stated to be *groundwater*. Added to this, participants also agreed that individual water consumption in Jordan is *lower* than international standards, averaging about *70 liters per day* for one group of participants, whilst the other stating that it varied *between 5 - 100 liters per day*.

Although all participants had heard of water saving devices, they differed on the amount of reduction in water consumption. One group stated that it was at *15 - 50% reduction*, whilst the other stated that it lay between *16 - 30%*. As for water conservation, the participants agreed upon the overall aim of *reducing general water consumption*.

D-2 ATTITUDES SECTION

Ajloun Non-exposed Groups - Participants here generally agreed that Jordan is *facing a water crisis*. The most important reasons were overpopulation, increased consumption because of high standard of living, technological development, and increased number of projects. Participants here suggested that this crisis will lead to a number of *obstacles* in the *economy*, as well as to *drought* and *disease*. Although participants did not specifically mention what the *government* could do to improve the situation, they did state that the government does not necessarily undertake its responsibilities adequately. Two variables were arrived at concerning *the lack of water saving, public awareness and availability (or lack of it) of water*.

Ajloun Exposed Groups - Participants here were also in agreement that Jordan is *facing a water crisis*. They also agreed that the *magnitude* of the crisis may increase due to *population growth, increasing and misuse of water consumption, defective networks, and an increase in green areas, inadequate planning by government, industrial development, and fluctuations in the amount of rainfall*.

Because of this, participants here suggested that the *government* should *increase public awareness, plan adequately for water projects, and maintain existing water networks*. At the same time, the *public* should attempt to *decrease their personal water consumption rates, increase their loyalty to authorities* and inform them of their water situation. Similarly to other locations, participants here also stated that religious

and personal beliefs play a significant role in water consumption. Thus, *public awareness should be increased through media activities, and conducting seminars, workshops and lectures, specifically to students*

Amman Non-exposed Groups - Participants here generally agreed that Jordan is *facing a water crisis*. They also stated that the crisis will continue to expand due to *population growth rates, and obligatory immigration from near countries*. Thus, the *government and the public* should work together on finding *alternative water resources* such as *water harvesting, reduction in personal consumption, and initiating public awareness campaigns*. Since participants here also agreed that religious and personal beliefs highly influence person's water consumption, they suggested water awareness campaigns aimed at this, but *especially targeting housewives, teachers, and the younger generation*.

Amman Exposed Groups - Participants here were also in agreement that Jordan is *facing a water crisis*. Similarly to other locations, participants here also suggested *population growth and old water distribution networks, industrial development, old irrigation systems, lack of water awareness, and the high rainwater losses* as the primary causes for the water crisis. Participants suggested that *the government* *replace, monitor, and control the present water network, and to make use of the existing waste water produced by large institutions through enforcing legal policies*.

Aqaba Non-exposed Groups - Participants here generally agreed that Jordan is *facing a water crisis*. Causes for this, as reported by the participants include *population growth, high evaporation, lack of public's awareness concerning water issues, inappropriate use of rain water, and lack of available dams*. Due to such reasons, participants also stated that the *government should introduce programs to increase public awareness*.

Aqaba Exposed Groups - Participants here were also in agreement that Jordan is *facing a water crisis* because of *population growth, industrial and agricultural development, using household machines requiring large amounts of water, rising living standards, lack of water awareness, and paying low prices for water*. Because of this, the *government*, in the opinion of the participants, *should intensify and increase water awareness campaigns, search for alternative water resources and maintain existing water networks*. The *public* on the other hand should *reduce its water consumption, and cooperate with the authorities by informing them of any network damage*.

Since personal and religious beliefs are reported by the participants to be influential in affecting persons' water consumption, they suggested *conducting seminars, workshops and lectures especially for women and students, and to hold competitions for water saving as public awareness activities to raise public opinion on water issues*.

Irbid Non-exposed Groups - Participants here generally agreed that Jordan is *facing a water crisis* because of *population growth, civilization development, obligatory immigration, and lack of rainwater collection interest*. Participants here were in agreement that possible solutions to this crisis *include reduction in personal rates of consumption and increasing prices of water*.

Irbid Exposed Groups - Participants here were also in agreement that Jordan is *facing a water crisis* because of *population growth, industrial and agricultural development, groundwater pollution, and fluctuation in rainwater amounts*. Thus, the *government*, according to the participants should engage itself in *building new dams, initiative intensive water awareness campaigns* for the overall public, and *searching for alternative water resources*. The *public* on the other hand, *should reduce its own water consumption, cooperate with the government, construct water collection wells and maintain existing ones*. Since religious and personal beliefs greatly affect water consumption, *media campaigns* should focus on *increasing public awareness on water issues*.

Madaba Non-exposed Groups - Participants here generally agreed that Jordan is *facing a water crisis*. The main reasons provided for this water crisis provided are *population growth, water pollution, high consumption rates, lack of networks maintenance, old agricultural techniques, lack of prioritization, and excessive water pumping*. Overcoming this crisis according to the participants here is the *responsibility of both the government and the public*. It was also agreed upon here that religious beliefs play an important role in determining water consumption of individuals.

Madaba Exposed Groups - Participants here were also in agreement that Jordan is *facing a water crisis* because of *water misuse, population growth, wastewater leakage, spread of plants and hospitals, defection of water networks, increase in green areas and groundwater pollution*. According to participants here, the *government* should maintain *existing water networks, enforce large water consumers to reduce their consumption through new technologies, and to support the media in implementing water awareness campaigns*. The *public* on the other hand should *develop a personal feeling of responsibility towards water consumption, and use water saving devices*.

Mafraq Non-exposed Groups - Participants here generally agreed that Jordan is *facing a water crisis*. They also suggested *population growth, losses from water networks, wastewater, chemical, industrial, and solid wastes, agricultural and animal wastes, solid waste landfills, cesspools, high water consumption, high temperature, and old water networks* as being the primary reasons for this crisis. Participants also stated that the *government* should increase *training and awareness programs* for the public in order to be better equipped for this crisis. Participants also stated that they felt that religious and personal beliefs played an important role in people's water consumption behaviors. Therefore, these would be good channels for targeting the reduction of water consumption - that is, *focus on changing attitudes towards water issues*.

Mafraq Exposed Groups - Participants here were also in agreement that Jordan is *facing a water crisis*. Reasons for this according to the participants are *population growth, irresponsibility in using water, lack of public awareness about water issues, lack of networks maintenance, not using new irrigation techniques, high consumption by governmental institutions, water pollution, lack of coordination between citizens and government, loss of rainwater, and household technological development*. As far as the participants are concerned they stated that the *government* should take an *active role* in facing this crisis through *increasing prices for large consumers of water, and making use of treatable polluted water and wastewater*. Citizens also should be educated in reducing their water consumption. Participants here also stated that personal and religious beliefs affect water consumption of individuals. Thus water awareness can be increased, according to the participants, by *focusing on the media, schools and lectures, and encouraging personal efforts within the immediate surrounding environment*.

D-3 PRACTICES SECTION

Ajloun Non-exposed Groups - Participants here suggested that the public should *reduce* their personal water consumption, through *maintaining water networks, taps, floats, and collecting rain water*.

Ajloun Exposed Groups - Participants here were of the opinion that the public should *reduce* its water consumption and that it should *engage in collecting rainwater*. Since public awareness campaigns have a good effect on *increasing public awareness*, such efforts *should concentrate on the future generations through the schools, media and other channels*.

Amman Non-exposed Groups - All participants here reported *drinking tap water* although some *boil* it before doing so. All participants also reported *experiencing water shortages*. Some suggested overcoming such shortages by reducing water consumption and *watering the garden during the night*, rather than during the day. Participants also agreed that every new building should possess a *well* for the collection of rain water. Unconventional (yet undefined¹) public awareness campaigns through the media should be initiated.

Amman Exposed Groups - Almost all participants here reported *drinking tap water*, and also *experiencing water shortages*. Participants suggestions for overcoming water shortages include *increasing number of water storage tanks, periodical maintenance of house networks, and collecting rainwater that can be used for drinking and irrigation*. Water awareness campaigns were also welcomed by the participants as the public must reduce their water consumption in order to overcome the water shortages they are currently experiencing.

Aqaba Non-exposed Groups - All participants here, similarly to Amman, reported *drinking tap water*. They also called for the *maintenance of water networks, washing cars with buckets rather than hoses and using alternative methods for irrigation*.

Aqaba Exposed Groups - Similarly to other locations, all participants reported *drinking tap water, and facing water shortages*. Participants suggested that the public should *reduce their water consumption*, by avoiding practices that consume a large amount of water - no examples were provided. There was also agreement that *rain water can be used for irrigation, drinking and household use, if it is collected*. The problem with this suggestion as the participants reported is that Aqaba has a very low rainfall rate anyway. Participants here also welcomed further *water awareness campaigns*, but stated that they should be more focused on the public's needs.

Irbid Non-exposed Groups - Most participants here reported *drinking tap water, and experiencing water shortages*. Such water shortages according to the participants may be overcome by *reducing domestic water consumption, collecting rain water, and using water saving devices*. If *water awareness activities* are to be implemented, the participants were in agreement that they should be targeted at the future generations through the academic curriculum.

Irbid Exposed Groups - Most participants reported *drinking tap water*, although some stated that they *boil* it before drinking. Participants here suggested *that rainfall can be used for drinking irrigation and other household uses*.

Madaba Non-exposed Groups - Participants here reported *experiencing water shortages*, and because of this they have begun implementing methods to avoid doing so, such as *collecting rain water*.

Madaba Exposed Groups - Participants here like other locations reported *experiencing water shortages*. To avoid these in the future, participants in this focus group suggested a *reduction in household water consumption using rain water for drinking irrigation and house use*. Participants also welcomed *water awareness campaigns* to guide people in changing their negative water consumption practices.

Mafraq Non-exposed Groups - Participants here were in agreement that *water shortages exist and are experienced*. Therefore, water saving should take place - in order to *reduce individual water consumption, and water storage must be improved through making use of rainwater*.

Mafraq Exposed Groups - All participants here reported *drinking tap water but did not report any experienced water shortages*. However, they agreed about an existing water crisis, and suggested the following practices to reduce it, *increasing number of storage tanks, reducing household water use for cleaning, and using rain water more*.

effectively Further participants here called for *water awareness campaigns* targeting housewives and students, mainly through the use of the media. It was also agreed upon by the participants that *individuals can participate* in increasing awareness through alerting neighbors, colleagues, and others within their immediate environment regarding the current water crisis and ways in which it can be reduced.

APPENDIX E

Results of the Survey Practices Section

Table E1 Periodical Reading of the Water Meter

	Ajloun		Amman		Aqaba		Irbid		Madaba		Mafraq		Total	
	NE	E	NE	E	NE	E	NE	E	NE	E	NE	E	NE	E
Never Read	11	16	15	24	10	17	14	14	13	15	13	8	76	94
Occasionally	20	12	13	12	7	15	21	22	14	19	12	26	87	106
Periodically	6	11	3	4	3	12	4	9	16	6	5	7	37	49
Examine the Water Bill	19	11	16	17	9	12	20	27	29	20	11	7	104	110

Table E2 Practices Conducted in Case of A Water Cut

	Buy Water From Tanks		Add Tanks at the Roof		Reduce Consumption		Others	
	NE	E	NE	E	NE	E	NE	E
Irbid	31	10	6	3	4	22	4	4
Madaba	34	7	1	3	2	26	1	3
Amman	12	6	19	5	3	15	3	4
Aqaba		1	1	4	4	8	38	2
Ajloun	25	13	6	4	2	13	3	6
Mafraq	18	7	21			21	2	2

Table E3 Number of Times of Tanks Check by Participants

	Once A Year		Twice A Year		3-4 Times A Year		Frequently	
	NE	E	NE	E	NE	E	NE	E
Irbid	7	3	5	7	8	2	2	2
Madaba	9	5	6	6	1	1	5	1
Amman	12	9	6	7	4	2	3	3
Aqaba	10	3	4	1	6	3	3	
Ajloun	7	6	4	3	2	4		3
Mafraq	6	9	9	7	7	3	2	
Total	51	35	34	31	28	15	15	9

Table E4 Frequency of Pipe Connections Checks by Participants

	Once A Year		Twice A Year		3-4 Times A Year		Frequently	
	NE	E	NE	E	NE	E	NE	E
Irbid	5	3	4	5	2	2	2	3
Madaba	5	4	3	1	1	1	2	1
Amman	8	8	7		1		2	6
Aqaba	6	3	4		5			1
Ajloun	4	6	2	3	2	2	4	7
Mafraq	6	2	6	4	4	2	3	
Total	34	26	26	13	15	7	13	18

Table E5 Frequency of Checks on Flush Tanks

	Once A Year		Twice A Year		3-5 Times A Year		Frequently	
	NE	E	NE	E	NE	E	NE	E
Irbid	4	4	2	1	1	1	1	
Madaba	2	4	3	2	1		3	7
Amman							3	6
Aqaba	2	1	2		4		1	1
Ajloun	4	3	1			1		4
Mafraq	4	3	4	3	4		2	2
Total	16	15	12	6	10	2	10	20

Table E6 Kind of Water Used for Drinking

	Tap Water		Filtered Water		Bottled Water	
	NE	E	NE	E	NE	E
Irbid	27	30	9	3	3	3
Madaba	28		10		2	
Amman	27	19	10	12	3	
Aqaba	37	18	6	1	1	
Ajloun	34	24	3	5	2	3
Mafraq	36	26	2	4	1	
Total	189	117	40	25	12	6

Table E7 Frequency of Car Washing

	Monthly		Weekly		Twice A Week	
	NE	E	NE	E	NE	E
Irbid	9	11	11	9	3	3
Madaba	6	9	9	14	5	2
Amman	8	5	8	10	6	2
Aqaba	8	4	10	5	4	2
Ajloun	4	9	8	7	1	2
Mafraq	4	5	6	11	4	1
Total	39	43	52	56	23	12

Table E8 Methods of Washing Cars

	Hose		Bucket		At Service Station	
	NE	E	NE	E	NE	E
Irbid	4	2	15	18	5	3
Madaba	4	3	12	19	4	3
Amman	4	2	11	10	7	6
Aqaba	3	1	11	6	8	5
Ajloun	1	2	13	13	2	1
Mafraq	3	2	5	9	7	5
Total	19	12	67	75	33	23

Table E9 Participants responses to Making Use of Rain Water

	Yes		No	
	NE	E	NE	E
Irbid	15	12	23	25
Madaba	14	13	20	27
Amman	28	18	6	10
Aqaba	33	16	9	2
Ajloun	14	15	19	18
Mafraq	18	20	22	11
Total	122	94	99	93

Table E10 Number of Participants Using Rainwater For Irrigation

	Yes		No	
	NE	E	NE	E
Irbid	14	10	21	26
Madaba	6	10	25	28
Amman	6	4	25	21
Aqaba	8	2	33	16
Ajloun	10	19	18	15
Mafrq	13	8	27	23
Total	67	53	149	129

Table E11 Participants Using Rainwater For Drinking

	Yes		No	
	NE	E	NE	E
Irbid	22	20	17	16
Madaba	4	3	25	35
Amman	4	2	27	22
Aqaba		1	41	17
Ajloun	10	25	20	12
Mafrq	8	2	32	29
Total	48	53	162	131

Table E12 Participants Using Rainwater For Housework

	Yes		No	
	NE	E	NE	E
Irbid	9	15	25	21
Madaba	12	7	18	32
Amman	9	5	23	19
Aqaba	1	1	40	17
Ajloun	10	19	18	16
Mafrq	9	7	31	24
Total	50	54	155	129

Table E13 Water Used For Gardens Irrigation

	Tap Water		Collected Rainwater		Kitchen Wastewater		There is no Garden	
	NE	E	NE	E	NE	E	NE	E
Irbid	20	12	8	8		2	13	16
Madaba	15	13	1	6		1	22	17
Amman	8	14	4	3		1	25	13
Aqaba	18	6				2	17	8
Ajloun	12	13	5	14	2		18	10
Mafrq	18	12	4	4	1	3	14	10
Total	91	70	22	35	3	9	109	74

Table E14 Participants Implementing Changes in Behavior After the Awareness Campaign

	Yes		No		Did Not Hear of the Campaign	
	NE	E	NE	E	NE	E
Irbid	32	34	8	3	4	3
Madaba	30	39	3	1	6	
Amman	16	24	5	7	17	
Aqaba	29	12	2	5	10	
Ajloun	29	31	5	4	4	4
Mafrq	29	29	2		9	1
Total	165	169	25	20	50	8

Table E15 Numbers of Participants Noticing Changes in the Value of the Water Bill After Changing Their Water Practices

	Yes		No	
	NE	E	NE	E
Irbid	28	27	5	9
Madaba	25	34	9	5
Amman	9	22	7	3
Aqaba	19	11	5	1
Ajloun	25	26	4	5
Mafrq	24	23	5	3
Total	130	143	35	26

APPENDIX F

Large Consumers Survey Results

Table F1 Business Type Participating

Type of Business	Number of Participants	Percentage of overall Participation
Industrial Businesses	4	33 %
Hotels	7	59 %
Hospitals	1	8 %

Table F2 Average Number of Employees in Participating Businesses

Number of Employees	Number of Businesses	Percentage of Overall Participants
less than 100	1	8 %
101 - 200	2	17 %
201 - 300	3	25 %
301 - 400	3	25 %
over 401	3	25 %

Table F3 Water Resources Utilized by Businesses

Source of water	Number of Participants	Percentage of Overall Participants
Water Authority	12	100 %
Water Tankers	7	59 %
Wells	1	8 %

Table F4 Average Water Bill per Cycle

Water Bill, JD	Number of Participants	Percentage of Overall Participants
less than 1000	1	8 %
1001 - 2000	2	17 %
over 2001	8	67 %

Table F5 Water Uses at the Institution

	Number	Percentage
Primary Factor in the Process	10	83 %
Not Primary Factor in the Process	2	17 %

Table F6 Participation in the Water Awareness Campaign

Type of Participation	Number of Participants	Percentage of Overall Participants
None	6	50 %
Workshops	6	50 %
Literature/Pamphlets	2	17 %
Water Saving Devices Campaign	2	17 %

Table F7 Largest Water Consuming Sector in Jordan

Sector	No of Participants	Percentage of Overall Participants
Agriculture	4	33 %
Household	1	8 %
Industry	2	17 %
Don't Know	5	41 %

Table F8 Water Prices in Jordan

Water Prices	No of Participants	Percentage of Overall Participants
Above Average	6	50 %
Around Average	3	25 %
Below Average	2	17 %
Don't Know	1	8 %

Table F9 Exposure to the Use of Water Saving Devices

	Number	Percentage
Exposed	11	92 %
Not Exposed	1	8 %

Table F10 Percentage of Water Saving When Using Water Saving Devices

Percentage	No of Participants	Percentage of Overall Participants
Less than 15 %	2	20 %
16 - 30 %	5	50 %
More than 30 %	0	
Don't know	3	30 %

Table F11 Water Crisis in Jordan

Opinion	No of Participants	Percentage of Overall Participants
Jordan is Facing a Water Crisis	11	92 %
Jordan is not Facing a Water Crisis	1	8 %

Table F12 Source of Water Used for Filling the Swimming Pool

	Number	Percentage of Pool Owners
No Pool	6	//
Municipality Water	6	100 %

Table F13 Availability of Water Treatment Unit at Institution

	Number	Percentage
Available	2	17 %
Not Available	10	83 %

Table F14 Disposal of Wastewater

	Number	Percentage
Sewerage Network	9	90 %
Others	1	10 %

Table F15 Water Recycling Use

	Number	Percentage
Complete Use of Water Recycling	2	17 %
Partial Use of Water Recycling	2	17 %
No Use of Water Recycling	7	59 %

Table F16 Methods of Reducing Water Consumption

	Number	Percentage
Use Water Saving Devices	6	50 %
Attendance of Water Awareness Activities	2	17 %

APPENDIX F List of Institutions which have applied used WSD's

- 1 Middle East Hotel
- 2 Orchida Hotel
- 3 Amra Hotel
- 4 Aqaba Gulf Hotel
- 5 Hayat Hotel
- 6 Jerusalem Hotel
- 7 Marriott Hotel
- 8 Palestine Hospital
- 9 Al-Rasheed Hospital
- 10 The parliament
- 11 Science and Technology University (Partially)
- 12 Regency Hotel

APPENDIX F List of Institutions which are planning to use WSD's

- 1 Baccalaureate School
- 2 Rawdat Al-Maref School
- 3 Islamic Scientific School
- 4 Ithad School
- 5 Al-Zeitounah University
- 6 Yarmouk University
- 7 Royal Medical Services Hospitals (10 Hospitals)
- 8 Jordan Hospital
- 9 Khalidi Hospital
- 10 Arab Center for Heart Surgery
- 11 Taibat Zaman Tourist Village
- 12 Nawafsa Zaman Tourist Village
- 13 Zaira Touristic Investment Co (14 Hotels in Dead Sea, Aqaba, Petra and Amman)
- 14 Al-Hikma Pharmaceutical Industries
- 15 Dar Al Da'wa'a (4 Factories)
- 16 United Pharmaceutical Manufacturing Co
- 17 Queen Alia Airport
- 18 Ampco Industries
- 19 S O S School
- 20 Mr Adnan Mufti
- 21 Orthodox Club
- 22 Jabri Restaurant
- 23 Royal Scientific Society
- 24 Central Bank
- 25 Cairo Amman Bank
- 26 Real Estate Investment Co
- 27 Hijazi and Ghosheh
- 28 The Tower Building
- 29 Al-Shmessani Hospital
- 30 Malhas Hospital
- 31 Hashemite University
- 32 Jordan Intercontinental Hotel

APPENDIX G

Collected Field Questionnaire (Interview Schedule)

Area/Village _____ Date of Interview _____
 Name of Interviewee _____ Profession _____
 Interviewer _____

Dear Sir/Madam

My name is _____ and I work on the Behavioral Impact Study - Phase II for the Ministry of Water and Irrigation. We are conducting a survey in this community and would like you to participate. If you don't mind, we will take about half an hour of your time to ask you a few questions about your family and your understanding of water issues. All information that you provide us with will be confidential and anonymous and will remain in the project files.

Behavioral Impact Study - Phase II / Section One GENERAL

- 1 Sex Male Female
- 2 Place and date of birth _____
- 3 Religion _____
- 4 Age _____ years
- 5 Marital Status Single Married Divorced Widowed
- 6 Number of individuals you support _____
- 7 Place of residence _____
- 8 Education Illiterate Basic Education
 Secondary Education Community College Graduate
- 9 House ownership Owned Rented
- 10 No. of workers in the family One Two Three Four or more
- 11 Monthly family income Less than 100 JD 100-200 JD
 More than 200 JD
- 12 Average water bill costs in one quarter Less than 5 JD 5-15 JD
 16-31 JD more than 31 JD
- 13 How many bathrooms do you have in your house?
 None One Two Three or more
- 14 At your place do you have
 swimming pool _____
 garden _____
 Backyard _____
 More than one car _____
- 15 Have you participated in the Awareness Project in Water that was prepared by Jordan Environment Society in cooperation with the Ministry of Water & Irrigation?
 Yes No

Behavioral Impact Study - Phase II / Section Two KNOWLEDGE

- 16 Jordan's climate is Arid Semi-Arid Wet I don't know
- 17 Considering water resources, Jordan is Rich Moderate Poor I don't know
- 18 The sector that consumes the largest amount of water in Jordan is Domestic Industrial Agricultural I don't know
- 19 Which of the following crops consumes more water to irrigate one dunum?
 Bananas Tomatoes Grapes I don't know

- 20 The most important water resource in Jordan that is used for drinking is
 Ground water Surface water Collection wells
 I don't know
- 21 Jordan's average water consumption per individual in comparison to the world average
 Higher Equal Less I don't know
- 22 Most rain water in Jordan goes to
 Dams Dead Sea Evaporation I don't know
- 23 In comparison to real costs water price in Jordan is
 Higher Equal Less I don't know
- 24 Which of the following causes water pollution
 Correct Answer All of the indicated items
- 25 Have you heard about water saving devices?
 Yes No
- 26 If the answer is yes how much savings do these devices give you?
 Less than 15% 16% - 30% More than 30%
 I don't know

Behavioral Impact Study - Phase II / Section Three ATTITUDES

- 27 Do you believe that there is a water crisis in Jordan?
 ++ Yes -- No (go to 31) - Don't know (go to 31)
- 28 Do you think this crisis will get even worse in the future?
 ++ Yes -- No - Don't know
- 29 What kind of solution do you suggest?
- 30 How can you contribute to solving this problem?
- 31 Water conservation is the responsibility of
 - Government - Citizens ++ Both government & Citizen
- 32 Do you think that religious beliefs influence water consumption?
 ++ Yes - No + To a minor extent
- 33 Which of the following is the main reason in your opinion for the increased water consumption in Jordan?
 + Population Increase + Using water consuming equipment
 + Industrial development - Don't know
- 34 If you see someone disposing of wastewater in an illegal place will you
 ++ Call the authorities + Talk to him/her -- Do nothing

Behavioral Impact Study - Phase II / Section Four PRACTICES

- 35 How often do you read the water meter?
 Never Occasionally Periodically
- 36 Do you examine your water bill in detail?
 Yes No Sometimes
- 37 How often do you have water pumped from the Water Authority?
 Once a week Twice a week Three times a week
 Daily
- 38 In case of water cut-off do you
 Buy water from tankers Add tanks to the roof
 Reduce consumption Other
- 39 How many times per year do you inspect your water tanks taps network etc
- 40 What kind of water do you drink?
 Tap water Filtered tap water Bottled water
- 41 If you have a car how often do you wash your car?
 Monthly Weekly Twice a week
 Daily I don't have a car (go to 43)

- 42 Do you wash your car by using a
 Hose Bucket At a service station
- 43 Do you try to use rain water?
 Yes No
- 44 How do you water your garden if you have one?
 Water Authority water or Tankers Collected rain water
 Kitchen wastewater Don't have a garden
- 45 Have you noticed any changes in your water usage after hearing about the water awareness campaign program?
 Yes No Did not hear about the program
- 46 If yes in 45 have you noticed any change in your water bill?
 Yes No

Further Comments

From Interviewee

From Interviewer

اسيستان - مسرور الوعيه الهائس (المرحله الثانيه)

استخدامات المياه العاليه

تاريخ بعينه الاسبان

الموقع

اسم الفاخص

نوع الصاعه

حجم الصاعه

اسم المسؤول

1 اسم المصانه

2 عدد العاملس في المصانه

3 مصدر المياه المستخدمه

1 مياه السلطه ب صهاريج المياه ج آبار مياه
د عبر ذلك (الرجاء التحديد) -----

4 معدل قابوره المياه في الدوره الواحده

1 اقل من 1 دينار ب 1 - 2 دينار ج اكثر من 2 دينار د

5 هل يدخل الماء كعنصر اساسي في احدى مراحل الانتاج

1 نعم ب لا

6 هل سارك ممثل عن مسابكم في مسرور الوعيه الهائس الذي سيعده جمعته السنه بالتعاون مع ورايه المياه والوسن ؟

1 نعم ب لا (اسفل الئ سؤال 8)

7 اذا كان جواب 6 نعم ، فما هي طبعه المشاركه ؟

1 حضور ورساب عمل

ب فواءه ملصقات

ج استخدام اذهره بوسد اسهلراك المياه

8 القطاع الأكثر أسهلراك " للمياه في الاردن

1 المولس ب الصناعس ج الرراعس د لا اعلم

٩ بالمعيار مع الكلفة الجعينة للمياه ، يعتبر أسعار المياه في الأردن
أ اعلی من الكلفة الجعينة ب بناسب مع الكلفة الجعينة ج اقل من الكلفة الجعينة
د لا اعلم

أ هل سمعت عن احقره بوسد اسفلاك المياه من قبل ؟
أ نعم ب لا (اسفل اللی سوال ١٢)

١١ اذا كان الجواب نعم ، ما هي نسبة التوفر في اسفلاك المياه التي يجمعها هذه الاحقره ؟
أ اقل من ١٥ / ب ١٥ - ٣٠ / ج اكثر من ذلك د لا اعلم

١٢ هل تعرف ان الأردن بواجه أزمة مياه ؟
أ نعم ب لا ج لا اعلم

١٣ في حالة وجود بركة سباحة في المنشأة، ما هو مصدر المياه المستخدمة لتعبئتها ؟

١٤ هل يوجد وحدة لمعالجة المياه العادمة الناجمة عن المنشأة ؟
أ نعم (ما هي طريقة عملها ؟) ب لا

١٥ اذا كان الجواب لسؤال ١٤ لا، فكيف يتم التخلص من المياه العادمة الناجمة عن المنشأة ؟

١٦ ما هي التكاليف المترتبة للتخلص من هذه المياه ؟

١٧ هل يحاول استخدام المياه العادمة الناجمة عن المنشأة ؟

أ نعم (كيف ؟) ب لا ج جزء منها (كيف ؟)

١٨ كيف تحاول تحليل استهلاك المياه في المساهمة؟

١٩ كيف كان تأثير الطرق المذكورة في السؤال (١٨) على فائوره المياه؟

ملاحظات مساعده

× ملاحظات من الشخص الذي تم استطلاع رايه

× ملاحظات من المعهد للمعايله

APPENDIX H

**Interview Schedule for Large Consumers of Water
(in Arabic)**

APPENDIX I

AWARENESS PROJECT IN WATER - Phase II Focus Group Schedule

Area _____

Date of Interview _____

Knowledge Section - Points For Discussion

Geography and climate in Jordan - effects on water supply and depletion

Water Quality

Water Pollution/Types of water pollution/causes and effects

Wastewater / Treatment and Reuse

Water resources and capacity in Jordan

Personal consumption of water relative to other nations

Water saving devices cost advantages and benefits

Water conservation methods known to participants

Attitudes Section - Points For Discussion

Water crisis severity and responses

What should the government/individuals do to prevent a water crisis?

Are individuals companies the government doing a good job in conserving water?

Can water conservation have an effect? If so how much of an effect?

How do personal beliefs come into play in the issue of water?

How can people's attitudes about water be changed?

Practices Section - Points For Discussion

Have you changed your normal practices because of water shortages?

How do you deal with drinking water pumped from the Water Authority? Do you boil it filter it etc?

What are the positive and negative practices that affect water supply?

Can rain water be an effective supply of water for domestic and agricultural uses?

How has the water awareness campaign affected your water practices? For the group who has not been directly exposed to the campaign Have you heard of any information on water awareness and conservation from someone who has been exposed to the APW's activities? In what way did it affect you?

Other Issues / Further Comments

Community Concerns Community Responses

APPENDIX J
Phase II Focus Group Session Agenda and Schedule

AWARENESS PROJECT IN WATER

1 US IID Funded Project for the Ministry of Water & Irrigation conducted by Development Alternatives Inc. Jordan Environment Society & Environmental Resources Management Consultants

Focus Group Agenda - Amman Session

October 5 1997

Time	Presentation	Name
A Entire Group		
9:30 - 9:40	Opening Remarks	Dr. Maher Abu-Taleb ERMC
9:40 - 9:50	Project Overview	Mr. Abdul Salam Kamal ERMC
9:50 - 10:00	Organization of Focus Groups	Dr. Bashai Kloub ERMC
10:00 - 10:30	Filling Out Questionnaire	Dr. Bishar Kloub ERMC
B Individual Groups		
10:30 - 11:00	Discussion *	Group Moderators
11:00 - 11:15	Coffee Break	
11:15 - 12:30	Discussion	Group Moderators
C Entire Group		
12:30 - 12:50	Presentation of Results	Group Moderators
12:50 - 1:15	General Discussion	All Groups

*Agenda for Discussions Within Focus Groups

1	Introductions around the table	10 minutes
2	Presentation of Agenda to Group	10 minutes
3	Knowledge discussion	25 minutes
	Attitudes discussion	25 minutes
	Behavior discussion	25 minutes
4	Other Issues	25 minutes
	Community Concerns	
	Community Responses	