Water Quality Improvement and Conservation Project

Sustainability Report

WQICP Management Team

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Sustainability Report

Water Quality Improvement and Conservation Project

The purpose of this report is to document the results of a series of sustainability workshops which were held during October November, and December 1997 to determine the future needs of the various activities being undertaken by the Water Quality Improvement and Conservation Project [1](WQICP)

The workshops focused on critical issues affecting the long-term sustainability of the eight primary components of WQICP The workshops summarized progress achieved to date by various Ministry programs and donor-funded projects working within each subject area, discussed activities which currently are in progress and their status, and outlined activities which are needed to promote the sustainability of each component The groups concluded that the various components of the WQIC project are fundamental to the strategic planning and daily operations and management of water resources in Jordan

Each group prepared a summary of the outcome of their workshop which provides a list of the currently funded activities for each component, a list of activities that are underway but have insufficient resources and recommended additional activities that are required to ensure sustainability but have no funding available The individual workshop reports are shown in the annexes of this report The views and recommendations provided within this report are those of the workshop participants and their consultants and do not necessarily represent the official position or views of MWI WAJ, or JVA

Many of the activities that require attention to be sustainable are long-range and require substantial resources For those activities, the Ministry needs to develop a long-term implementation plan and seek funding sources In the interim, it is recommended that the Ministry consider supporting critical activities beyond the end of the current USAID/DAI assistance (1 October 1998)[2] that need to be completed in the short-term (prior to May 1, 1999) The activities requiring minimal resources during the short-term period (October 1998 to May 1999) to become sustainable are outlined in the following tables organized by component (no priorities are established between components)

However, to ensure the success and sustainability of any short or long-term program, the constraints presently facing WQIC Project activities should be addressed and resolved These constraints which have been hindering progress on many activities include the following

- Lack of progress on institutional arrangements
- Lack of committed counterpart staff to implement the activities
- Lack of transportation for field activities
- Lack of counterpart funds for installation of equipment and Operation and Maintenance

Until these constraints are adequately addressed, it will be very difficult to complete the activities listed below in a timely and sustainable manner

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[1] The WQIC Project has been renamed the The Water Resources Strategic Objective ' program in a grant agreement signed between the Ministry of Planning and the US Embassy on 26 September 1996 Within MWI the project is till referred to as WQICP

[2] The current DAI contact ends on 10 November 1998 The technical assistance will end approximately on October 1 1998 to allow time for close out of accounts preparation of final documentation, and handing over the inventory to the Ministry

MANAGEMENT INFORMATION SYSTEMS (MIS)

Issue Category	Activity	Status	Available Resources	Recommendations (Required Resources)
Networks for MWI facilities in greater Amman	Install networks in five additional buildings in Amman	Amend current Comcent contract	Funding via locally generated funds	- JD 80 000 - Requires an additional 4 PM of STTA
General MIS support	All MIS activities	On going	None	- 3 PM STTA - full time local TA
Support for Notes Database development	Databases to track MWI Investment Plan and individual projects and Donor activities	On Hold	None	- 2 PM STTA - 4 PM local TA

WATER RESOURCES MONITORING SYSTEM (WMS)

Issue Category	Activity	Status	Available Resources	Recommendation (Required Resources)
Network Upgrading	(1) Install ground water wells	Require local currency	WAJ staff	- JD 485 000
	(2) Design of surface water stations	Require local currency	WAJ staff	- 2 PM STTA - JD 50 000
	(3) Install/Rehabilitate surface water stations	Require local currency	WAJ staff	- 2 PM STTA - JD 300,000 - full time local TA
Information Management	(1) Enhancement of WMS database	Proceeding slowly	MWI	- Enhancements to basic database are needed, STTA (up to 4 PM)
	(2) Integrate monitoring database with GIS	Test completed by WQIC Project	None	- 4 PM STTA
Operations and Management	(1) Institutionalise within MWI	On hold	WAJ staff	- Vehicles offices and equipment, 3 PM STTA
General WMS Support	All WMS activities	On going	None	Full time STTA (6 PM)

LABORATORY UPGRADE

Issue Category	Activity	Status	Available Resources	Recommendation (Required Resources)
Policy/Planning	Evaluate role of lab for MWI WAJ and JVA	-	None	- 2 PM STTA
LIMS (for WAJ laboratory)	(1) Operational support		None	- Long-term operational support and training desired (2 PM STTA) - LAN O&M contract
Operations and Management (for WAJ laboratory)	(1) Operations QA & SOP implementation	In progress	None	- 4 PM STTA - Local staff

ENVIRONMENTAL PROTECTION

Issue Category	Activity	Status	Available Resources	Recommendations (Required Resources)
Institutional Development	Define roles and acceptance by MWI, JVA, and WAJ	Slow	MWI/WAJ/JVA	- 2 PM STTA - Need MWI staff

IRRIGATION WATER MANAGEMENT

Issue Category	Activity	Status	Available Resources	Recommendation (Required Resources)
Infrastructure Modernization	Upgrade of JVA Mechanical Workshops	Equipment purchases in process	Limited	- 1 PM STTA for training - $250,000 for equipment - 1 PM STTA for stores management evaluation
Irrigation Advisory Service/PIMs	Establish and train	On hold	No staff	- Transfer staff within JVA to the IAS

ARTIFICIAL RECHARGE

Issue Category	Activity	Status	Available Resources	Recommendation (Required Resources)
Planning	Develop strategy for national artificial recharge program	Issue has been identified	None	- Assess conditions and prepare strategic action plan (STTA of 3 PM)
Development	Wadi Madoneh Pilot Project Construction and operation	On hold	None	- JD 300,000 - 1 PM STTA

PUBLIC AWARENESS

Issue Category	Activity	Status	Available Resources	Recommendation (Required Resources)
Institutional Development	Strengthening the MWI PA Directorate	No staff to work with	None	2 PM STTA Additional training

HUMAN RESOURCES DEVELOPMENT

Issue Category	Activity	Status	Available Resources	Recommendation (Required Resources)
Support HRD Directorate	Training programs	In progress	MWI staff	- Full time local HRD specialist
Training by MWI trainers	Various courses	In progress	None	- Funds for local training

Annexes

A Sustainability Paper for the MWI's Unified MIS Component
B Sustainability Paper for the MWI's Water Resources Monitoring System Component
C Sustainability Paper for the MWI's Laboratory Upgrade Component
D Sustainability Paper for the MWI's Environmental Protection
E Sustainability Paper for the MWI's Irrigation Water Management Component
F Sustainability Paper for the MWI's Artificial Recharge Component
G Sustainability Paper for the Public Awareness Program
H Sustainability Paper for the MWI's Human Resources Development Component

Sustainability Paper for the Ministry of Water and Irrigation's Unified MIS Component

The Workshop on the Unified MIS was held on November 2nd and 3rd, 1997 to identify what is necessary for sustainability and to address issues considered as obstacles to successful project implementation A brief review of donors that have impact on the overall program was performed to ensure that all understood which organizations were contributing to the overall effort

1 Objectives of the Workshop

The objective of the workshop was to identify needs and issues affecting long-term sustainability of the Ministry's Unified MIS

2 List of Currently Funded Activities

Many tasks of the MIS Components are completed or in progress These tasks contribute to the overall objective of a Unified MIS

Issue Category	Activity	Status	Available Resources	Recommendations (Required Resources)
Standard Database System	Oracle procured, installed and being applied	Procurement Complete Staff in ongoing training	Training funds addressed in shortfall section of this report	Continue use Increase number of trained staff through training
Standard GIS System	ArcView procured installed and being used	Procurement complete Staff and other donors developing applications		Ensure donor's developing applications use standard coverage s and provide links to Oracle based databases as appropriate
The Water Information System (WIS)	Under development	On-going enhancements	Resources available under WQICP	Transition data in UNDP FoxPro database to WIS Oracle based system
Personnel and Payroll System (Oracle Based)	Completed in use by JVA	Ready for implementatio n in MWI and WAJ	In house rescues available for transition and training	Transition system to MWI and train personnel Transition to WAJ next
Stores Management (Oracle Based)	Completed by WAJ Requires testing	After testing, transition to JVA	In house resources used Awaiting arrival of server for testing	Test developed system Transition to JVA
Operations and Maintenance System (Oracle Based)	Completed by JVA	In use by JVA	WAJ waiting arrival of server and network prior to implementation	Implement at WAJ new facility when server arrives and network installed
King Abdullah	Operational	Complete	In house	Maintain currency of

Canal Control System		(KFW)	support	software and supporting equipment
Water Balance Model (Oracle Based)	Operational	Complete (KFW and JVA)	In house support	Maintain software support licenses and staff support Develop electronic link to HQ JVA in Amman

A major component in developing the Unified MIS is to provide a common architecture and a means to communicate between organizations In the 1995 Detailed Engineering Design (DED), a Local Area Network (LAN) was designed for the main Ministry building as the foundation for this architecture A contract has been funded and will be issued in November to install a common network in the main Ministry building beginning in February 1998 All organizations will migrate their individual equipment to this common network Important related activities in this common network are fully funded and being developed

Issue Category	Activity	Status	Available Resources	Recommendations (Required Resources)
Unified MIS Network for main Ministry Building	Install in February -March 98	Contract for installation pending approval	Resources and funding in place	Install after Ramadan and Eid as scheduled
Provide Internet access to selected individuals	Internet connection completed for MWI	Connection is available on interim basis	Resources in place and funding complete	Expand Internet access after migration to common network
Develop Intranet and Internet Web Page	Intranet prototype developed Internet Web site being designed	Intranet site accessible by personnel on MWI network	Resources in place and funded	Policy needed on who has access to Internet Web sites
Document tracking within MWI	Develop system to tack documents within MWI	Under preparation	MWI and WQICP	Complete system and test

In training, limited funding in the current year for training in MIS related disciplines is available and some training has been accomplished An additional ten courses are needed to meet the requirements for Database Administration and Windows NT training Remaining funding covers only one or two of the required additional courses

Planned and funded additions to the overall Unified MIS capability include the acquisition of commercially available applications for portions of the MWI enterprise

3 List of Required but Under-Funded Activities There are several projects underway supporting the Unified MIS that have funding or technical resource shortfalls These shortfalls exist because of previously established priorities, that when applied to needed activities drive requirements for additional resources to complete or fully implement solutions

Issue Category	Activity	Status	Available Resources	Recommendations (Required Resources)
Networks for MWI facilities in greater Amman	The contract to install a common network for the main Ministry Building contains options to network five additional buildings	Contract pending award	Funding for one of the options is probably available	Require an additional JD 80 000 in funding and 4 PM LOE for short term technical assistance
Networks for the new Training Building and the new Central Laboratory	Develop contract vehicle to network these buildings	Waiting final design for Laboratory	None - could amend current Installation contract as contracting vehicle	Require an estimated $170,000 for installation and 4 5 PM LOE for contract development and installation activities
Training in the MIS Disciplines	Train staff as Oracle database Windows NT network and Lotus Notes administrators	Initial Oracle training accomplished Oracle Windows NT and Notes courses required	Originally $20,000 was programmed for training $18,000 remain This covers one additional course	Require an additional $90,000 for training for this year to build core staff and their skill level to support the Unified MIS
New Applications for Unified MIS and Ministry	Develop priority list with Ministry for required commercial applications e g Library Mgt System	Work will begin in early 1998 with Ministry to target applications	Available	
Internet connectivity through the NIC	Develop reliable high speed data link and operable interface to MWI Windows NT server	Using interim connection from commercial source	None	Estimated requirement of $10 000 for sustainable connection and Satellite download and 1 PM LOE of technical assistance

4 List of Required but Non-Funded Activities

A number of activities and requirements need to be accomplished to adequately establish the Unified MIS and ensure its sustainability These requirements have been identified in various plans such as the DED and Concept of Operations Plan, however, they have not received funding from donors Continued lack of resources for these activities and commodities jeopardize the long-term viability of the Unified MIS

Issue Category	Activity	Status	Available Resources	Recommendations (Required Resources)
Wide Area Network (WAN)	Design and implement connectivity between Ministry sites	Preliminary design complete in DED Need to revise and upgrade	None Potential help from USGS for prototype connectivity	Require $40 000 to install and lease lines for the greater Amman area Require 2 5 PM LOE to design prepare contracts and implement

Local Area Network (LAN) Reliability	Develop plan to back up data and improve reliability of network services once LAN is installed using RAID, better memory configurations better equipment use	Concepts developed Detailed plans required	None	Require $150 000 to implement RAID and system improvements Require 1 5 PM LOE for planning and implementing
JVA/WAJ Hardware Requirements	JVA and WAJ have stated and prioritized hardware shortfalls in terms of workstations small servers and peripherals	Need to develop tender documentation	None	Require $350,000 for hardware to satisfy stated needs Require 1 PM LOE to develop and evaluate tender documents
Revise Update and Implement JVA Socio-Economic Database	Need to transition old database to Oracle 7 and implement methodology to continuously enter new data and maintain database	Database is not in use due to lack of resources data processing and human to support it	None	Require 3 PM to transition database and develop new support methodology
Transition and/or create information systems in Oracle to support the Ministry	Several small scale information system projects have been identified (CONOP) which require transition development	No activity has been planned due to lack of resources	None	Require 4 PM LOE and work with WAJ/JVA staffs to develop and test these information systems
Implement standardized accounting system	Requirement identified in CONOP Accounting organizations must adopt standards first	GTZ has provided some work in this area Standards have not been adopted	None	Require $100 000 for software and training Require 3 PM LOE for developing plans acquisition documents and arranging for training
Unified MIS Contract for Network Support	Draft Statement of Work developed	Actions on hold pending Ministry decisions on funding and approach	None	Require $60 000 for one year contract Require 0 5 PM LOE to finish work on acquisition and help setup contract controls within the MWI
Implement Ministry wide project planning software	Concept of implementing system developed in CONOP Need full scale planning based on requirements collection	No current actions Early planning stages	None	Requires $20 000 additional software licensing fees and 2 PM planning development and training
Tracking of	Develop system to	No current	None	0 7 PM of LOE

Donor Projects	track and coordinate all donor activities by technical area	plan		

5 **Existing Sustainment Requirements** The long term sustainment of the Unified MIS is dependent on several important factors that require technical expertise and funding for ongoing operations The three-key components of sustainment are

- Organizational structures that make efficient use of scarce human resources
- A well trained and focused staff
- A current set of plans, standards, procedures and policy that is published and followed

Plan for and Begin to Staff Unified MIS Management Unit To sustain a Unified MIS a strong unified trained staff is necessary This staff will be responsible for setting policy procedures, developing plans budgeting operating, maintaining, and improving the Unified MIS on a long-term basis The forerunner to this staff is the MIS Steering Committee and the recently created MIS Directorate A phased approach is needed to develop a consolidated staff with the right skill set to sustain the Unified MIS for the Ministry A staffing plan job descriptions and unit responsibilities are needed These should be developed and phased in over a Ministry selected period of time Conceptually this has been addressed however details need to be added with realistic schedules

Five year Planned, Funded and Sustained Training Effort To ensure adequate staff are trained and gain experience a five year training plan needs to be developed, funded and implemented Personnel in the MIS disciplines need to have training and practical experience to be truly effective Training all at one time or experience all at one time is the least effective way to build a staff A staff growth plan, with training interspersed with practical hands-on experience will help build a trained and motivated staff Even in cases where the day-to-day operations of the system may be contracted out, without trained managers performing contract oversight duties the Unified MIS will not be efficiently operated

Develop Standards, Policy, Procedures, and Implement for Unified MIS Standards policy and procedure development have been initiated by the MIS Steering Committee with technical assistance As the Unified MIS capability grows the standards, policies and procedures will need to evolve to manage this area Similarly previously developed plans need to be updated such as the DED and the Concept of Operations to reflect changes These plans and guidelines should routinely be updated to ensure the Ministry has an approved direction and operating procedures that are available for review by senior management

Issue Category	Activity	Status	Available Resources	Recommendations (Required Resources)
Establish a consolidated MIS Management Unit for the Ministry	Plan for develop position descriptions begin staffing actions and acquire space allocations for Ministry organization supporting all aspects of the	The concept for this organizational change is identified in the Detailed Engineering Plan and the Concept of Operations	None	Requires 3 PM LOE of technical assistance supplied over a 6 to 9 month period [1]

	Unified MIS	Plan		
Sustainment Training for MIS Disciplines Five year outlook	Currently training is being provided but only in one year increments	Current training is under-funded No long term plan developed	None	Required contract development with one year award and four one year options for technical training for MIS Requires 1 8 PM LOE for plan and contract development and $250,000 for funding
Develop Standards, Policy, Procedures, and Implement Unified MIS	Current activity includes technical assistance in this area, however, on going support will be required	Current support will end in June 98	None	Requires 6 PM of technical assistance which is a continuance of support currently being provided[1]

1 The superscript ' 1 indicates that these activities could be accomplished or consolidated into a broad tasking for on site MIS advisor

ANNEX B

Sustainability Paper for the Ministry of Water and Irrigation's Water Resources Monitoring System

A workshop was conducted on October 27th and 28th, 1997 with representatives of MWI, WAJ, JVA, and the Water Quality Improvement and Conservation (WQIC) Project to address sustainability of the Ministry's water resources monitoring system program

1 0 Objective of the Sustainability Workshop

The objective of the workshop was to identify critical issues that affect long-term sustainability of the Ministry's water resources monitoring system This program provides the water resources and water quality data that are fundamental to the strategic planning and daily operations and management of water resources for Jordan The workshop focused on the progress achieved to date with various Ministry programs and internationally funded projects supporting water resources (including water quality) monitoring activities in the Ministry, activities which currently are in progress and their status, and activities which are needed to promote sustainability of the water resources monitoring system

2 0 Key Activities and Issues of Concern

Activities toward upgrading and sustaining the Ministry's water resources monitoring system generally have been supported by international donors including USAID, KFW, GTZ, and Regional Water Data Banks Coordination among the donors has been important in achieving much of the progress realized to date However, sustainability of the basic water resources monitoring system continues to be an issue primarily because of the limited Government of Jordan funding for the program

During the workshop, several major issues which affect the long-term sustainability of the water resources monitoring system were identified

- Policy and Planning
- Operations and Management
- Water Resources Monitoring Information Management
- Water Resources Monitoring Network Upgrading

Activities required to resolve these issues are listed and briefly described below based on whether the activity is currently funded, under-funded, or not funded

2 1 List of Currently Funded Activities

Most currently funded activities supporting the water monitoring system focus on upgrading the monitoring networks Slow development of several activities (e g , upgraded hydrometeorology plan, surface water station design and construction) is affecting procurement of equipment for which funding is available No currently funded activities are supporting the policy/planning and operations and management issues affecting the water resources monitoring system

ANNEX B

Issue Category	Activity	Status	Available Resources	Recommendations (Required Resources)**
Policy Planning	No Activities		-	
Network Upgrading	(1) Hydrometeorology equipment procurement	On hold	$150 000	- Complete upgrade plan so equipment can be ordered (see item (2) below)
	(2) Upgrade Hydrometeorology Plan	Proceeding slowly	WAJ staff	- WQIC STTA LOE (2 PM) to complete more quickly
	(3) Upgrade drinking water plan	Proceeding slowly	WAJ staff	- WQIC STTA LOE (2 PM) to complete more quickly
	(4) Surface water equipment procurement	On hold	$100,000	- Need to complete station designs (see Section 2 2)
	(5) Upgrade waste water monitoring plan	Proceeding slowly	WAJ staff	- WQIC STTA LOE (1 PM) to complete more quickly
Information Management	(1) Unification of WMS database	In progress	WQIC STTA LOE (4PM)	Continue as planned
Operations and Management	No Activities			-

* PM STTA LOE currently available from the monitoring component of the WQIC Project Pending USAID agreement, PM monitoring STTA LOE could be converted to 2 PM of STTA LOI

Several of these activities directly impact subsequent actions necessary to sustain the water resources monitoring system or are linked to existing funding mechanisms Consequently, these activities should be completed by the **end of the first quarter 1998, if not sooner**

2 2 List of Required but Under-Funded Activities

Several ongoing activities are significantly under-funded This is particularly true for those activities focusing on upgrading the monitoring networks Continued uncertainty regarding the monitoring function has significantly slowed progress toward implementation of several programs developed under the WQIC Project No currently funded activities are supporting the policy/planning issue affecting the water resources monitoring system

Issue Category	Activity	Status	Available Resources	Recommendation (Required Resources)
Policy/Planning	No Activities		-	-
Network Upgrading	(1) Install Rehabilitate ground water monitoring wells	On hold	None	- Require JD 485,000 to complete networks
	(2) Design of surface water stations	On hold	WAJ staff	- Subcontract design work to local firm (JD 50 000) technical assistance (2 PM)
	(3) Install Rehabilitate surface water stations	On hold	None	- Require approx JD 300 000 for networks technical assistance (2 PM)
	- GW SW equipment [illegible]	Proceeding slowly	WAJ staff	Require vehicles per diem stations installed
	Flood gauges and water	Proceeding	WAJ staff	- Require vehicles per

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	monitoring wells	slowly		diem committee to QA/validate basic well data
Information Management	(1) Completion of WMS database	Proceeding slowly	MWI staff, WQIC Project	- Enhancements to basic database are needed , WQIC STTA LOE (6 PM)
	(2) Wider accessibility to the WMS database	On -hold	None	- Expand to include 7th circle office, lab, JVA dams, JVA Dirar (see MIS paper)
	(3) Complete other parts of water database system	In development	MWI staff, GTZ	- Accelerate process, additional technical assistance desirable
	(4) Use database for studies, analysis, reporting decision making	Proceeding slowly	MWI staff, GTZ, UNDP, WQIC Projects	- Develop more structured program for objectives, try to accelerate development process, additional technical assistance desirable
Operations and Management	(1) Bring upgraded water quality monitoring networks on-line	Plans complete, implementation on-hold	WAJ, JVA, MWI staff	- Staff and resources are required to sustain networks (see Section 2 3)
	(2) Bring standard data collection procedures on-line	Plans complete, implementation on-hold	WAJ, JVA, MWI staff	- Management decision to proceed with staff and resources
	(3) Training	Proceeding slowly	Limited	- Need more structured training program (see Section 2 3)

Most activities relate to completion of the water resources monitoring networks and to the water monitoring system database Other activities relate to implementation of work completed earlier under the WQIC Project An effort should be made to resolve these activities by the end of the first quarter 1998, if not sooner

2 3 List of Required but Non-Funded Activities

Several activities including those most seriously affecting long-term sustainability of the water resources monitoring system currently are not addressed by Ministry programs or donor projects Continued uncertainty regarding the monitoring function and programmatic resource requirements possibly is the most serious issue affecting sustainability of the water resources monitoring system

Issue Category	Activity	Status	Available Resources	Recommendation (Required Resources)
Policy/Planning	(1) Establish unified monitoring function in Ministry	In discussion	Decision required	- Accelerate decision making
	(2) Create organization for unified monitoring function	In discussion	Current Ministry resources	- Finalize operational plans and job descriptions, define and seek resources required to operate function (see operations item below)
Network	(1) Extreme events	None	WAJ staff	- Scope details for activity

Upgrading	monitoring			and seek donor funding and technical assistance
	(2) Establish representative monitoring basins	None	WAJ staff	- Scope details for activity, develop plans seek donor financing and technical assistance
	(3) Evaluate telemetry systems to support water resources networks	None	None	- Seek donor financing and technical assistance
Information Management	(1) Validate accuracy of data in database	None	MWI WAJ staff	- Ministry establish a program to address issue with donor funding and potential technical assistance
	(2) Incomplete data in database	None	MWI, WAJ staff	- Coordinate as part of item (1) above
	(3) Update data flow procedures	Draft plans complete	MWI WAJ JVA staff	- Ministry to establish committee to update technical assistance desired
	(4) Establish formal data publication program	Limited publications issued	MWI staff	- Ministry to establish a more structured program
	(5) Integrate monitoring database with GIS	Test completed by WQIC Project	None	- WQIC STTA LOE (6 PM)
Operations and Management	(1) Develop detailed operations plan including resource requirements	None	None	- Seek technical assistance for operations plan (2 PM)
	(2) Develop training plan for organization	None	None	- Seek technical assistance for training plan (2 PM)
	(3) Develop equipment management plan for organization	None	None	- Seek technical assistance for equipment management plan (2 PM)
	(4) Institute new monitoring function	None	Existing Ministry resources	Ministry to budget for required resources or seek donor support (includes staffing cars equipment allowances, etc) and long term technical assistance (2-5 years)

The annual operating budget for the unified water resources monitoring system is estimated at $1 200,000 (including $300,000 for replacement of monitoring stations instruments, vehicles) Initial capital costs for monitoring stations instrumentation, office equipment and furniture, and vehicles are estimated at $3 300 000 Approximately $2 700,000 of this amount already has been committed under the WQIC Project funding and associated in-country funds once all monitoring stations are constructed Based on current conditions long-term advisory support (2-5 years) at the operations/management level is likely necessary to institute required operational practices for the function

3 0 Constraints and Recommendations

(1) The policy/planning and operations and management issues seriously affect sustainability of the water resources monitoring system and implementation of work completed over the past four years by the WQIC and other donor projects A sustainable water resources monitoring system is a long-term proposition and will require several years to be fully achieved once these issues are resolved

The recommendation is to immediately resolve the unification and organizational issues for the water resources monitoring system Final operational and financial planning must be completed and financing must be secured either from the Government of Jordan or donor organization A goal of 31 December 1997 for resolving the organizational issue and 31 March 1998 for securing required funding is proposed

(2) Completion (i e , full construction and instrumentation) of the upgraded monitoring networks must remain a high priority The networks are very close to completion

(3) Continued development of the water resources monitoring system database is essential to support and complement the overall monitoring network upgrade activities and unification of the monitoring organization This includes full integration of the database with geographical information systems (GIS)

2 0 Accomplishments to Date

Several significant accomplishments have been achieved to date, particularly those supported by the WQIC Project Other activities currently are in progress or soon will be initiated Accomplishments include

- Preparation of detailed upgraded monitoring plans (water resources and water quality) for all surface water basins (11 documents) and ground water aquifers (18 documents covering 34 aquifer regions) in Jordan
- Installation of more than 30 ground water monitoring wells and rehabilitation of more than 70 ground water monitoring wells for the B2/A7 and B4 aquifers throughout most of Jordan Another 30 monitoring wells remain to be installed and an additional 70 wells require rehabilitation
- Installation and instrumentation of 6 surface water resources monitoring stations in the Zarqa River Basin An additional 30 surface water resources monitoring stations remain to be constructed or rehabilitated and instrumented throughout Jordan
- Installation of the automated monitoring system for the King Abdullah Canal with connection to the hydrologic center at Dhar (KFW Project) Expansion of the system to include all of the Jordan River and Rift Side Wadis Basins will commence in 1998
- Installation of approximately 30 ground water monitoring instruments for the upgraded monitoring networks More than 50 instruments remain to be installed as wells are constructed or rehabilitated
- Preparation of upgraded data measurement and sample collection protocols quality assurance protocols and data management procedures for the upgraded water resources monitoring networks

Development of a water monitoring system database programmed in ORACLE relational database management system The database currently is undergoing final testing prior to full-scale application and use

ANNEX C

Sustainability Paper for the Ministry of Water and Irrigation's Laboratory Upgrade

A workshop was conducted on November 5th and 6th, 1997 with representatives of MWI, WAJ, JVA, and the Water Quality Improvement and Conservation (WQIC) Project to address sustainability of the Ministry's laboratory upgrade program The workshop responded to needs of both the Central Laboratory of WAJ and the Laboratory Directorate of JVA

1 0 Objective of the Sustainability Workshop

The objective of the workshop was to identify critical issues that affect long-term sustainability of the Ministry's laboratories These laboratories provide critical water quality data for water samples collected by various operational functions of WAJ and JVA These water quality data primarily are important for daily operations and management of water resources for Jordan both for domestic (drinking) water and irrigation water The workshop focused on the progress achieved to date with various Ministry programs and internationally funded projects supporting the work of the laboratories, activities which currently are in progress and their status, and activities which are needed to promote sustainability

2 0 Key Activities and Issues of Concern

Several achievements have been realized toward upgrading and sustaining the Ministry's laboratories Most of the effort has been directed toward the Central Laboratory of WAJ However, sustainability of basic laboratory upgrade programs is an issue primarily because of the limited Government of Jordan funding for the programs

During the workshop, several major issues which affect the long-term sustainability of the Ministry's laboratories were identified

- Policy and Planning
- Operations and Management
- Laboratory Information Management System (LIMS)
- New Central Laboratory Facility

Because of the inherent differences between the authorities and responsibilities of the WAJ and JVA laboratories, different issues and activities have been identified for each laboratory Activities required to resolve these basic sustainability issues are listed and briefly described below based on whether the activity is currently funded, under-funded, or not funded

2 1 List of Currently Funded Activities

Most currently funded activities have focused on upgrading the capability of the WAJ Central Laboratory Space limitations and the slow development of the new laboratory facility (e g , proper engineering design and construction) have affected the ability of the Central Laboratory to procure required analytical instrumentation and to rapidly implement upgraded operational and quality assurance protocols and procedures

Issue Category	Activity	Status	Available Resources	Recommendations (Required Resources)
Policy/Planning	No Activities		-	-
New Central Laboratory Facility	(1) Completion of new facility building	Under construction	WAJ budget	- Accelerate construction consistent with available funding
LIMS (for WAJ laboratory)	(1) Procure/install LIMS software and hardware	Design plan complete, procurement in progress	$60,000 from WQIC Project for software, WAJ budget for server	- WQIC STTA LOE (1 PM) to evaluate tenders for LIMS software
LIMS (for JVA laboratory)	(1) Included in O&M Plan		-	-
Operations and Management (for WAJ Laboratory)	(1) Training	In progress	WQIC Project	- Continue instrumentation training 3 PM lost from WQIC Project for lab design review
Operations and Management (for JVA Laboratory)	(1) Upgrade O&M Plan	Under preparation	$100,000 from WQIC Project	- Implement the procurement and training portion of the plan when approved

These activities are proceeding Procurement and installation of the LIMS is dependent on qualified personnel being hired by the Central Laboratory to support LIMS and LAN operations This issue should be resolved by the end of the March 1998, if not sooner Effort should be made to recapture the WQIC Project STTA LOE (3 PM) reallocated from planned training activities for reviewing the design of the new laboratory facility This issue should be resolved by the end of 1997

2 2 List of Required but Under-Funded Activities

On-going activities supporting the LIMS and implementation of upgraded laboratory operations/quality assurance and standard analytical procedures could benefit from additional technical assistance

Issue Category	Activity	Status	Available Resources	Recommendation (Required Resources)
Policy/Planning	No Activities	-	-	-
New Central Laboratory Facility	(1) Furnishings for new facility	Unknown	Unknown	- Ministry to verify funding requirements
	(2) Move laboratory instruments and furnishings to new facility	Unknown	Unknown	- Ministry to verify funding requirements
LIMS (for WAJ laboratory)	(1) Basic training	Part of procurement	Vendor	- Long-term operational support and training desired (2 PM)
Operations and Management (for WAJ laboratory)	(1) Operations/QA & SOP implementation	In progress	Approx 2 PM WQIC Project STTA	- Proceed as planned additional technical assistance desired (6 PM)
Operations and	No Activities		-	-

Management (for JVA laboratory				

Effort should be made to secure additional technical assistance to support continued implementation of upgraded programs prior to fulfillment of current assistance efforts in May 1998

2.3 List of Required but Non-Funded Activities

The Central Laboratory has made significant progress toward upgrading capabilities and adopting operational and quality assurance systems consistent with international standards. Much work still must be done to actually achieve these objectives. The JVA laboratory will be able to learn much from the Central Laboratory's experience. However, the JVA laboratory has specific needs if they also are to move forward with their systems.

Issue Category	Activity	Status	Available Resources	Recommendation (Required Resources)
Policy/Planning	(1) Identify/establish objectives authorities for each laboratory	In discussion	Ministry resources	- Accelerate decision making
	(2) Develop coordination and cooperation between laboratories	In discussion	Laboratory staff	- Ministry establish steering committee to promote coordination
New Central Laboratory Facility	(1) Procure B2 list of equipment	On hold due to space limitations	None	- Complete new lab facility funding (est $500,000)
	(2) Equipment needs identified in refurbishment plan	None	None	- Seek required funding (details in refurbishment plan)
LIMS (for WAJ laboratory)	(1) Operation and management of LIMS (existing facility)	None	WAJ staff	- Technical assistance desired (2 PM)
	(2) Integration of some PCs and analytical instrumentation (existing facility)	None	WAJ staff	- Technical assistance desired (2 PM)
	(3) Design and installation of full LIMS (new facility)	None	WAJ staff	- Technical assistance desired (2 PM), funding for HW
	(4) Operation of full LIMS (new facility)	None	WAJ staff	- Technical assistance desired (3 PM)
	(5) Recruit LIMS/LAN personnel	None	None	- Ministry decision to hire required personnel
LIMS (for JVA laboratory)	(1) Assess laboratory requirements	None	None	- Need technical assistance (1 PM)
	(2) Procure develop and install LIMS	None	None	- May need funding for LIMS software if Access is not used
	(3) LIMS training	None	None	- Obtain as part of procurement

Operations and Management (for WAJ laboratory)	(1) Obtain international accreditation (ISO)	None	WAJ staff	- Long-term process, lab must initiate
	(2) Obtain formal approval of lab organization and job descriptions	In discussion	WAJ staff	- Lab to present plan to Ministry for approval
	(3) Recruit required personnel	Personnel needs identified	None	- See refurbishment plan (LIMS, LAN, QA staff)
	(4) Adopt O&M program	Basics identified	WAJ staff	- Follow existing models, technical assistance (2 PM)
	(5) Implement health and safety program	Proceeding slowly	WAJ staff	- Several issues, technical assistance (2 PM)
	(6) Institute training program	Training needs identified	WAJ staff	- Substantial training, see refurbishment plan
	(7) Integrate lab functions to reduce duplication	Proceeding slowly	WAJ staff	- Lab to streamline operations
Operations and Management (for JVA laboratory)	(1) Operations QA & SOP developed and implemented	None	JVA staff	- Technical Assistance (2 PM), work with WAJ lab
	(2) Training (SOPs and instrumentation)	None	WAJ staff	- Work with WAJ lab
	(3) Study feasibility of converting lab to public fee for services enterprise	None	JVA staff	- Technical Assistance (2 PM)
	(4) Adopt O&M program	None	JVA staff	- Assess needs and work with WAJ lab
	(5) Data management	None	JVA staff	- Reassess issue (computers MIS, GIS integration)
	(6) Interpretation of data lab support to clients	None	None	- Technical assistance for interpreting data for clients
	(7) Adopt health and safety program	None	None	- Work with WAJ lab
	(8) Establish analysis performance testing program	None	None	- USGS or Australian labs
	(9) Long-term equipment needs	None	JVA staff	- Funding required for equipment identified in assessment

The objectives outlined for the laboratories represent long-term programs and planning and financial commitments are required if the laboratories wish to be successful Activities listed in the above table should be pursued consistently over the next 2 to 4 years to help the laboratories achieve their goals

3 0 Constraints and Recommendations

The basic programs and systems for the Central Laboratory have been developed and are being implemented as resources and staffing allowed Construction of a new laboratory for WAJ will make

a significant contribution to the long-term sustainability of the Central Laboratory if these programs and systems continue to develop and mature

(1) The Central Laboratory can continue to benefit from specific technical assistance efforts These efforts should be consistent with the developments achieved to date and the recommendations specified in the refurbishment plan Training as outlined in the refurbishment plan will be instrumental in helping promote continued development and sustainability of the Central Laboratory's programs and systems

(2) The JVA laboratory can benefit from the experiences of the Central Laboratory The two laboratories should develop a program to ensure that the experience of the Central Laboratory is transferred to the JVA laboratory This could include joint training programs, sharing of operations/quality assurance protocols and standard analytical procedures, and implementation of specific operations programs (e g , health and safety, maintenance, quality assurance, etc)

(3) The JVA laboratory can benefit from specific technical assistance which focuses on some of the unique problems faced by the laboratory These include LIMS, data interpretation and advisory support to laboratory clients (i e , farmers), and equipment needs

Sustainability Paper for the Ministry of Water and Irrigation's Environmental Protection Component[1]

A workshop was held on December 22nd and 23rd, 1997 with representatives from MWI WAJ JVA and the Water Quality Improvement and Conservation (WQIC) Project This workshop was somewhat different from other sustainability workshops in that all but one of the activities under the WQIC Pollution Prevention Component have been completed In addition the Ministry has just established the Environment Protection Directorate Thus the focus of the workshop was on the issues related to the roles, responsibilities, and needs of the new directorate in MWI and the restructured directorates in WAJ and JVA There was insufficient time to complete the discussion for this component As such this Annex is not complete and will require additional effort prior to becoming a useful document

1 0 Objective of the Sustainability Workshop

The objective of this workshop was to address the needs of three environmental directorates at the three entities (MWI, WAJ and JVA) and how they will co-ordinate their efforts to ensure sustainability of environmental activities

2 0 Major Accomplishments and Key Players in the Field of Environment in Jordan

Major accomplishments over the past few years by MWI, WAJ and JVA in environmental activities were listed and discussed The known accomplishments of other key players in the field i e MOH GCEP RSS HCST MOA MOP MOMRE IEC GAM, JES RSCN, Jordan Department of Standards Ministry of Interior, Ministry of Education, Amman Chamber of Industry, Industrial Development Bank Universities Municipalities, Aqaba Regional Authority and Armed forces were also outlined

The group agreed that all the key donors have or are contributing to this area (USAID, KFW GTZ CIDA EU ACSAD) through technical assistance funds training and supplying equipment

3 0 Environmental Objectives of Each Entity

A list of objectives (as perceived or practised) of each entity, functions, activities under the environmental protection field are summarised below

MWI

Objectives	1) Protecting Water Resources through Planning, policies and Overall Management 2) Support WAJ JVA			
Functions activities	• Performing and Reviewing Environmental Studies • Strategies/ National Policies Plans	• Standard Setting • Compliance Assessment	• Public Awareness • Review effectiveness of facilities and operation in meeting the standards	• Studies and Investigations • Data Bank Support
Linkages	WAJ JVA GCEP Government and NGO s Mass media Donors			

[1] To better reflect the actual objective of the Ministry the name of this component has been changed from Industrial Wastewater Discharge Prevention

WAJ

Objective	1) Protection of Water Resources 2) Water Resources Development			
Functions Activities	Ground water resources studies Drinking water supply and Q monitoring Waste Water Management Collection treatment monitoring reuse	Surface water resources studies Public Awareness Env Monitoring program Implementation of WW facilities	Study of non-conventional water resources Implementation of water facilities Env Impact assessment Advisory and technical assistance	Institutional arrangements Data and information management Legislation and std Setting Policy planning arrangements Licensing ' industries and wells
Linkages	MOH ACI JDS MOTI MOA MOI Private Sector NGO MMRA, JVA, NRA MOP Donors GECP, MOE MWI A R A			

JVA

Objectives	1) Sustainable use of land and water resources 2) Conservation and protection of water (quality and quantity) 3) Soil pollution prevention 4) Environmental health protection			
Functions/ Activities	Monitoring of surface and ground water Development and use of marginal (brackish) water Research and development soil water plant relationship Soil and plant monitoring and analysis Improvement effect (conveyance distribution and on-farm use)	Land reclamation (Drainage leading) Irrigation advisory services and extension Environmental impact assessment Land use planning	Community based sanitary/waste management projects Irrigation water standards development Planning treated wastewater reuse in agriculture Loosening on water resources allocation (quality and quantity) inter and intra country	Licensing - Industry - Quarrying - Crops Combating flies problems in the Jordan valley (house and fruits flies) Activation and enforcement of environmental protection laws Water quality management (Blending, KTD destrat System)
Linkages	General corporation of for environmental protection (GCEP)	WAJ MWI MOA	Local municipalities local industries donors	Interstate regional

4.0 Major Concerns Challenges and Issues to Deal With

In this part of the workshop the major concerns challenges and issues were discussed and are defined below. There was insufficient time to fully define and determine the resources required under each category. Additional meetings are planned to further refine the tasks and resource requirements

MWI

Areas/ fields issues/ challenges	How to address Issues/ challenges/ fields	Necessary resources	Potential responsibilities
Water quality and quantity Political support for the role of EPP - Interfaces with WAJ/ JVA Process follow Building consensus on roles Team building WAJ MWI JVA Insuring coordination among the 3 Entities	Building and sustaining the capacities the EPD Clear functions - Clear responsibilities On going co ordination		

WAJ

Areas / Fields Issues / Challenges	How to address the Areas / fields / Issues / Challenges	Necessary Resources	Potential Responsibilities
			WAJ MWI International donors MOP
Water Quality	Better management of water resources	Funds	MWI Planning follow up - WAJ implementation Co-ordination JVA
Water Quality Funding	Development of new resources	Technical Asst	- MWI Allocations water resources - WAJ develops water resources co ordination with JVA
	Implementation of water monitoring program		WAJ implement 12 assessment of monitoring program - MWI overall assessment JVA co ordination
	Improve wastewater services and		WAJ studies implement MWI secure funding
			- WAJ studies Implementation

	management		- MWI secure funding identify plans JVA co-ordination
	Out scouring (subcontracting)		- WAJ identify their core compete, subcontract, data exchange with MWI, co-ordinate - Funding role is of MWI
	Staff and Distribution		- Role of WAJ to develop Job description - Role of MWI to provide training

JVA

Areas/ fields where future emphasis is to be focused " Issues challenges"	**How to address these areas/ fields/ Issues/ challenges?**	
Water quality/ quantity	Evaluation of current procedures to reform institution set-up → pre condition	Define priorities resources and plan accordingly (sustainability)
	Develop and integrate water resources quality and quantity management	Comprehensive monitoring program
	Ground water recharge	On-farm water management soil management
Development of formalized procedure to address issues of water in a co-operative way (WAJ, JVA)		Crop management 'salt tolerant plants '
Assessing the impact of JV activities on underground water quality	Improving quality of Treated Wastewater	
Red-Dead	Potentials and impacts of development of brackish water use	
Conditionalities of regional arrangements	Future planning should take Jordanian commitments into consideration	
Funding	"Institutionalized co-ordination/ co-operation	

5 0 Discussions

Below are some of the major items that were raised during the discussions in the workshop

- Some kind of agreement on the role of each entity is needed Political support is critical Coordination between the three entities was of an urgent concern by all participants

- Acceptability of MWI EPD role is still needed Political support for the role of MWI as a planning organization and policy making entity needs to be clarified MWI has a role to play in filling data gaps (exchange data) and in providing training

- Somebody needs to look on the overall picture For example operation and planning is a common denominator for their organizations Also, in JVA s case they develop and protect at the same time Role of Ministry is not well known or understood by all parties

- Ministry supports WAJ and JVA, but it also needs their support

- Environmental Steering Committee needs to be established and needs to be approved by the SG

- Each agency has its governance functional relation as a priority issue to start with, monitoring needs to be addressed first and a vision developed and consensus reached This will help in further development of the roles and the vision

6 0 Constraints and Recommendations

The participants came to us with challenges, roles the major recommendations for MWI, WAJ and JVA management They are

1 There is a need (ASAP) for a joint MWI-JVA-WAJ exercise aiming at

- Defining functional relationships between the three entities so we can proceed to defining our relationship with GCEP
- Agreeing on a clear unified definition for certain terms/ tasks
  e g Master plan →not including pre-engineering design and pre feasibility
  ˅
  Including pre engineering design and pre-feasibility

- Reviewing some of the tasks assigned to the EPD to insure effectiveness/efficiency/practicality

  e g Overall review of EIA Is it review after (?) Or participation in (?)

2 Institutization of the co ordination between the three entities co-ordination cannot continue based on personnel relationships

3 Political support (Decision-makers at all relevant levels) for agreements reached technical and implementation levels

Establish an Environmental Impact System (EIS)

- Finalization of GCEP procedures
- Design of MWI EIS Preparation Reviews Procedures
- EIS Finalize (MWI WAJ JVA)
  Guidance procedure
- EIS Checklist (s) for
  1) Water Development

2) Wastewater
3) Water Storage

* Demonstration EIS -
Conduct an EIS as Model (Technical Assistance needed)

Assessment

* Prioritise Major Issues
* Initiates Studies
* Establish Co-ordination

Standard Development

* Checklist Design Procedures - Tech & Co-ordinate
* Hold standards development workshop
* 3 month STTA to support Procedure Development
* Prioritise standards
* Develop specific standards employing expert on STTA for each industry or subject matter

Performance Assessment

* Ingestion training
* Guidance manual Preparation
* Information management analysis to design and automatic performance reports
* Model injection
* Pollution prevention
* Priority last for PP Intervention
* Prioritisation of Facilities / Hotspots
* Discussion / agreements on enforcement
* Pursuit of a joint enforcement campaign
* Reconsentration of regulatory approach

Public information

* Figure out co-ordination with PI office
* Prioritize outreach campaigns
* Establish complaint procedures
* Undertake selected outreach efforts

R+D

* Prioritize research Issues
* Establish Internet expertise Network
* Design research project
* Implement research project

Sustainability Paper for the Ministry of Water and Irrigation
Irrigation Water Management

A Workshop was conducted October 25th to 26th 1997 with representatives from the Ministry of Water and Irrigation Jordan Valley Authority (JVA), Ministry of Agriculture (MOA) United States Agency for International Development (USAID) and the Water Quality Improvement and Conservation Project (WQIC) participating

1.0 Workshop Objective

The objective of the Workshop was to identify the next steps/actions required to reach sustainability in the conservation usage of irrigation water Conservation usage of irrigation water is defined as the use of irrigation water in the amounts required to produce high crop yields while maintaining soil productivity with minimum water loses Conservation usage of irrigation water is urgently needed because of planned increased diversions of high quality water away from agriculture to the greater Amman metropolitan area The Workshop focused on progress achieved to date directions water conservation should take in the future, impediments to achieving desired targets and approaches for overcoming impediments

2.0 Background and Key Activities

Numerous donors have assisted in the development of irrigation infrastructure in the Jordan Valley Consequently most of the Valley is served by a water delivery system capable of high efficiency Weaknesses that currently exist in the irrigation water delivery system derive from shortage of funds for maintenance and limited training of operations and maintenance staff Donors have been providing assistance to JVA in upgrading management of the King Abdullah Canal (KAC) the backbone of the water delivery system There is now interest by the GTZ in aiding JVA to improve operations at the Directorate level

Operation and maintenance of farm micro irrigation systems is fraught with problems Neither the farmers nor JVA staff fully understand the demands of the new micro irrigation systems Consequently efficiencies are lower than they should be, indicating wastage of water Under the WQIC Project work has begun on a program the Irrigation Advisory Service (IAS) to develop a capability in the Valley for training and assisting both farmers and persons who serve farmers Training material has been prepared and distributed to organizations and some farmers Extension literature on irrigation water management topics is completed and being prepared for distribution

2.1 Currently Funded Activities

Several currently funded activities directly impact on achievement of sustainability in the conservation use of irrigation water Some of these activities are currently ***on hold*** because no full-time staff have been assigned to conduct the activities The Irrigation Advisory Service irrigation water delivery scheduling and pilot/demonstrations on farms are designed to enhance the skills of farmers and JVA staff to manage and use irrigation water efficiently

Issue Category	Activity	Status	Available Resources	Required Resources	Recommendations
Infrastructure Modernization	Upgrade of Tel Al Thahab Weir	On going	$630 000 JD400 000	Sufficient for equipment	May be short on STTA funded time
	Upgrade of JVA Laboratory	Equipment purchases in process	$100 000	Sufficient for equipment	Need to assess funding levels needed for training
Skills Enhancement	Irrigation Advisory Service	On hold	$20 000	Assigned JVA personnel	No additional expenditure of funds until full time personnel assigned
	Irrigation water delivery scheduling	Equipment has arrived		Assigned JVA personnel	No additional expenditure of funds until full time personnel assigned
	Pilot demonstration on farms	On hold	$67 000	Assigned JVA personnel	No additional expenditure of funds until full time personnel assigned
	Training pump & control	Proceeding slowly	Funds available		

2 2 Required but Under-Funded Activities

Three ongoing activities are under-funded for TA and training The activity to rehabilitate the Tel Al Thahab Weir requires additional TA time The local consultant has required more assistance than original envisioned Given the size of the funding commitment to the activity it would be prudent to provide the expertise to ensure that the work is done correctly

The mandate of the JVA has been modified since approval was received for the upgrading effort For the Lab to satisfy the demands for testing set out in the new mandate, additional equipment is required Fortunately the original monies allocated for the upgrading are sufficient to complete instrument purchases However, there are shortages in funds for both limited quantities of US based training and training conducted at the Lab by STTA

The WQIC Project has purchased tools and equipment to enable the JVA Workshop to perform efficiently The JVA Secretary General has requested that the WQIC Project provide TA to evaluate the organization and management of the Workshop Additionally, there is a need to provide some STTA to lead local training on the operation of some of the equipment already purchased

Issue Category	Activity	Status	Resource Deficiencies	Recommendations
Irrigation Water Use Efficiency Modernization	Irrigation Water Use Efficiency Technical Assistance	Equipment purchases in process	$250 000 shortage of funds for required equipment Need STTA for training and warehouse management evaluation	(1) Add 1pm STTA for training[1] (2) Add $250 000 for equipment (3) Add 1 5 pm for management evaluation[1]

[1] It may be possible to shift some STTA within the component which would decrease the additional allocation of time to the WQIC Project contract

2 3 Required/Recommended but Non-Funded Activities

High irrigation water use efficiency only derives when water is an important factor in profits For high profits to occur all production factors must work synergistically Organizations providing production factors to farmers in the Valley stretch across several Ministries and private and semi-government organizations These entities do not coordinate their services to farmers Consequently service gaps occur, which create deficiencies that seriously hinder achievement of returns from national investments in projects To rectify deficiencies in the services provided to farmers one must first understand the problems The following described activities are designed to define the problems and begin addressing two of the more serious and already identified constraints

The following three activities are not funded or within the scope of work of any ongoing WQIC project The *Irrigated Agriculture Production Enhancement* activity does however build upon the work started by the WQIC Project The *Agricultural Produce Marketing Assistance* activity would build upon results obtained under the USAID funded Agricultural Marketing Development Project

Irrigation Infrastructure Projects Assessment[1]

Since the early 19 s USAID and other donors have been involved in the development of irrigation infrastructure in the Jordan Valley To date no one has conducted a post-construction evaluation of the effectiveness of this infrastructure in achieving projected economic and social return levels Given the current interest by donors for significantly increasing funding levels for development in the Valley, now is an appropriate time to evaluate completed projects

Findings from the IV can be used to assist in increasing benefits from existing projects Results will show where constraints to full benefits exist Several recent studies indicate that the poor performance of irrigated agriculture is a major constraint This indication needs to be verified and quantified so its true worth can be used to advocate change Findings can be used to aid in designing projects under the new funding, thereby avoiding replication of previous errors

A performance (benefits) review of completed projects in the Jordan Rift Valley should include

- Definition of the project cost and projected benefits of the project
- Current status of the project – how well has it met targets and achieved projected results benefit/cost ratio and IRR

[1] This was suggested by Assistant Secretary General in a meeting with WQIC Project personnel

- Identification of constraints to achieving projected benefits, or a discussion of why projected benefits are unobtainable, and
- Lessons learned with suggestions for future projects

Time Frame – 8 months
Resources – 10 pm TA (Economist, Agricultural Engineer, Rural Sociologist), and
12 pm local counterpart (8 pm JVA, 4 other)

Irrigated Agriculture Production Enhancement

Achieving high returns from the use of irrigation water and soils requires an integrated approach to irrigated agriculture development Water and soils are, but two of several inputs, needed to produce a crop Crops must be selected based on soil parameters, irrigation water quality, and irrigation water application method Irrigation applications must be coordinated with planting schedules, fertilization, pesticide application, and harvest Farmers need assistance from a range of expertise, expertise that can be offered by Irrigation Advisory Service personnel and MOA Extension Service Agents working together A current weakness in assistance providers is a lack of knowledge about state-of-the-art production methodology and how to effectively transfer this knowledge to farmer producers

To maximize effectiveness, this activity should stretch across the Ministry of Agriculture and the Ministry of Water and Irrigation Strong linkage with the Marketing Assistance activity would aid in the success of this activity, farmers will directly realize the benefits from improved production methods

Activity focuses could include

- training of trainers program and technical short courses for assistance personnel Experts from the US should teach the technical short-courses in Jordan
- study tour for selected farmer leaders and assistance personnel to see farm irrigation system management in Israel, Israeli farmers to visit farms in Jordan (farmer-to-farmer program)
- intensive assistance to selected farmer leaders (cooperating farmers would host field days and conduct demonstrations open to neighboring farmers)
- assistance as requested by other farmers

Time Frame – 2 years
Resources – 18 pm long-term TA,
12 pm short-term TA, and
48 pm local counterpart, one JVA and one MOA (does not include regular cooperating IAS and Extension agents)

Agricultural Produce Marketing Assistance

Marketing has been identified as a major constraint to achieving full economic returns to the investments in irrigated agriculture production infrastructure in the Jordan Valley USAID funded the Agricultural Marketing Development Project, which in addition to assisting in the establishment of a private grower s export association also funded studies of Jordanian export regulations and policies A recent ESCWA report also identified regulations and policies that distort the local economy to the detriment of Jordanian farmers wishing to export Currently, there is great interest to increase development in the Jordan Valley As part of this impetus for development, the time is ripe for adjustments to marketing regulations and policy This activity should be timed to follow the Projects Evaluation study The timing would allow study results to reinforce proposals for adjustment of regulations and policies

Assistance to private marketing organizations could include

- penetration of new markets (potential export markets were identified under the previous USAID project),
- establishment of linkages with other produce wholesalers/marketers (Israeli),
- promotion of Jordanian produce in targeted markets, and
- port-harvest handling (grading, packaging, labeling, and transportation),
- conduction of post delivery surveys of customer satisfaction (feedback to drive improvements in product marketability)

Time Frame – 2 years
Resources – 17 pm long-term TA,
10 pm short-term TA, and
36 pm local counterpart

3 0 Constraints and Recommendations

- Irrigation policy makers and operation staffs have limited appreciation of the constraints faced by farmers adopting micro irrigation methods This is reflected in the policy of the JVA to only deliver irrigation water to a farm unit on a fixed rotation of two or three times per week The crop and size of the unit determine the frequency of delivery This schedule is suited to surface irrigation and not appropriate for best use of micro irrigation Efforts must continue to change JVA irrigation water delivery policy to one having flexibility Results from the projects evaluation study may be useful in persuading JVA to look at new approaches in water delivery

- Given past difficulties in obtaining full compliments of pledged staff from the Government of Jordan counterpart organization, each new activity should be written to include a SOW reduction or termination clause The activity's SOW would be scaled back or the activity terminated if pledged staff are not committed to the activity by a fixed date after project startup

ANNEX F

Sustainability Paper for the Ministry of Water and Irrigation's Artificial Recharge

A workshop was conducted on October 30th 1997 with representatives of MWI WAJ JVA and the Water Quality Improvement and Conservation (WQIC) Project to address sustainability of the Ministry's artificial recharge program

1.0 Objective of the Sustainability Workshop

The objective of the workshop was to identify critical issues which affect long-term sustainability of the Ministry's artificial recharge program This program had its genesis from the WQIC Project which explored the feasibility of artificial recharge of ground water aquifers as a integral factor in Jordan's long-term water resources management strategy The workshop focused on the progress achieved to date with various Ministry programs and internationally funded projects supporting artificial recharge studies in Jordan activities which currently are in progress and their status and activities which are needed to promote sustainability of the artificial recharge program

2.0 Key Activities and Issues of Concern

Basically there are no significant on going activities at the Ministry which focus on artificial recharge to ground water aquifers as an integrated component in the Ministry's short-term and long-term strategic planning for water resources management Activities required to support a more integrated application of artificial recharge to ground water aquifers are identified in the table below

Several activities including those most seriously affecting long-term sustainability of the artificial recharge program currently are not addressed by Ministry or donor programs

Issue Category	Activity	Status	Available Resources	Recommendation (Required Resources)
Policy/Planning	(1) Develop strategy for national artificial recharge program	Issue has been identified	None	- Assess conditions and prepare strategic action plan (TA of 3 PM)
	(2) Establish national artificial recharge program	None	Current Ministry resources	- Ministry to budget or seek donor support technical assistance desired (12 PM)
	(3) Awareness of AR by decision makers	In discussion	None	- Conduct seminars and study tours requires donor support and TA
	(4) Funding for AR	None	None	- Determine based on item (1) above
Operations and Management	(1) Design implement O&M plan for AR reservoirs	None	Ministry staff	- Technical assistance desired (2 PM)
	(2) Training in AR applications	Limited	None	Technical assistance desired to define training requirements (1 PM)
	(3) Recruit staff	None	Ministry staff	Develop staff through training programs

Technical Applications and Problems	(1) Implement pilot project	Feasibility study engineering design complete	Ministry staff	- Seek donor support (JD 300,000), TA desired (3 PM)
	(2) Rehabilitate/retrofit existing reservoirs for AR purposes	In discussion	Ministry staff	- Scope details for activity develop plans seek donor support and technical assistance (3 PM)
	(3) Inadequate studies for proposed sites	None	Ministry staff	- Establish national AR program with training
	(4) Inadequate design for proposed sites	None	Ministry staff	- Establish national AR program with standard methods and training
	(5) Flood sedimentation of reservoirs	None	Ministry staff None	- Establish national AR program with standard methods and training

Based on current conditions significant efforts and resources would be required over the next 2-5 year period to establish and institute a national artificial recharge program Long-term advisory support (2 5 years) at the operations/management level is likely necessary to institute required operational practices and technical applications for the function

3 0 Constraints and Recommendations

The Ministry should strive to proceed with implementation of the artificial recharge pilot study based on the detailed engineering design prepared under the WQIC Project This would require an investment of approximately JD 300,000 over a 2 5 year period Advisory support for the pilot project would be desirable

The Ministry should establish an artificial recharge program that would be considered an integral component of the long term water resources management strategy for Jordan Again advisory support would be desirable

Several existing reservoirs potentially could be easily converted into artificial recharge sites Some geohydrological and engineering studies would be required to determine the suitability of each reservoir for artificial recharge applications Funding would be required for the suitability studies engineering/retrofitting designs, and the actual implementation and construction of the artificial recharge facilities Technical assistance would be desirable

Sustainability Paper for the Ministry of Water and Irrigation's Public Awareness

A workshop was conducted December 1st and 2nd, 1997 with staff from the Ministry of Water (MWI) and the Jordan Environment Society (JES) and representatives from the JES branches and JES Executive Board Members

1 0 Workshop Objectives

⇒ To review and assess accomplishments in public awareness activities,
⇒ To identify future direction needed for sustainability,
⇒ To inform decision makers in USAID, JES and MWI about the accomplishments, and gain support for future directions

2 0 Background and Activities

The program is a joint cooperative effort between the Jordan Environment Society (JES) and the Ministry of Water and Irrigation (MWI) The MWI provides the technical assistance while JES is a non-governmental organization that has branches throughout Jordan The volunteers in the branches and other organizations are a key component in developing public awareness campaigns in the local communities The public awareness component addresses the Improved Water Resources Management Strategic Objective Program by increasing efficiency of water use The strategy is to

- Strengthen the capacity of MWI and JES staff to plan, supervise and implement public awareness activities which encourage people to adopt practices to maximize the efficient use of and protect the quality of water

- Implement, and monitor water use campaigns throughout Jordan aimed at policy makers, educational institutions public and private sectors, industries, agriculture, local organizations and communities and individuals

The activities have trained over 1,000 leaders and reached over 50,000 people through mass media and personal contact in seminars lectures, workshops, and special events

A recent study shows that the campaigns have been responsible to raise the awareness of the water scarcity water pollution problems and water conservation methods The study also shows that people who were exposed to the campaigns have started to practice more ways to save water and have a belief that water awareness campaigns should be expanded to reach more people

Water saving devices (WSD s) campaigns started in 1997 have been very successful in promoting the use of these devices to the general public as well as consumers who use large amounts of water The recent Behavioral Study Phase II shows that in those areas where the campaign on WSD s has been implemented the majority of the people knew about them, knew how they operated and knew the amount of water savings Records have been kept on the number of contacts which have been made to JES regarding the WSD's Over 83 telephone requests for additional information have been received and 85 businesses have either installed the devices or have stated that they will install them Businesses and people who have been exposed to water saving devices want to know more about the installation in their businesses or homes Business owners especially have requested staff to carry out feasibility studies regarding use of WSDs at their premises

Public awareness programs are unique from the other components The main emphasis has been on developing human resources both in staff and volunteers to create a ripple effect where each person trained will train others to spread information and create pressure for people to maximize the efficient use of the water they receive This process in itself develops sustainability because those people trained will retain the information and have an impact on families or friends

During the first two years of the program, activities were centered on creating general awareness with the core staff developing the activities and lectures with the help of volunteers During the third year, the staff concentrated efforts on developing practical methods of water savings through promotion of water saving devices, establishment of water savings demonstration sites and resource material The staff will become more of a support and training unit to the JES branches and volunteers while the liaison volunteer in the branches and leaders in other organizations will take the responsibility for implementing the programs

The recent sustainability workshop has proven to be very successful in that volunteers who came to the workshop from the JES branches started to evaluate the impacts and to plan for future programs that they feel are needed in the JES branches and communities to develop better public awareness programs Members from several branches who attended the workshop stated that they had gained valuable skills to not only organize water campaigns but to use the skills they have learned in leadership, communications and organization in their work In the end, those members with negative views started to develop a more positive attitude after going through the process of evaluating the past and planning for the future

As a result of the workshop, the JES board has requested to hold a similar workshop where all branches will be present to develop a plan for the remaining 18 months and for the future activities and funding after the USAID funding ceases This is an important step because the branch representatives are eager to be more heavily involved in the planning of the activities as well as the implementation

3 0 Needs

An analysis is presented separately for the Jordan Environment Society and the Ministry of Water and Irrigation There is currently 7 weeks left for STTA for this component However, in meeting with both MWI and JES, they have requested additional time of 2-3 months for development of materials, training, monitoring, and follow-up work

3 1 Currently Funded Activities - MWI

Previously, a minimal amount of money was given to the MWI for production of materials because the Grant to JES was supposed to cover all of the production of materials, demonstration sites, training, etc

3 2 Required but Under-Funded Activities - MWI

The MWI has recently developed a Directorate for the Public Awareness and a director has been appointed When the workshop was implemented, he was in the United States for training However, he has developed an initial plan for MWI needs and the amount of money which would be required to meet those needs A final plan will be submitted when he returns

3 3 Currently Funded Activities - JES

The Behavioral Study - Phase II points clearly to the fact that people learn more in those activities that have complete packages which includes demonstration models, films, slides, etc Also the campaigns need to continue with mass media to target women, consumers who use large amounts of water and the younger generation The current activities are proceeding as planned with staff planning to develop more resource material and assisting the branches to become the planners and implementers of the activities

Below is the budget allocated for the JES Grant until June 1999

PRESENT BUDGET - JES
(June 1997 - June 1999)

Item	Dollars Available	Recommendations
Salaries (Includes two staff members and one part time coordinator) JES pays for an additional staff member	46,000	One staff member needs to be hired to develop training programs and act as a volunteer coordinator
Training Includes travel and per diems for staff and volunteers	5,000	
Equipment	18,500	Some additional equipment needs to be provided to the branches
Other Direct Costs Includes costs for training workshops, special events, office supplies, publications, demonstration sites, billboards, slide projectors for branches, etc	209,000	Local consultants need to be funded to help in training, help prepare slide sets, films, prepare additional demonstration sites Additional money needed for billboards
Audits	2,000	
Total	US$280,600	

3 4 Required but Under-Funded Activities - JES

Several currently funded activities directly impact on the achievement of sustainability in the public awareness component After assessing the past accomplishments and looking to future requirements the following are not adequately funded

- *Development of resource material* on subjects like water saving devices, water pollution, rainfall harvesting, etc Local consultants need to be hired to help prepare the material which will be distributed to each branch for their use and other local community organizations in the awareness campaigns The sets need to include a teacher's guide, slides, and informational materials which will be helpful to the person conducting the activity Presently, money is in the budget to pay for the production but additional money needs to be allotted to pay the person who will prepare the materials Short-term technical assistance is recommended for help in this area

- *Demonstration sites* are proving to be very successful in providing additional impact to activities in the form of field trips for students and the general public to understand practical methods of water conservation Thus additional sites are proposed to be developed particularly in schools

- *Billboards* are currently funded but not enough money is available to place them in all required sites

- *Additional training for branches* is required because liaison officers are being appointed to be responsible for the water awareness activities Additional training is needed in communications, development of lectures, materials, and organizational development

- *Educational models* need to be developed like the water saving device low flow showerhead model It is recommended also to develop water testing kits, water characteristics and mobile demonstration units as additional resource materials

- *Training in proposal writing and fund development* is needed to help the main JES headquarters and the branches secure their own funding in the future Short-term technical assistance is required for this work (3-4 weeks)

Required but Under-Funded Activities

Activity	Available funding US$	Required additional funding US$
Development of resource materials/production expenses are covered in the present budget but additional money is needed to pay consultants who will help prepare the materials	7 500	6 000 (4 consult x1500)
Demonstration sites 12 sites are covered in the present budget , 3 more sites can be implemented during the coming period	75,000	12,000 (3 sitesx4000)
20 billboards in demonstration sites are covered in present budget but many others are needed in other sites that use WSDs or that have water conservation practices worth to be highlighted for the public	8 000	8,000 (20 boardsx 400)
Additional training for branches is needed as liaison officers will be assigned to coordinate APW activities and they need training in communications, development of lectures, etc	12,000	12,000 (4 w sh x3000)
Educational models like the WSDs low flow showerhead model, water testing kits, mobile demonstration units are needed as additional resource material	7 500	6,000
Total	**110,000**	**44,000**

2 5 Required/Recommended but Non-Funded Activities - JES

Training Unit/Volunteer Coordinator It is evident that additional work needs to be done to develop water awareness and help people understand the need to adopt new habits concerning water awareness Volunteers are always available but the staff do not have time to coordinate them properly A training/volunteer coordinator is needed to mobilize and utilize volunteers especially in large areas like Amman in an efficient manner and to train them to develop campaigns In the United States, there are many models where people are used as master gardeners, environmental specialists etc The volunteers receive intensive training and are certified to do special kinds of activities with schools and the general public This requires a short-term technical specialist to help develop the concept and training material

Staff

- Training unit/volunteer coordinator

Equipment needed Branches need additional equipment if money is available

- Computer , printer, and email for branches
- Fax for branches
- TV & Video for branches
- Mobile/small sound system

Training for branches and staff

- English courses
- email
- Computer
- Typing

Required but non-funded activities

Activity	Required funding US$
Staff	
Training unit/volunteer coordinator	11,700

	(600x13x15)
Equipment	
• computer printer email for branches	7,000 (5 branchesx1400)
• Fax machines for branches	5,000 (10 branchesx500)
• TV and Video sets • (1 set is needed for headquarters and 9 more for branches)	6,000 (5 setsx1200)
• Sound systems for branches activities	1,000 (2 setsx500)
• Flip charts for all branches	3,300 (22 branhesx150)
• Scanner for headquarter	1,400
Training	
• English training (branches and staff)	11,500 (50 traineesx115x2)
• Training on using equipment computer, typing, email	6,150 30 trainees
Total	**US$ 53,050**

3 0 Constraints and Recommendations

The amount of money which has been allocated to this component is small while the accomplishments in developing and using human resources has been large Policy makers and decision makers have rarely been involved in creating public awareness programs and rarely understand or are aware of the amount of time that it takes to change habits and practices of a larger population

Support must be given over an extended period of time in order to create momentum and help the organizing bodies become sustainable and able to prove success which will attract other donors or agencies to contribute funds to continue and expand the activities A campaign must be constantly developing and creating information, developing leaders and groups of people to work with others in order to become effective and sustainable The tendency is to fund implementation for a few years and to assume that the job is done

MWI staff must be assigned, plans written, roles and job descriptions defined and activities monitored in order for the MWI Unit to use the money If this is not undertaken, the activities should be terminated or reduced

Support provided by the top leaders in JES, MWI and USAID is crucial and needed to ensure the success of the activities The staff they choose must be creative, committed and able to work as a team The JES branches and volunteers provide a valuable means of organizing the community activities The MWI provides valuable technical information and liaison with other governmental agencies to expand the activities With teamwork and support from the top leaders, continued and improved achievements can be realized in this component

ANNEX H

Sustainability Paper for the Ministry of Water and Irrigation's Water Management Education Component

A workshop was held on the December 23rd and 24th, 1997 with representatives from MWI, WAJ, JVA, and the Water Quality Improvement and Conservation (WQIC) Project to address sustainability issues related to Human Resources Development (HRD) activities

1 0 Objective of the Sustainability Workshop

The workshop objective was to clarify current perceptions of Human Resources (Development/ Management) The workshop participants invited an HRD consultant to introduce and discuss systematic approaches to HRD The workshop focused on the future directions of HR in the three entities

2 0 Key Activities and Issues of Concern

During the workshop, several major issues affecting the long-term sustainability of the HRD activities were raised

- The three HRD directorates within each entity do not have clear objectives
- There are no set policies for the HRD departments
- There are no approved job descriptions for the HRD staff
- There is no specific or defined training plan Training is based on supply/demand
- No post training evaluation
- No defined criteria for the trainees
- Training activities are project linked and not institutional

Activities required to resolve these issues are listed and briefly described below based on whether the activity is currently funded, under-funded, or not funded

2 1 List of Currently Funded Activities

Most currently funded activities supporting the Water Management Education component focus on supporting the Ministry in establishing the HRD directorate, training the HRD staff, and training of future MWI trainers

Issue Category	Activity	Status	Available Resources	Recommendations (Required Resources)**
Support Establishment of HRD Directorate	(1) Development of HRD report	proceeding	97 CIP funds	- Review draft with MWI, WAJ, and JVA counterparts
	(2) Train HRD Director	On hold	WQICP funds	- Send HRD Director in WAJ (funds ??)
	(3) Form & Train HRD Teams	Proceeding slowly	WQICP funds	- Identify staff, and training needs (WAJ, JVA staff)
	(4) Organize HRD workshops	On hold	WQICP funds	
	(5) Develop HRIS	On hold	MWI/JVAstaff	- MIS cooperation is needed
	(6) Conduct TNA	On hold	HRD staff	
Strengthen MWI	(1) Finalize ' Training	proceeding	97 CIP funds	Needs to be revised by HRD

Training capabilities	Center Management report			working group

2.2 List of Required but Non-Funded Activities

Several activities are required to ensure the sustainability of the Water Management Education Component but are not funded through the WQIC project

Issue Category	Activity	Status	Available Resources	Recommendation (Required Resources)
Strengthen MWI Training capabilities	(1) Computer & English training incentives	proceeding	Decision required to utilize new funds	- Accelerate decision making
	(2) Develop training plan for CD courses	On hold		Space and incentives are required
Strengthen MWI Training capabilities	(1) Develop specifications for furniture & equipment	None	MWI WAJ staff	Technical assistance & funds are needed to finalize the specifications for the training & AV equipment needed for MWI training center
	(2) Procure furniture & equipment	None	None	Funds are needed to procure the equipment & furniture

3.0 Constraints and Recommendations

(1) The HRD working group should activate the role of the HRD units in each entity by promoting the concept of HRD The HRD working group should organize workshops for decision makers (Secretary Generals and directors) to explain the role mission, requirements, etc

(2) The HRD working group should build on the Human Resources ' report in coordination with WAJ and JVA Plan (policies strategies requirements) → Action plan

(3) The Ministry should decide on nature of future relationship between MWI WAJ and JVA with regard to HRD planning and implementation

(4) The HRD working group should identify HRD staff, and liaison officers

(5) The HRD working group should provide training for the HRD staff (skills knowledge behaviour managerial)

(6)

(7) The HRD working group should prepare and implement training needs assessment