

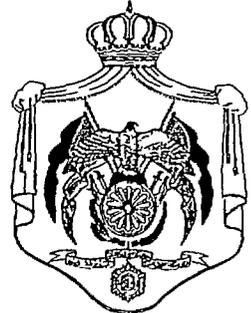
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# Jordan Water Quality Improvement and Conservation Project

## Computer Automation Plan

*WQIC Project Computer Team*

The Hashemite Kingdom of Jordan



Ministry of Water and Irrigation



The Technical Assistance Team Includes

**Development Alternatives, Inc**  
Science Applications International Corp  
Harza Environmental Services, Inc  
Development Associates, Inc



**AUTOMATION PLAN**  
**Water Quality Improvement and Conservation Project**

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**List of Acronyms**

ADP	Automated Data Processing
AR	Artificial Recharge
CIP	Commodity Import Program
CL	Central Laboratory
CMS	DAI Computer Management Specialist
COP	Concept of Operations Plan
DA	Development Associates, Inc
DAI	Development Alternatives, Inc
FIRMR	Federal Information Resources Management Regulations
GIS	Geographical Information Systems
GTZ	Deutsche Gesellschaft Fur Technische Zusammenarbeit
HRD	Human Resources Development
IMS	Irrigation Management Services
IRM	Information Resources Management
JES	Jordan Environmental Society
JVA	Jordan Valley Authority
MIS	Management Information Systems
MN	Monitoring Network
MWI	Ministry of Water and Irrigation
NGO	Non-Governmental Organization
O&M	Operations and Maintenance
PD&I	Planning Development and Information
PP/WM	Pollution Prevention/Waste Minimization
QA/QC	Quality Assessment/Quality Control
RFP	Request for Proposals
RSS	Royal Scientific Society
SAIC	Science Applications International Corporation
SG	Secretary General
SOW	Scope of Work
STTA	Short-Term Technical Assistance
TDY	Temporary Duty
TNA	Training Needs Assessment
UNDP	United Nations Development Program
USAID	United States Agency for International Development
WAJ	Water Authority of Jordan
WG	Working Group
WQIC	Water Quality Improvement and Conservation

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**I Purpose/Introduction**

The purpose of this report is to provide the Ministry of Water and Irrigation (MWI) and United States Agency for International Development (USAID) with a comprehensive automation plan, procurement requirements, and implementation schedule to properly support the Water Quality Improvement and Conservation Project (WQIC). This report covers those activities being implemented with the assistance of Development Alternative, Inc (DAI) under an eleven million dollar direct contract with USAID. DAI and its subcontractors provide assistance to 10 of the subcomponents being implemented at three locations. The WQIC components are

- 1 Water Resources Monitoring and Management
  - a Policy and Strategic Planning
  - b Management Information System (Operations)
  - c Water Monitoring Network
  - d Laboratory Upgrade
  - e Artificial Recharge
- 2 Water Pollution Prevention and Cleanup
- 3 Irrigation Water Management
  - a Improving the Water Conveyance System
  - b Irrigation Water Management
- 4 Water Management Education
  - a Human Resources Development
  - b Public Awareness

To assist in the implementation, DAI has four U.S. based subcontractors: Harza Engineering Co., Harza Environmental Services, Science Applications International Corporation (SAIC), and Development Associates, Inc. In addition, DAI has several local subcontracts for varying lengths of time to assist with the project activities. WQIC is implemented by MWI with most of the activities implemented out of its headquarters. However, some activities are also implemented in the offices of the Jordan Valley Authority (JVA) located in Amman and the Jordan Valley, the Jordan Environmental Society, the Chamber of Industries, and in the yet to be located MWI Training Center. To complicate management further, the ministry is made of three different organizations that have direct input to the WQIC activities.

Given the numbers of locations and consultant groups, a successful WQIC Project will require information systems that

- allow a smooth flow of communication among project staff
- provide information to management staff on a timely basis
- facilitate reporting to both MWI and USAID
- enhance the ability of the expatriate staff to share information with MWI counterparts
- encourage the exchange of ideas throughout the project team
- complement the larger MWI Management Information System
- provide reliable and dependable access to the network
- provide the working groups a vehicle to enable them to work closely together ensuring the sustainability of the WQIC effort

This automation plan details the infrastructure (hardware and software) requirements for developing an information system that satisfies the above objectives. The plan is the result of work completed by the WQIC Project staff team. The short-term technical assistance was provided by an Information Systems Specialist and a Management Information Systems Specialist with Novell and Lotus Notes expertise.

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It should be noted from the outset that the findings and recommendations presented in this plan are directed only at the WQIC Project Management Information System to support the Working Groups implementing WQIC. The internal needs of the MWI for their functions outside the WQIC are not addressed. The Management Information System (MIS) to be designed for the overall MWI is addressed in a separate analysis currently underway and should not be confused with the WQIC Project Management Information System defined in this document.

The WQIC Project MIS covered in this document can be considered the first step towards the overall MIS that is being designed under the project.

## **II Background**

Directly after WQIC startup in February 1994, the planning and procurement for the initial computer network was begun. There were a number of delays in the arrival of the computers and the network was not installed until November 1994. Thus, users have only been using the network since December 1994. This network links most WQIC Project staff members including those housed on the second floor of the Ministry and the Secretary General located on the first floor of the Ministry. A network administrator was not available within MWI. Thus DAI hired an administrator to assist in setting up the network and workstations, to maintain the network for one year, to develop Lotus Notes applications, and to train MWI staff.

The network is currently used to exchange files on a limited basis and printers are shared. The project primarily uses 28 IBM PC compatibles and four Macintoshes with an additional 5 Macintoshes in operation at the JES. The Macintosh's are used for desktop publishing purposes by staff responsible for the Public Awareness activities under the Water Management Education component. Project staff are also using Lotus Notes (for electronic mail), Microsoft Arabic Word, Microsoft Project and Microsoft Excel on a frequent basis.

At this time, there is no means of electronically communicating with USAID/Amman or connecting with the UNDP/MWI network and the GTZ computers.

Improvements to the information systems and infrastructure must be continued to connect all the staff together. Currently, staff housed at the JES and at the Chamber are not connected to the network. Additionally, staff located at the upcoming Training Center will not be connected. Improved information systems are required in order to overcome the project's inability to provide the MWI and AID with the information needed on a daily basis.

## **III Methodology**

This Automation Plan assesses both current MWI computer hardware and software as well as future needs. It also discusses local area network requirements to support the WQIC Project. The plan is based on USAID guidelines for developing a five-year strategic Information Resources Management Plan (IRM), referred to in Handbook 18 Information Services, Part 5 Information Resources Management.

The requirements of this plan are based on the Federal Information Resources Management Regulations (FIRMR) which deal with the operation and procurement of equipment, systems services, and supplies as monitored by M / SER / IRM in conjunction with the Office of Management and Budget (OMB).

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These regulations require that any complete cost estimate for Project advanced data processing (ADP) components should include life-cycle cost projected over a five-year period, whether funded in whole or in part by USAID. The following items should be included:

- 1 System planning and information surveys
- 2 Project computer hardware, software, and networks
- 3 Hardware redundancies
- 4 Commercial and custom-developed software
- 5 Spare parts, supplies, and expendables
- 6 Equipment maintenance
- 7 Uninterrupted power supply (UPS)
- 8 Site and computer room preparation
- 9 Hardware installation, checkout, and acceptance
- 10 Air conditioning and environmental controls
- 11 Application monitoring and client use
- 12 ADP operations and production processing
- 13 User training and orientation
- 14 Software and technical support
- 15 Ex-post facto audits and end-user evaluations

This plan also addresses the building of an infrastructure which will remain after the original project procurers and trainers have left.

The Management Information System Specialist conducted user interviews to determine (1) the types of information staff requires in order to successfully contribute to the work plan, (2) the kind of information used in reporting to MWI, USAID and management staff, and (3) the constraints on obtaining critical information. A list of interviewees is given in Annex A. Annex B provides a sample of the formal interview protocol. The Information Systems Specialist and the Management Information Specialist also reviewed the use of the current Novell and Notes network.

From the interviews and the examination of systems use, a comprehensive set of recommendations was developed. The final automation plan along with the hardware and software needs are based on these recommendations.

#### **IV Targeted Audience**

This document is intended for review and approval by USAID Information Resources Management, the Jordanian Ministry of Water and Irrigation, the USAID project office, the WQIC Project management, and the WQIC Project computer support staff.

#### **V Completing the Automation**

The interviews revealed that the Project is already using automation to share, track and manage information on a limited basis. However, upgraded automation would produce many additional benefits.

##### **Lotus Notes**

An overwhelming concern, especially at the management level, is transferring the knowledge and developing the ability to make the Project sustainable. Increasing the expertise of the Project team is another concern. In order to increase this expertise, staff members must be able to share ideas and track the current status of activities.

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While the project currently uses Notes as its internal mail package and for limited database application on its policy work, Notes should be used to facilitate the WQIC team's work. First, a WQIC Activity Management database should be created. This database would track project activities by component and house Action Memos, Scopes of Work, Terms of Reference, Microsoft Project schedules, and information about upcoming short term technical assistance, training, indicators, CIP contributions, subcontracts, level of effort, and weekly updates on activities. Information on impact and lessons learned would contribute to the sustainability of the project. Maintaining this information in Notes will also provide a means of sharing information among Project staff members housed in the MWI. Through replication, it will further provide a link with the JES, the Chamber of Industries and the MWI staff which will be housed in the yet-to-be-built Training Center.

Notes discussion databases will be used to share ideas among Project staff members, both within and among working groups. These discussions could include new ideas for public awareness campaigns, dialogue on the benefits of various policy initiatives or discussion of training activities. This kind of database can also be used to house meeting minutes and the project newsletters.

Descriptive technical information can also be recorded in Notes databases. An example is the evaluation of water monitoring stations. This information is highly unstructured and is difficult to fit into a rational database structure. A number of administrative functions should also be automated. Drivers schedules, car management, inventory and procurement are all tasks that would be made more efficient through shared systems. An electronic library would house entries on both project generated and background documents. The abstracts would be full-text searchable, allowing for easy identification of critical documents.

A number of activities must be accomplished for this information sharing to be a success. Notes application development should be completed as much as possible by WQIC or MWI staff. The local Notes vendor, GCE, should be used only when programming obstacles cannot be overcome by internal resources. However, GCE expertise should be used as much as needed in order to teach project or MWI staff about Notes. Long term costs will be lower if this effort is made to institutionalize the Notes knowledge. Additionally, project staff will have to help each other learn to use the systems. This will involve training, fact sheets, user groups and discussion.

### **Hardware**

Currently the project has one server acting as both the Novell and Notes server. In order for both Novell and Notes to work at their optimum, each system should have its own server. An additional server is required for the Training Center. To accomplish this, two new servers should be purchased. One will be for the Training Center's Novell network and the other for the WQIC Novell network. The current server will be used as a Notes server.

The capacity of the Novell servers should be high. Since the Novell servers work as the network server and print server, additional hardware is needed to increase network performance and reliability. The new servers should have 64 MB of RAM. Having this much available RAM makes the Novell server easily expandable as far as function and disk capacity are concerned. The disk storage of the Novell servers will need to be 4 GB for the WQIC project server and 2 GB for the HRD training server in order to handle additional data storage requirements for the next five years. This disk storage does not need to be installed all at once. In the near future (1 to 2 years) only 2 GB of storage will be needed. As the rest of the MWI MIS plan takes shape and additional users are added to the network, an additional 2 GB of disk storage can be added for the WQIC Novell server.

To increase the fault tolerance of the network and to increase operation time and network data integrity, the Novell server should include duplexed hard disk drives. This will avoid server problems with one of the three most common causes of failure. The three main sources of server failure are the server's hard drives, the hard drive controller, and the computer itself. Of the three types of failure, the hard drives

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and hard drive controller are the most likely to fail. Duplexing the Novell server's hard drives means that when information is written to the server, it is actually written to two separate disks through two separate disk controllers inside the server. If one of the hard drives or one of the hard drive controllers fails, the server will automatically switch to the working pair. The users on the network would not notice that any failure occurred. The failed computer part can then be repaired during non-working hours to minimize user down time. The addition of duplexed disk drives increases the fault tolerance of the server by protecting against the two most common types of hardware failure.

In order to protect the information that will be housed on the Novell and Notes network, a new backup solution needs to be implemented. The current backup solution does not provide the ability to restore the Novell or Notes network to its original state in the event of a computer crash. We recommend that a DAT tape backup drive be installed in the WQIC Novell server. This tape drive will be able to backup all the Novell server's files and all the Notes files on the OS/2 Notes server. It will have the ability to backup individual workstation's hard drives. A second backup drive may need to be purchased in the third or fourth year since tape backup drives have a two-year life. When the first backup drive needs to be replaced, a new higher capacity drive can be purchased to match the increased disk capacity planned for the third year. A set backup plan also needs to be implemented. The plan should consist of the ability to backup the entire network once a week with incremental backup of user and data files every night.

In order to further integrate the staff, the two main computer networks within MWI (WQIC and the MWI/UNDP networks) must be linked to provide file sharing and data exchange among the staff using the two independent networks. Additional network accessories are required to complete this process.

Additional workstations are required. Currently, many staff members are without their own workstations and share with other users. For example, the water monitoring and the artificial recharge counterparts do not have computers. This lack places large constraints on the ability to perform. Workstations will also be required for HRD staff and key members of the working groups.

Higher capacity printers and a color jet color plotter should also be procured to provide the project with the ability to produce the quantity and quality of publications and maps required.

### **Software**

The Novell server software needs to be upgraded from 3.11 to version 4.1 in order to support Macintosh name spacing so that the 5 current Macintosh computers can store files on the Novell network. With the upgrade, the WQIC server can be integrated into the MWI MIS plan which would facilitate centralized administration of the Novell servers. Also, Novell 4.1 comes with better TCP/IP support which will allow WQIC users to access other UNIX computers in the MWI MIS plan.

The Notes server's operating system should be changed to OS/2. This is the best operating system on which to run Notes. This option is also less expensive than keeping the Notes and Novell server as one because the additional upgrade license for Novell 4.1, which would need to be purchased for Notes, is more expensive than purchasing the OS/2 license.

In addition to maximizing the use of Lotus Notes, additional software is required to improve the project's computer aided drafting capacity, enhance graphics, scan old English and Arabic studies and reports, and protect the network from viruses.

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**VI Recommendations for the Future**

**Internet**

In addition to maximizing the information shared among Project staff members, management staff stated that it was important to begin communicating with overseas-based engineers and water professionals and with universities. These relationships would provide critical dialogue on shared water problems and obstacles. This is the kind of information that can usually only be gathered at conferences or on study tours. Using the Internet this way could complement travel and make these relationships more sustainable.

Currently there is no full-service Internet provider in Jordan. There is an Internet messaging provider but Internet messaging is already provided by the project's electronic mail software. The closest full-service provider is in Israel. The costs of using the Internet at these long-distance rates makes such a venture cost prohibitive. Instead, we propose that the project concentrate on developing the use of the automation it already has. Once a full-service provider becomes available in Jordan, an account could be opened and one workstation should be outfitted with a modem and used for Internet searching. Additional workstations could be outfitted if and when user demand warrants it.

To maximize the return on investment of an Internet account, it would be critical for staff to be trained and for equipment use to be monitored for value and cost.

**Communicating with USAID**

The location of the WQIC offices within the MWI building makes it easy to maintain electronic communications and file sharing among Project and MWI staff members. However, currently, there is no electronic mail or data exchange capacity between WQIC and USAID/Amman. If key USAID staff working with the project were to have Notes licenses and a modem (on a 486 PC with 8 megs of RAM), they could exchange Notes mail with project staff and directly access the WQIC Activities database to get immediate updates on project activities. The cost of the licenses and modems would easily be justified by the benefits of direct access to this information and the enhanced communication flows.

**Database Connectivity**

The larger Ministry-wide MIS component recommends the use of Oracle as the platform for the country-wide water information system. Research undertaken over the past month has confirmed that Oracle provides the required compatibility with existing systems currently being used throughout the country by WAJ and JVA.

There may be a time when there is a comparative advantage to having the highly structured Oracle program work with the unstructured Notes information. Should this interaction become necessary, the project will want to invest in DataLens and an OS/2 server on which to run it. This will allow the Oracle and Notes data to be exchanged.

**Communications with External Organizations**

There are a number of outside organizations with which the Project staff works frequently. Once the internal automation is complete, the CMS should begin investigating ways to electronically communicate with organizations such as the University of Jordan, the Chamber of Industries, JVA in Amman, in the valley and at the lab. JES, the Royal Geographic Center, and other key local subcontractors.

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**VII System Planning**

**General System Planning and Design Goals**

- The system should be inexpensive and easy to learn, so that the Ministry of Water and Irrigation can expand the system themselves beyond the scope of the pilot system
- The hardware and software should adhere, as much as possible, to open standards (UNIX, MS-DOS, NOVELL networks, Relational Databases, DXF graphics interchange) These are the de facto standard file and system format in almost any government department and/or large corporations Using standard systems will eventually ease file exchange among different outside agencies
- In order to reduce down time in case of a system failure and increase the efficiency of users of the system, in-country vendor support should be available for any systems which might be procured

**Systems Configuration**

Two main computer networks are being used by MWI staff and WQIC staff These networks are

- 1 WQIC Project network, a multi-platform system which consists of 7 MACINTOSH systems and 29 IBM or compatible systems They are connected to an IBM file server through a NOVELL Netware network
- 2 MWI network containing the water data-bank database which was developed by the UNDP project three years ago It consists of one file server (IBM PS/2 model 80- 386DX with 8 MB Ram and 300 MB hard disk) and eight PC stations linked to the file server through a Novell network There are also two PCs in the Studies Department of the Water Authority (WAJ) which are linked to the system for data entry Finally, there are three computers and three printers used by the GTZ project which are not currently connected to the WQIC network

Section VII provides the details of the existing systems Section IX and X describe the additional systems required by the WQIC Project The following provides a summary of both existing equipment and additional requirements

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**Summary of existing and required hardware and network accessories**

<u>ITEM</u>	<u>EXISTING</u>	<u>ADDITIONAL REQUIRED</u>
IBM & COMPATIBLES PENTIUM	4	4
IBM & COMPATIBLES 486 -based *	23	34
IBM & COMPATIBLES 386 -based	1	0
IBM & COMPATIBLES NOTEBOOK COMPUTERS *	2	3
POWER MAC's 7100 *	3	0
MACINTOSH QUADRA*	2	0
MACINTOSH LC- based	2	0
LASER PRINTERS*	6	3
COLOR PRINTERS *	3	1
BLACK INKJET PRINTERS	0	1
COLOR PLOTTERS	1	1
DOT MATRIX PRINTERS	1	1
FAXMODEMS *	4	3
SCANNERS	2	0
TAPE BACKUP & OPTICAL DRIVES*	3	1
CD - ROMS	8	4
SOUND CARDS	1	0
DIGITIZERS	2	1
INTELLIGENT HUBS	3	2
UPS	3	9
TRANSCEIVERS	3	6
PRINT SERVERS	4	2
POCKET ETHERNET ADAPTER	1	2
AUTO DATA SWITCH	0	1
OVERHEAD PROJECTOR	2	1
E-SIZE PHOTOCOPIER	0	1
AIR-CONDITIONING UNIT ( HEATING & COOLING)	2	1

**SYSTEM SUPPORT EQUIPMENT**

3 5" FLOPPY DISK DRIVES	0	5
200 MB HARD DRIVES	0	3
360 MB HARD DRIVES	0	3
500 MB HARD DRIVES	0	2
2 GB HARD DISK	0	1
16 BIT ETHERNET CARDS	0	5
COMPUTER CLEANING KITS	0	10
MULTI I/O CARDS	0	5
KEYBOARDS	0	3
MONITORS	0	3
MICE	0	10
INTERNAL DESKTOP 150 W POWER SUPPLIES	0	5
NETWORK TOOL KIT	0	3

\* One computer is located in the chamber and one in the Valley

\* One faxmodem is located in the chamber

\* one laser printer in the chamber and one in the Valley

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- \* One notebook computer is located in the chamber
- \* One color printer in the chamber
- \* One optical disk, one MAC LC one QUADRA, one Laser Printer are in JES

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**VIII Existing System**

The existing system , is composed of hardware and software procured over the past few years by the Ministry GTZ, UNDP and USAID USAID finance equipment was procured during 1994 and 1995 under the technical assistance contract with DAI The network, hardware, computers and software procured by DAI was for the start up of the WQIC project with the plan of having the network compatible with the overall MIS design for the entire Ministry The existing systems follow

<b>EXISTING SOFTWARE</b>	<b>LICENSE</b>	<b>DESCRIPTION</b>
• ADOBE ILLUSTRATOR FOR MAC	1	PRESENTATION PROGRAM
• ALDUS PAGEMAKER 5 0 FOR MAC	2	DESKTOP PUBLISHING
• ARCVIEW	1	VIEW OF GIS MAPS
• CC-MAIL	1	E-MAIL PROGRAM
• CLIP ART	1	EXTRA CLIP ART IMAGES
• COREL DRAW 5 0	1	PUBLICATIONS
• DBASE III FOR DOS	2	DATABASE
• EXPERT FONTS	1	EXTRA FONTS FOR WINDOWS
• GIS ATLAS	1	GIS MAPPING
• HARVARD GRAPHICS FOR WINDOWS	1	PRESENTATION
• LOTUS 1 2 3 FOR WINDOWS 4 0	1	SPREADSHEET
• LOTUS FREELANCE GRAPHICS	2	PRESENTATION
• LOTUS NOTES VER 3 12	20	GROUP COMMUNICATIONS
• MICROSOFT WORD 5 0 FOR MAC	1	WORD PROCESSING
• MS EXCEL 5 0	4	SPREADSHEET
• MS EXCEL 4 0 FOR MAC	2	SPREADSHEET
• MS PROJECT	14	PROJECT PLANNING
• MS WORD 2 0	1	WORD PROCESSING
• MS WORKS	1	INTEGRATED OFFICE PRGRAM
• MY BROCHURES	1	BROCHURE MAKING
• NORTON UTILITIES	14	COMPUTER MAINTENANCE
• OS/2 FOR WINDOWS	1	32 BIT OPERATING SYSTEM
• QUATTRO PRO 5 0	2	SPREADSHEET
• SURFER FOR WINDOWS	1	CONTOURING & 3-D MAPPING
• VIRUS SCAN	1	ANTI-VIRUS
• WINDOWS ATLAS	1	WORLD ATLAS
• WORD PERFECT 6 0 FOR WINDOWS	1	WORD PROCESSING
• FILEMAKER PRO ARABIC	1	MACINTOSH DATABASE
• EASY OPEN TRANSLATOR	1	MAC CONVERSION
• MAC-LINK PLUS	2	
• QUARK EXPRESS 3 3	2	DTP PROGRAM
• ADOBE PHOTOSHOP 2 5 LIMITED	2	PHOTO EDITING
• DISK DOUBLER	2	DISK UTILITY
• WINTEXT	2	WINDOWS TO MAC UTILITY
• AL NASHIR EL-SAHAFI	7	ARABIC DTP

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<u>PROJECT COMPONENT/LOCATION</u>	<u>EXISTING COMPUTERS</u>
PUBLIC AWARENESS	QUADRA 650/16/260 QUADRA 850 AV 3 X POWER MAC 7100- 80MHZ/40/700, 2 MAC LC 475 /8/240
IRRIGATION WATER MANAGEMENT	COMPUDYNE 486-DX2 66/16/21 IBM 4/33DX /8/170
INDUSTRIAL WASTE WATER DISCHARGE PREV PROJECT COORDINATOR (MWI)	IBM 4/33DX /12/170 IBM PENTIUM 60/16/360
INDUSTRIAL WASTE WATER DISCHARGE PREV PROJECT SECRETARY	IBM 4/33DX /8/170 IBM 4/33DX /8/170
ADMINISTRATIVE ASSISTANT (MWI) HUMAN RESOURCE DEVELOPMENT WATER MONITORING 486-DX2 66/16/212	IBM 4/33DX /8/170 COMPUDYNE 486-DX2 66/16/212 IBM 486-33SX/8/170, COMPUDYNE
ADMINISTRATIVE ASSISTANT (DAI) PROJECT ACCOUNTANT CHIEF OF PARTY (DAI)	COMPUDYNE 486-DX2 66/16/212 COMPUDYNE 486-DX2 66/16/212 COMPUDYNE 486-DX2 66/16/212
COMPUTER SYSTEMS MANAGER PROJECT CAD DRAFTSMAN WQIC PROJECT FILE SERVER HISHAM BASHIR	IBM PENTIUM 60/8/360 IBM PENTIUM 60/16/360 IBM PENTIUM 60/32/2X520 IBM 4/33DX /8/170
STTA	TATUNG 386/5/ 80
STTA	TI NOTEBOOK COMPUTER
STTA	IBM NOTEBOOK COMPUTER
STTA	TI NOTEBOOK COMPUTER
WQIC PROJECT TRAINING ROOM SEC GEN BANI HANI SEC GEN 'S SECRETARY	6 X IBM 4/33DX/8/170 IBM 4/DX66 /8/270 IBM 4/33DX /8/170

**Existing Peripherals**

- 1 Printers & Plotters-
  - One 10 PPM IBM laser printer
  - One 5 PPM IBM laser printer
  - One 10 PPM Mannesman Tally laser printer
  - One Hewlett Packard color inkjet printer
  - One IBM color inkjet printer
  - One Apple Macintosh Laser Writer Pro 10 PPM laser printer
  - One Houston Instrument 8 pen B-size plotter
  - One Dot Matrix FUJITSU DL 2400 PRINTER
  
- 2 Scanners
  - One Umax UC 1260 Flat Bed Full Page Color scanner
  - One Microtek Flat Bed Full Page Color scanner
  
- 3 Tape Backup & Optical Drives
  - One Colorado Systems Jumbo Tracker 250 MB Tape Backup unit
  - One Syquest 80 MB Optical Drive

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- One 230 MB Optical Disk
- 4 Multimedia
  - Eight Internal Double Speed CD-ROM Drives
  - One Sound Card, speakers, and a microphone
- 5 FaxModems
  - Four external 14 4 Kbps FaxModems
- 6 Digitizers
  - One Houston Instruments 12x12 Digitizer
  - One E-Size Digitizer
- 7 AIR-CONDITIONING UNIT ( HEATING & COOLING)
  - Two ceiling units
- 8 OVERHEAD PROJECTOR
  - Two units

**Existing Networking Software, Hardware, and Accessories**

- 1 Network Operating System
  - Novell Netware 3 11 100 user
- 2 Network Topology
  - A Star-Like topology connected by a three 24-Port 3COM Intelligent Hubs with Management Module installed
  - Level 4 & 5 Unshielded Twisted Pair cabling (UTP)
- 3 Network Cards
  - One PCI Ethernet Card for File Server
  - Twenty Seven 16 Bit Ethernet Cards in PC Stations
- 4 Existing Uninterruptible Power Supply
  - Two 2 KVA UPS s used for MWI-UNDP server and the WQIC project Hubs
  - One 400 VA UPS used for WQIC server only

The amount of hardware and software purchased to date, with USAID funding, is approximately \$110,000  
This equipment serves the WQIC Project consultants and MWI staff

## **IX Required System**

### **Project Requirements and user needs**

As described earlier, there are two main computer networks within the Project (WQIC Project network and the MWI-UNDP network) which are independent from each other, without any physical connection between them. Since there is a need for the users of both networks to access and exchange data among each other and from either file server, a gateway between the two networks must be established.

Since the UNDP file server is slow and is not capable of handling current user needs and the continuous updating of the water resources database, an integration of the database in the new WQIC Project server is needed. The old UNDP server can be used as a station.

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The servers and the hubs must be locked in a ventilated glass partition to protect them from heat and dust and to provide a secure environment where users cannot access the servers directly. The glass partition is needed to allow the system administrators to monitor network activity without opening the partition.

### **Additional Required Hardware**

**1 FILE SERVERS - two required**

- BACKUP NOVELL SERVER FOR WQIC PROJECT AT MWI
- HRD UNIT SERVER FOR THE NEW RENTED CENTER

*Specifications for WQIC server*

- Pentium 90 Mhz Upgradable To Next Generation Of Processors
- Tower Case W/ Min 8 Bays In Total
- 64 MB Ram (Should Be Upgradable to a minimum of 128 MB Ram)
- 2X 2 GB SCSI-2 Hard Disks Duplexed
- 2 SCSI-2 Adapters
- Twisted Pair PCI Ethernet Card (rj45 & coax connectors)
- 3.5 FDD
- Mono Monitor
- built-in SVGA 1 MB VRAM
- 512 KB Cache
- 1 Internal CD-changer
- 2GB SCSI-2 internal DAT Tape Backup Drive

*Specifications for HRD training server*

- Pentium 90 Mhz Upgradable To Next Generation Of Processors
- Tower Case W/ Min 8 Bays In Total
- 64 MB Ram (Should Be Upgradable to a minimum of 128 MB Ram)
- 2 GB SCSI-2 Hard Disk
- 1 SCSI-2 Adapters
- Twisted Pair PCI Ethernet Card (rj45 & coax connectors)
- 3.5 FDD
- Mono Monitor
- built-in SVGA 1 MB VRAM
- 512 KB Cache
- 1 Internal CD-changer

**2 WORKSTATIONS - 28 required (15 WQIC PROJECT + 13 HRD UNIT BUILDING)**

- Two for TDY room
- Two for the MWI administrative staff
- One for instructor at MWI training room
- One for Human Resources Development unit leader
- One for short term consultants and as a backup station
- One for Human Resources Development team
- Four for MWI computer staff
- One for Water Monitoring MWI staff
- Dedicated Internet & cc-MAIL station
- One for Irrigation component MWI staff

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- Rented HRD center (Training and Office computers)

*Specifications*

- Intel local bus 486/DX2 66 Mhz upgradable to next generation of processors
- desktop case w/ min 5 bays in total
- 16 MB ram
- 250 MB enhanced IDE hard disk
- 16 bit bnc & rj45 Ethernet Card
- 3 5' 5 25' FDD
- SVGA color monitor
- built in SVGA local bus video with 2 MB vram
- 256 kb cache

3 WORKSTATIONS QTY = 6

- For satellite Computer Training Center at the Jordan Valley for irrigation component

*Specifications*

- Intel local bus 486/DX2 66 Mhz upgradable to next generation of processors
- desktop case w/ min 5 bays in total
- 16 MB ram
- 250 MB enhanced IDE hard disk
- 16 bit bnc & rj45 Ethernet Card ??
- 3 5' FDD
- SVGA color monitor
- built-in SVGA local bus video with 1 MB vram
- 256 kb cache

4 HIGH END WORKSTATIONS QTY = 2

- One station for the MWI engineer CAD & GIS developer
- One station for the MWI programmer and system integrator

*Specifications*

- Pentium 75 MHz Upgradable To Next Generation Of Processors
- Desktop Case W/ Min 5 Bays In Total
- 16 MB Ram (Should Be Upgradable To 256 MB Ram)
- 500 MB Enhanced IDE Hard Disk
- 16 bit bnc & rj45 Ethernet Card
- 3 5" FDD
- 17' SVGA Color Monitor
- built-in PCI local bus SVGA with 2 MB Vram
- 256 Kb Cache
- Double Speed CD-ROM Drive

5 ONE FIELD NOTEBOOK COMPUTER

- For use in Water Monitoring field Data collection

*Specifications*

- 486-DX2 66, 9 5 TFT COLOR

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- 340 MB HARD DISK
- 16 MB RAM
- BUILT-IN 14 4 Kbps FAXMODEM
- 2 TYPE-II PCMCIA
- 3 5 FDD

6 ONE NOTEBOOK COMPUTER

- For WQIC Project MWI Coordinator

*Specifications*

- 486-DX4/100, 9 5 TFT COLOR
- 500 MB HARD DISK
- 16 MB RAM
- BUILT-IN 14 4 Kbps FAXMODEM
- 2 TYPE-II PCMCIA
- 3 5 FDD

7 ONE NOTEBOOK COMPUTER

- For WQIC Project Short Term Technical Assistance Staff

*Specifications*

- 486-SL 25, PASSIVE MATRIX COLOR
- 120 MB HARD DISK
- 8 MB RAM
- BUILT-IN 96/24 Kbps FAXMODEM
- 3 5" FDD

## Peripherals

1 LASER PRINTER QTY = 2

- One printer will be used for heavy printing and for multiple paper formats for WQIC project
- One printer for HRD building

*Specifications*

- 10 Ppm
- 4 Mb Ram
- 2 Paper Trays Each Capable Of 250 Sheets Of A4 and a3 Paper
- built-in Ethernet Network **RJ45** Interface

2 LASER PRINTER QTY = 1

- For satellite Computer Training Center at the Jordan Valley for irrigation component

*Specifications*

- 8 Ppm
- 2 Mb Ram
- built-in Ethernet Network **RJ45** Interface

3 COLOR INK JET PRINTER QTY = 1

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- One printer for HRD building
- 4 BLACK INK JET PRINTER A3 SIZE QTY = 1
  - One printer for HRD building
- 5 24 Pin Wide Carriage Dot Matrix Printer QTY = 1
  - For Stallite Computer Training Center at the Jordan Valley for Irrigation Component
- 6 ONE E-SIZE THERMAL JET COLOR PLOTTER
  - For producing color and topographic maps
- 7 12x18 DIGITIZER FOR MAPPING AND CAD DRAFTING
- 8 14 4 kbps EXTERNAL MODEMS QTY =3
  - To enable the different satellite training centers computers in different locations to communicate with main MWI file server

**Networking Accessories**

- 1 AUI TO RJ45 TRANSCEIVERS QTY = 6  
These small devices are used to convert an old network adapter with only Thick Ethernet (AUI) connector to an RJ-45 connector which is used in the WQIC project Intelligent Hubs
- 2 Cabling (Twisted Pair) - Rented HRD center ( Training and Office computers)
- 3 2 x 16 -port intelligent hubs ( RJ45 PORTS, BNC, AUI)
- 4 Two twisted pair cables to connect the data entry staff on the 7<sup>th</sup> floor of the MWI to the WQIC intelligent hubs on the second floor
- 5 Two Print Servers
  - For HRD building
- 6 ETHERNET CARDS QTY =2  
Pocket Ethernet adapter to connect the notebook computers to the WQIC Project network
- 7 NOVELL upgrade from 3 11 to 4 1 100 user license
- 8 Network Tool Kit QTY =1
- 9 Uninterrupted Power Supply
  - Two 2 KVA UPS's for the WQIC project File Servers & Hubs
  - Seven 250 VA UPS's For Stallite Computer Training Center at the Jordan Valley for Irrigation Component
- 10 Auto Data Switch - 8 -1 parallel (Allows all computers to use one printer QTY=1
  - For satellite Computer Training Center at the Jordan Valley for irrigation component
- 11 Overhead Projector QTY =1

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- For satellite Computer Training Center at the Jordan Valley for irrigation component

**Required Software**

<u>SOFTWARE</u>	<u>LICENSE</u>	<u>PURPOSE</u>
AUTOCAD VER 13 FOR WINDOWS OR INTERGRAPH MICROSTATION VER 5 X	1	COMPUTER AIDED DRAFTING FOR PRODUCING WATER RESOURCES MAPS AND LAYOUTS
ORACLE	25	DATABASE FOR MWI, WAI, JVA
HIJACK PRO FOR WINDOWS	1	GRAPHICS CONVERSION TO MAKE USE OF OLD ARCHIVED FILES IN THE GDS FORMATS
ARABIC/ENGLISH OPTICAL CHARACTER READER	1	OPTICAL CHARACTER READER TO PREPARE REPORTS OF OLD STUDIES AND PLANS AND BE ABLE TO EDIT THEM
VISUAL BASIC	1	PROGRAMMING LANGUAGE FOR THE DEVELOPMENT OF IN-HOUSE CUSTOMIZED APPLICATION FOR WINDOWS FOR WORK GROUPS
CENTRAL POINT ANTI VIRUS LAN VERSION	33	AN ANTI VIRUS PROGRAM AND SECURITY FOR NETWORKS
XTREE GOLD FOR WINDOWS 1-800-240-2279 EXT 407	1	FILE & DIRECTORY MANAGEMENT
WINDOWS FOR WORK GROUPS 3 11 W/ARABIC SUPPORT	33	AN UPGRADE FOR WINDOWS TO SUPPORT ALL ARABIC PROGRAMS
PROCOMM PLUS FOR WINDOWS	1	A FAXMODEM PROGRAM, FOR FAX & DATA TRANSFER
MS ARABIC EXCEL VER 5 X	36	AN UPGRAE TO THE SPREADSHEET PACKAGE WQICP USES
MS PROJECT W/ARABIC SUPPORT	6	PROJECT MANAGEMENT
MS ARABIC WORD VER 6 X	36	AN UPGRAE TO THE WORD PROCESSING PACKAGE WQICP USES
NETWARE CONNECT	1	A SERVER BASED UTILITY REMOTE MODEM COMMUNICATIONS
OS/2 SERVER VER 3 X	1	AN OPERATING SYSTEM TO RUBAN LOTUS NOTES SERVER
LOTUS NOTES SERVER UPGRADE FROM NLM TO OS /2	1	FOR THE OBOVE MENTIONED REASONS
MS WINDOWS 95	1	THE FUTURE WINDOWS ENVIRONMENT
STATGRAPHICS	1	STATISTACAL PACKAGE
CHEYENNE BACKUPSOFTWARE	1	TAPE BACKUP SOFTWARE

**Miscellaneous**

- 1 ONE E-SIZE PHOTOCOPIER FOR MAKING MULTIPLE COPIES OF MAPS
- 2 ONE AIR-CONDITIONING UNIT ( HEATING & COOLING)
  - TO BE LOCATED IN THE FILE SERVERS ROOM FOR KEEPING TEMPRATURE AT A CONSTANT LEVEL

**X System Support**

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System maintenance and support is crucial. Maintenance must be handled by computer professionals and documented properly. This can be done in two ways. One is to contract an outside vendor to provide support. Another is to institutionalize the knowledge and support the network internally.

Experience in Jordan has demonstrated that long term costs of an outside vendor are high and unacceptable. It was also found that outside vendors frequently do not know as much about the specific setup of the client's network as is required. Also, dependency on an outside company results in frequent calls to them for even the easiest maintenance as there is no internal learning from one service call to the next. Lastly, we have found that the response time to service requests is unacceptable as the vendors do not view time as an important factor.

The objective of the WQIC Project is to set up a system that will cut the increasing costs of service contracts and decrease the turn-around time for any piece of equipment to be fixed by the service company. Since today's computer technology is modular ("plug and play"), with no need for complex computer repair procedures, an in-house system service and support system can be developed. This will be achieved by having the computer experts of the WQIC Project conduct intensive and prolonged practical training courses for the computer staff of the MWI. Topics to be covered include computer system trouble-shooting, networking, upgrading, and replacing defective parts.

On the basis of experience and professional consultations, a one-year projection of spare parts requirements has been carried out. These requirements include:

- Two extended computer tool kits
- Five 3.5" Floppy Disk Drives
- Three 200 MB, three 360 MB, two 500 MB, one 2 GB Hard Disks
- Five 16 Bit Ethernet cards
- Ten Computer Cleaning Kits
- Five Multi I/O cards
- Three keyboards
- Three monitors
- 10 Mice
- Five internal desktop 150 watt power supplies

The estimated cost of these spare parts is approximately \$5,000. They have been included in the table of required equipment and software.

## **XI Training**

To help ensure the sustainability of the network and all of individual systems, a training program has been developed for the WQIC project and Ministry staff that interfaces with WQIC. A training room has been established and equipped with six computers. Since February, instructors have been trained and two courses have been given each week on the various software applications used in the Ministry. Administrators for Novell and Lotus Notes have also been trained.

In addition to user training, which will continue throughout 1995 and 1996, special courses will be established for concentrated Novell training. This class will concentrate on introduction and advanced topics that make up the day-to-day activities of the Novell network administration. Six network administrators from MWI will be trained to ensure that there is sufficient redundancy to account for staff transfers, leave days, and holidays.

Although most users have attended introductory Lotus Notes classes, supplemental classes will be provided. To reduce costs, these classes will not be the normal certified Notes class. The WQIC project will nominate one or two individuals, who are especially proficient, to provide monthly

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workshops on Notes potential uses and problems. These nominees will also assist the administrator with database development.

**XII Plan for Implementation**

Upon approval of the Automation Plan, advertisements and RFQ will be made for all the required hardware and software in Jordan and the United States. The RFQs will be evaluated by a committee composed of WQIC Project staff from MWI, WAJ, JVA and DAI. Approximately two months is allocated for the advertising and evaluation of bids.

It is expected that placing the orders and taking delivery of the equipment will take three to six months. During that time, the MWI computer staff will be trained on Novell 4.1 and Lotus Notes using the existing equipment.

After the installation of the equipment, the Project plans to have a network and MIS expert from the DAI home office come to Amman for four weeks to fine tune the network and to provide additional training for administrators and users.

**XIII Costs**

As of April, 1995 an approximate sum of \$110,000 has been spent by the WQIC Project on computer equipment that has been positioned in the Chamber of Commerce, the Jordan Environmental Society, the Ministry of Water & Irrigation, and the Jordan Valley Authority.

To complete the network and satisfy the automation needs of the Project, approximately \$300,000 additional will be spent to procure, install, and train staff.

The list on the next page shows a rough estimate of the required equipment in US dollars duty free at the current US pricing as of June, 1995.

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**Cost Estimate**

<b>Hardware</b>		
File Servers	2	16,000
Workstations	34	60,000
High-End Workstations	2	5,000
NoteBook Computers	1	4,000
Laser Printers	2	6,000
Color-Inkjet Printers	1	500
Black Inkjet Printers	1	500
Plotters	1	6,000
Digitizers	1	500
Network Accessories	lot	8 500
Copier (E size)	1	5,000
		0
Oracle	25	95,000
Other Software	lot	15,000
		0
System Support (spare parts)	lot	5,000
Training	lot	5,000
AC Unit	1	1,500
TOTAL COMMODITIES		233,500
5% Contingencies		11,675
TOTAL		245,175
Shipping, insurance, fees 20%		49,035
TOTAL BUDGET AMOUNT		\$294,210

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**ANNEX A**

**LIST OF INTERVIEWEES**

**Formal Interviews**

Dr Mohammad BenıHani, Secretary General, MWI  
Dr Muwaffaq Saqqar Project Coordinator, MWI  
Abdullah Ahmad Project Officer, USAID  
Edwin Stains, Chief of Party, DAI  
Dario Dal Santo, Water Resources Monitoring and Management SAIC  
Bob Smail, HRD Specialist, DAI  
Ross Hagan, Irrigation Water Management, DAI  
Hala Dahlan Training Coordinator, DAI  
Jasmine Altayyar HRD Unit  
Naomi Tannenbaum, Administrative Assistant, DAI  
Ruba Haffar Project Secretary DAI

**Informal Discussions**

Ahmad Abu Senneh, Computer Management specialist DAI  
Ken Beeman Team Leader, MIS, SAIC  
Paul Demmert, Lead Engineer, MIS, SAIC  
Sahar Abu Jarour, Programmer - MIS , MWI  
Mahmoud Al-Shloul Programmer - MIS, MWI

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**ANNEX B**

**WQIC AUTOMATION PLAN INTERVIEW PROTOCOL**

- 1 What are the most important things you see WQIC accomplishing?  
For the Ministry?  
For Jordan?
- 2 What do you see as the responsibility of your working group in implementing WQIC?
- 3 What is the planning process for WQIC? What is the role of your working group in planning the WQIC activities and tasks?
- 4 What type of information would you like to have to enable you to better develop the annual WQIC workplan?
- 5 As the workplan is implemented, are you able to determine the progress on and results of the various activities and tasks in the workplan?
- 6 What type of information or indicators are you getting now to help you determine progress and results of the tasks in the workplan?
- 7 Is this adequate? Are you getting the information you need when you need it?
- 8 What do you do (happens) when you are not able to obtain the information you need?
- 9 What information would you like to have to enable you to better monitor the progress and results of WQIC?
- 10 What do you see as your role in the eventual automation?
- 11 What kinds of information technologies (hardware/software, etc) are available in the (Ministry or USAID) to support an automation that would develop and monitor the WQIC workplan?
- 12 What linkages are needed between WQIC staff and outside organizations?
- 13 What commercially available information, if any, would you like to be able to access?  
How would you use this information?
- 14 Is there anything you were expecting me to ask that I did not ask relative to the WQIC information needs and flow of information among the various parties?