

3114-94-1c-001

DRAFT MONITORING NETWORK OBJECTIVES STATEMENT

**Water Quality Conservation and Improvement Project
Ministry of Water and Irrigation
Kingdom of Jordan**

**United States Agency for International Development
Contract No. 278-0288-00-C-4026-00**

7 September 1994

**Prepared by Monitoring Network Working Group
Ministry of Water and Irrigation**

Members of the Monitoring Network Working Group
Ministry of Water and Irrigation

L. Froukh (MWI)

D. Dal Santo (MWI)

A. Elimat (WAJ - Central Lab.)

M. Momani (WAJ - Studies Dept.)

A. Saa'd (WAJ - Studies Dept.)

K. Hadidi (WAJ - Basins Project)

K. Smadi (JVA)

Y. Hassan (JVA)

1.0 Project Overview & Background

Optimal development and utilization of water resources in the Kingdom of Jordan and the institution of associated water policy requires the establishment and implementation of several integrated resources, information, and management systems. The Ministry of Water and Irrigation (MWI) is responsible at the national level for administering water policy and managing water resources. The Water Quality Improvement and Conservation (WQIC) Project provides a basis for addressing serious problems and issues identified in the Kingdom's national water management program relative to improving water quality and water conservation. This initial work performed under the WQIC Project will provide the foundation for more comprehensive water resources planning and management. A national monitoring network for collecting water resources and water quality data and information is a major component of the WQIC Project.

1.1 Background

During 1992, the United States Agency for International Development (USAID) provided assistance to the Government of Jordan to develop a national water management program. A conclusion of this study was that the water deficit in the Kingdom of Jordan was more serious than had been realized and was moving toward a crisis situation. The study recommended that priority be given to developing and implementing a comprehensive strategy for increasing water supply and reducing water demand. The initial focus of the strategy should be the Zarqa River basin which includes approximately 70 percent of the population of Jordan.

The WQIC Project, which developed as a result of the national water management program, provides a framework for the foundations of a comprehensive water management system, including water quality improvement and conservation, in Jordan. The project, administered through the Ministry of Water and Irrigation, is intended to promote more sustainable water conservation programs. Although the focus of the WQIC Project activities is the Zarqa River basin, the project goals are of national importance and the project will promote a national policy for water quality improvement and conservation.

1.2 Overview of WQIC Project

The goal of the WQIC Project is to improve the overall management and conservation of the water resources of Jordan. Objectives of the WQIC Project include: (1) improving water quality; (2) reducing demand for water; (3) augmenting water supply; and (4) building a sustainable water use system. The specific purpose of the project is to increase and improve the quality and quantity of water available in the Zarqa River basin.

Achievement of the goals and objectives of the WQIC Project will be realized through the development and implementation of several technical programs (or components). These include: (1) water resources monitoring and management; (2) water pollution prevention and cleanup; (3) irrigation water management; and (4) water management education. Each technical program contributes to the overall goals and objectives of the WQIC Project and each relies on water resources and water quality information available for the country and in particular the Zarqa River basin.

The water resources monitoring and management component of the WQIC Project focuses on strengthening the Ministry of Water and Irrigation's (MWI) capabilities in developing and managing the water resources of Jordan. Several tasks of this component are related to the collection, management, storage, and retrieval of high quality data, both water resources and water quality. These tasks include:

- Establishing a Monitoring Network;
- Upgrading and Improving the Central Laboratory;
- Establishing a Water Management Information System; and
- Completing Aquifer Recharge Studies.

Each of these tasks constitutes an independent subprogram of the overall WQIC Project although the tasks are related. Detailed development and planning for each of these tasks is presented in a separate paper or report. The monitoring network task is discussed in this objectives statement.

1.3 Purpose of Monitoring Network Objectives Statement

Establishing an effective monitoring network and program in the Kingdom is essential for strengthening Jordan's surface and ground water resources database and for providing the requisite information to the MWI for planning and management purposes. Both water resources quantity and

quality data are critical in a water management system. Therefore, the primary objective of the monitoring network task is to enhance the national water monitoring network program so it meets the needs and objectives of the MWI. In addition, a single integrated national monitoring network program is essential for ensuring optimal use of resources, eliminating duplication, eliminating potential data gaps, and ensuring that the data collected are of known quality and have been obtained using consistent collection methods and procedures.

This Monitoring Network Objectives Statement (MNOS) has been drafted to serve as the framework for developing the overall goals and strategy for an upgraded and a long-term water monitoring network program and to ensure that the objectives and responsibilities of the various users of water resources information can be achieved. The MNOS, developed by the members of the Monitoring Network Working Group, incorporates and integrates the various needs and philosophies of the MWI member organizations which are the Ministry of Water and Irrigation, the Water Authority of Jordan, and the Jordan Valley Authority. In addition, the MNOS attempts to integrate the water resources needs which support the functions and responsibilities of external organizations within the government of Jordan so that a nationally responsive monitoring network can be developed.

2.0 Monitoring Network Objectives

Based on a review of the objectives, responsibilities, and functions of the MWI member organizations, informal discussions with external organizations (e.g., Royal Scientific Society, Ministry of Health), and discussions within the Monitoring Network Working Group, several short-term and long-term objectives for the national water monitoring network have been identified. To varying degrees, the objectives are interrelated with other components of the water resources monitoring and management component of the WQIC Project.

The objectives attempt to address water resources, water quality, data collection, data management, and organizational factors which are important in an overall monitoring network system. These factors must be considered in developing an effective, functional monitoring network program. The ultimate goal is to define and develop a national water monitoring network system which fulfills the data requirements of the MWI member organizations for the optimal use of water resources within the Kingdom.

Specific objectives of the monitoring network task include:

Long-Term Objectives

- (1) Establish and operate a comprehensive, unified monitoring network within Jordan and the MWI. The network should be flexible so that emergency situations can be addressed:
 - Incorporate monitoring for surface water and ground water, both quantity and quality data, for all sectors of Jordan (municipal, agriculture, industrial);
 - Incorporate monitoring for municipal and industrial effluent discharges (i.e, integrate with Pollution Prevention component of WQIC Project);
 - Monitor sediment bedload in rivers and sediment deposition and quality within reservoirs;
 - Monitor irrigation uses and return flows (quantity and quality);

- (2) Develop a system that can provide the needed data to make decisions about the quality and quantity of water delivered for various uses (e.g., municipal, irrigation, industry):
 - Provide data for establishing water quality classifications, and for evaluating compliance with water quality regulations and standards;
 - Provide information on water quality trends, including past data, for evaluation of effects on the environment and identification of areas requiring improvement;
 - Provide information for establishing a priority system for solving water quality problems;
 - Identify sources of pollutants and loadings including industrial, municipal, agricultural, mining, septic tanks;
 - Provide data for establishing the suitability of natural waters for appropriate uses (i.e., drinking water, industrial, agricultural);
 - Provide data that can be used to establish relationships between different pollution sources and surface waters and ground waters;
 - Provide data that can be used with geologic data for investigating the source of and factors influencing the natural salinity of aquifer systems;

- (3) Develop data of known completeness and quality through technically sound and consistent acquisition methods;
- (4) Provide for quality control/quality assurance provisions to ensure the integrity of the data;
- (5) Coordinate with the laboratory function and capabilities so that the types of analytical data required for evaluations and analysis and water management decisions can be obtained (i.e., integrate with the Central Laboratory component of WQIC Project);
- (6) Coordinate with the data management function so the data can be stored and retrieved for analysis and evaluation, including national water quality mapping (i.e., integrate with Management Information System component of WQIC Project);
- (7) Provide for a sufficiently comprehensive monitoring network so that data needs for future conceptual and research studies are available (e.g., artificial recharge programs);
- (8) Develop a monitoring network system that functions as an early warning system of water quality conditions for management purposes; and
- (9) Provide a forum for establishing a council of the organizations involved in water monitoring to discuss and resolve water monitoring issues and research programs.

Short-Term Objectives

- (1) Identify the monitoring program responsibility within MWI and establish a central monitoring program within the MWI;
- (2) Evaluate existing monitoring network systems and identify enhancements and upgrades;
- (3) Identify existing types of water quality and quantity data and trends and identify additional data needs;
- (4) Evaluate the time scale for sample frequency and measurements and identify enhancements and improvements;
- (5) Evaluate monitoring network equipment within the MWI and identify enhancements and additional equipment needs;
- (6) Evaluate existing data acquisition procedures and identify enhancements and improvements;
- (7) Evaluate existing quality control/quality assurance procedures throughout the data acquisition process and identify enhancements and improvements;
- (8) Identify and evaluate proposed monitoring program plans and incorporate existing programs and proposed programs into a comprehensive, unified national monitoring network program;
- (9) Evaluate operations and maintenance costs and human resources needed for a comprehensive monitoring network program;

- (10) Evaluate training programs for staff involved with the monitoring network and identify training needs and enhancements;
- (11) Develop a priority listing to phase in the national monitoring network program to include the geographical distribution of the system, the design of the system, and the types of data and frequency for collection and monitoring; and
- (12) To the extent possible, identify water monitoring program practices in need of improvement.

Other organizations within the Kingdom of Jordan which are involved on a regular basis in water monitoring are the Ministry of Health (microbiological, chemical, and biological monitoring of water), the Ministry of Transportation, Department of Meteorology (precipitation and evapotranspiration data network), the Ministry of Municipal and Rural Affairs, Department of the Environment (water quality studies), the Greater Amman Municipality Laboratory (chemical and microbiological monitoring of water), and the Royal Scientific Society (subcontractor to various water quality and pollution projects). Other organizations such as the Ministry of Agriculture and the University of Jordan also may be involved to lesser degrees in water resources related studies for research purposes. Generally, however, these studies are of shorter duration and do not include a systematic monitoring network or routine data collection.

3.0 Goals of Monitoring Network Task

Consistent with the monitoring network objectives outlined in Section 2.0, the goals of the Monitoring Network Working Group are to develop the technical framework for a long-term comprehensive, unified water resources monitoring network for Jordan. Because the monitoring network will be comprehensive and include the entire country of Jordan, a priority system for phasing in the network is envisioned. Immediate enhancements to the existing monitoring network will be presented in a Monitoring Network Upgrade Plan (MNUP) which will be developed after completion of a survey of the existing monitoring network. A Long-Term Monitoring Plan (LTMP) also will be developed which will describe the specific details for phasing in the comprehensive monitoring network program for Jordan.

Short-term objectives (2) through (10) specified in Section 2.0 will be completed in association with the survey of the existing monitoring network. The scope of the survey activities are presented in greater detail in Section 1.3.2 of the WQIC Project Annual Work Plan (MWI, 1994). A draft survey

report is anticipated to be completed during September 1994. A final survey report will be completed following review of the draft.

The findings of the survey will form the basis for development of the MNUP and the LTMP to achieve the long-term monitoring network objectives identified in Section 2.0. After completion of the survey, short-term measures to establish a central monitoring program within the MWI and to prioritize immediate and long-term national monitoring network program goals and objectives will be explored. These priorities will be reviewed for immediate institution as part of the MNUP or for phase in over the long-term as part of the LTMP.

Development of the MNUP also will commence after completion of the survey. A preliminary framework for the scope of the monitoring network developed in the MNUP is anticipated to be completed by January 1995. Development of the LTMP will proceed concurrently with the MNUP. Proposed MNUP tasks will be developed to be integrated into the LTMP establishing the comprehensive monitoring network. Achievement of long-term objectives (2) through (12) specified in Section 2.0 will be addressed by the LTMP through a phased approach. The LTMP also must provide a system to ensure continued operation of the comprehensive monitoring network and the collection and management of water resources data.

4.0 References

Ministry of Water and Irrigation. 1994. Annual Work Plan, Water Quality Improvement and Conservation Project. Prepared under USAID Contract No. 278-0288-00-C-4026-00. Amman, Jordan. June 1994.

United States Agency for International Development. 1994. Water Quality Improvement and Conservation Project Scope of Work, Government of Jordan. USAID Contract No. 278-0288-00-C-4026-00.