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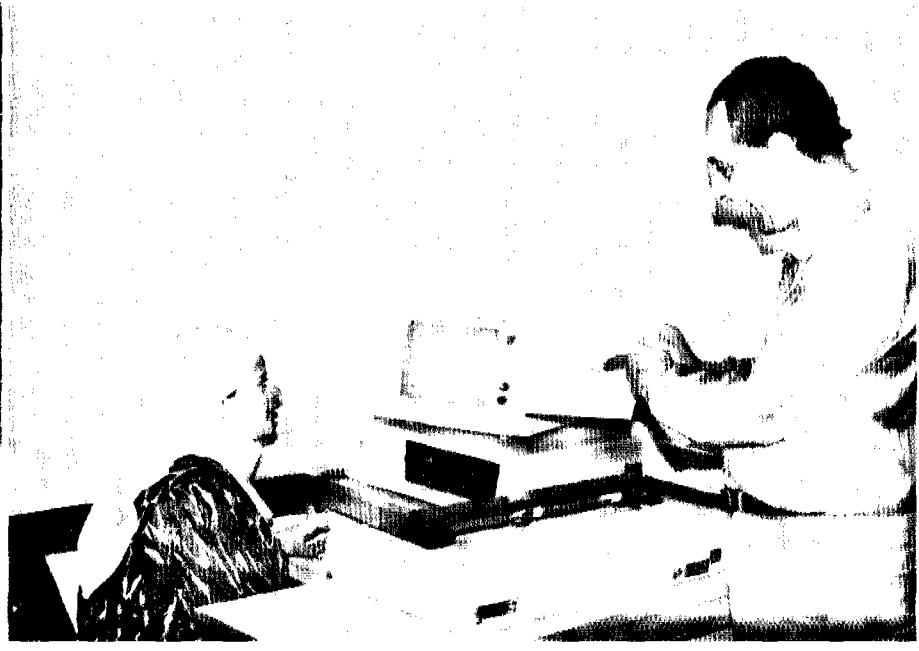
ORDEV

UNDP

UNICEF

# DRINKING WATER SUPPLY AND SANITATION SECTOR SUPPORT PROJECT IN EGYPT

## SECTOR INFORMATION MANAGEMENT



WORLD HEALTH ORGANIZATION  
Regional Office for the Eastern Mediterranean  
Alexandria  
1992

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P.O. Box 93190, 2509 AD The Hague

Tel. (070) 814911 ext. 141/142

RR:ISU 10021

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**SECTOR INFORMATION MANAGEMENT**

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## 2. Sector Information Management

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*In the name of God, the Compassionate, the Merciful*



## **FOREWORD**

*I am pleased to have the opportunity of contributing a foreword to this series of six booklets prepared to describe the work which has been done under the project, "Drinking Water Supply and Sanitation Sector Support", in Egypt.*

*It is appropriate that, at the end of the project, we should analyze what has been achieved, what have been the successes and shortcomings of the project, and what lessons we can learn for the future development of the water supply and sanitation sector not only in Egypt, but also in other countries of the Eastern Mediterranean Region.*

*WHO has executed this project, with the financial support of UNDP and UNICEF, to provide technical support to the Organization for Reconstruction and Development of Egyptian villages (ORDEV), in order to extend water supply and sanitation services to rural communities. WHO has been guided by the approaches of the International Water Supply and Sanitation Decade which have called for the complementarity of sanitation development with that of water supply, the involvement of communities in the planning and execution of projects, the utilization of appropriate technologies, and the training of personnel. The project has covered both software and hardware aspects, has used improved, self-sustaining and affordable methodologies, and, with its inter-sectoral approaches, has achieved a marked success in the rural areas of Egypt where it has been possible to implement demonstration activities.*

*I commend these booklets as illustrative of the success of this innovative project. If they can in some small way arouse interest in the importance, to us all, of the development of a sustainable programme of water supply and sanitation in rural areas, they will have served their purpose.*

A handwritten signature in dark ink, appearing to read 'H. Gezairy'. The signature is fluid and cursive, with a large initial 'H' and 'G'.

**Hussein A. Gezairy, M.D., F.R.C.S.  
Regional Director for the Eastern  
Mediterranean**

## **PREFACE**

This booklet is one of a series of six in similar format prepared to demonstrate the objectives, activities and outputs of the project of the Government of the Arab Republic of Egypt, in cooperation with the United Nations Development Programme (UNDP), the United Nations Children's Fund (UNICEF), and the World Health Organization (WHO), for Drinking Water Supply and Sanitation Sector Support project.

The booklets in the series are entitled:

1. Social Aspects and Health Education
2. Sector Information Management
3. Human Resources Development
4. Rural Sanitation Technology
5. Rural Water Supply Technology
6. Leakage Detection and Control

Copies of any of these booklets can be obtained from:

World Health Organization  
P.O. Box 1517  
Alexandria 21511  
Arab Republic of Egypt

## INTRODUCTION

The activities of the project, "Drinking Water Supply and Sanitation Sector Support", started formally in January 1987, having been preceded by a preparatory phase (Phase I) from October 1984 to May 1985. The project was formulated within the context of the International Drinking Water Supply and Sanitation Decade (IDWSSD), 1981-1990, with the development objective of assisting the Ministry of Local Government to extend water supply and sanitation coverage to Egyptian villages (numbering about 30000) and to other underserved sections of the population through improved infrastructures, human resources development and transfer of appropriate technology.

It was recognized that activities in the water supply and sanitation sector had been considerably accelerated in the first half of the Decade. The purpose of this project has been to build on this initiative and to support further development through:

- introduction and demonstration of affordable, appropriate technologies based on technical, economical and social feasibility;
- establishment of a human resources department consisting of specialists and trainers for the planning and organization of training of water supply and sanitation personnel;
- upgrading of local capabilities in operation and maintenance, management, water and wastewater analysis, through appropriate training courses;
- assessment of sector information processes, identification of needs, and development of improved management information systems.

The project was considered to be of direct relevance to the promotion and support for women's participation in IDWSSD for community participation, for health and hygiene education at the village level, and for the preparation of teaching and learning materials adapted to the sociological needs of village women.

Even prior to the start of IDWSSD, the lack of proper information systems was identified as being a constraint in sector development and a

contributing factor to the overall poor performance. The United Nations Water Conference in Mar del Plata, Argentina, in 1977 called on countries to collaborate with the World Health Organization in monitoring and reporting on the status and progress of the development and strengthening of their national systems.

Information on the status of water supply and sanitation is required so that water supply and sanitation activities can be planned at village, markaz, governorate or national level, and future needs can be estimated. For this information to be available, systems must be in operation as part of the sector's administrative and managerial structure to collect, process, analyse and utilize data. In order to be efficient, these systems must be compatible with the capabilities of each of the organizations within the sector, but should have the facility to store data which can be rapidly retrieved on demand.

In Egypt, the National Organization for Potable Water and Sanitary Drainage (NOPWASD) has been established during the early part of the Decade to act as a single body under the Ministry of Housing and Public Utilities to coordinate activities, provide technical assistance and supervise works in the sector. The Ministry of Health, with laboratories dispersed throughout the country, collects and analyses samples of water from the Nile and from water supplies. The Organization for Reconstruction and Development of Egyptian Villages (ORDEV) assists in providing or improving not only water supplies and sanitation, but also roads, bridges, schools, industrial units and such facilities needed for the well-being of the communities.

An important aspect of the responsibilities of the project is clearly seen to be to assist in developing a sector information system which is centralized, but which responds to information management at all administrative levels.

This booklet describes the approaches and methodology used in the development of water supply and sanitation sector information system and collaboration with other sector-related organizations. Information system with effective linkages with other sector development organizations has been established in order to capitalize on the benefits resulting from the computerization of the information system.



## SPECIFIC OBJECTIVES

The project's specific objectives, for the improvement of sector information management, have been to:

- study the existing information systems operating in ORDEV, NOPWASD, the Ministry of Health, and local authorities;
- develop an improved information management system to link local authorities at village, markaz, governorate and central levels;
- develop data collection forms for basic reporting at all levels;
- provide training for sector officials from central and governorate levels on system design and data management;
- establish, on a demonstration basis, information centres at central level and at certain governorate and markaz levels;
- procure and instal computers for data processing at selected centres and train operational personnel accordingly;
- encourage the publication of a sector newsletter to propagate relevant information; and
- build up a reference library to serve the sector.



HARDWARE FOR IMPROVED M.I.S.

# PROJECT APPROACH

In tackling the subject of sector information management, the project has adopted the approach of using external consultants along with project staff and professionals from different government organizations and offices. To this end, WHO consultants visited the project in October-December 1985, in May-June 1988, and in October 1988 to advise the project staff and the Government. The reports of these consultants are referenced in the final section of this document. On the basis of their recommendations and of internal discussions, visits and meetings, the following have been the activities developed and the summarized findings.

## 1. STUDY OF EXISTING INFORMATION SYSTEMS

### 1.1 The Organization for Reconstruction and Development of Egyptian Villages (ORDEV)

ORDEV had a computerized information system which was effective in producing the reports required, updated quarterly, but these were exclusively financial in content indicating the category of expenditure and the number of schemes as appropriate to ORDEV which has wider scope than the water supply and sanitation sector. Expenditure was broken down to governorate and markaz levels so that sources of funds, allocations and expenditures were available for "Water" or "Sanitation" for these units, but no information on nature or objective of the expenditure. A further computerized system, called OSIRIS, stored information for each sub-village on population, mortality rates, sources of raw and treated water, hours of operation, numbers of houses, etc., connections, and qualitative indications of water quality and pressure. Only extremely basic data were held on sanitation and health aspects.

### 1.2 The National Organization for Potable Water and Sanitary Drainage (NOPWASD)

Reports were compiled manually, updated on a quarterly basis by the staff of NOPWASD's Directorate of Planning and Follow-up. Two systems were being used, for the Ministry of Planning and for the

Investment Bank, but in both cases the information was almost entirely financial. A new record card system had been proposed with a view to computerization, covering those schemes in which NOPWASD has an interest only.

### 1.3 The Ministry of Health

Health statistics were received from health units and recorded manually by the governorate health authorities, but these were only comprehensive where reporting is compulsory, which includes certain water-related diseases. Water quality sampling was also carried out on treated water sources. At the central level, reports from governorates were consolidated annually. The Ministry of Health has laboratories throughout Egypt which collect and analyse samples of water from the Nile and from drinking water supplies, and reports were prepared manually at the central level.

### 1.4 Governorates

At governorate and markaz levels, the collection and storage of data were carried out without any well defined plan and purpose, being concerned with the expenditure of funds, rather than on sector status or profile. Raw data, manually processed, were generally made available to higher levels without any checking or analysis. Data were therefore often contradictory and misleading to the planners at the central level.

## **2. DEVELOPMENT OF INFORMATION MANAGEMENT SYSTEM**

Following the recommendations of the consultant experts, and after consultation between the project staff and national counterparts, it was agreed that the following steps were to be taken:

### **2.1 Use of Computers**

The information system should operate on computers at the national and selected governorate levels from the start. At markaz and rural community level, the information was not so extensive as to necessitate computers at this stage, but trials would be held to test the benefits for the future.

### **2.2 Design of Information System**

Three databases are to be used:

- sector status
- scheme profile
- financial.

The sector status database allows identification of problems relating to:

- poor health
- poor quality water source
- inadequate water supply
- unreliable water supply
- poor quality water supply
- low pressure water supply
- inadequate sanitary facilities
- unsatisfactory sewage disposal
- pollution
- unhygienic practices.

The scheme profile database is required to identify schemes by:

- a unique reference number
- location
- population served
- nature of the scheme (e.g. for health or economic growth)
- objective of the scheme (e.g. water treatment or sewerage)
- status (e.g. not yet started)
- latest cost
- cost per head
- annual savings (if any)
- payback period.

The scheme financial database includes information on:

- a unique reference number (as for scheme profile)
- total cost of the scheme
- make-up of funds (e.g. local, external)
- source(s) of loans, grants and/or aid
- allocation of funds among physical components
- budgeted expenditure for current and future years
- expenditure to date for current year
- percentage of physical completion to date for current year
- estimate of year end expenditure.

### 2.3 Organization and Operation

A central computer has been set up at the information centre of NOPWASD to function as the terminal point to the computerized system. Further computers have been provided through the project to the information centre of ORDEV, to two governorates and one markaz. Assistance was given to establish information units at village and markaz levels within selected governorates so that local administration staff may obtain and ratify data on a continuous basis. Initially, however, data are collected at the village level by special survey teams.

## 2.4 Information Workshop

A two-day workshop was organized to discuss the draft information system and data collection format prepared by the project, in collaboration with sector authorities. Key personnel and professional staff from sector organizations and governorates were invited, and discussion was led by the WHO consultant and project professional staff. The following recommendations were made by the workshop concerning the information system layout, linkages and data forms:

- the system should start from the basic village level;
- information units should be established at village and markaz local authority levels;
- information personnel at village and markaz levels should be trained in data collection and management;
- data forms should be classified to include basic data, as well as system data at the village level;
- a committee should be set up to review the system and follow up on implementation.

### 3. DEVELOPMENT OF DATA COLLECTION FORMS

Data collection forms have been prepared by the project, in conjunction with the staff of sector agencies, to facilitate the collection of information from the basic local unit, village and markaz levels. Data are being entered on these forms by individual project for:

- |                                  |                            |                  |
|----------------------------------|----------------------------|------------------|
| Basic data                       | - population               | - housing        |
|                                  | - education                | - social aspects |
|                                  | - health status, etc.      |                  |
| Water supply and sanitation data | - water resources          |                  |
|                                  | - water supply systems     |                  |
|                                  | - water quality            |                  |
|                                  | - wastewater systems, etc. |                  |

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على مستوى العزب والكفور والنجوع / القرى / المدن

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أولاً : البيانات التمهيدية

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ج. اسم الوحدة الإدارية / المدينة : \_\_\_\_\_ كود \_\_\_\_\_

د. نوع الوحدة : \_\_\_\_\_ كود \_\_\_\_\_

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أ - عدد الطابق العامة : \_\_\_\_\_

ب - عدد الطابق الخاصة :

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FIRST PAGE OF DATA COLLECTION FORMS

#### **4. TRAINING IN SYSTEM DESIGN AND DATA MANAGEMENT**

Training related to sector information management has been carried out by the project in the following ways:

- Training, under contractual service agreement with the American University in Cairo, of 50 data collectors from Governorates of Fayoum and Daqahliya, ORDEV, NOPWASD and the Ministry of Health in data collection and management;
- Continued on-the-job training, by project information systems professional staff, of data collectors from NOPWASD, Daqahliya, Fayoum and Mansoura markaz for a period of six months;
- A two-day workshop for sector and governorate officials and professionals in system design and data forms.



TRAINING IN INFORMATION MANAGEMENT



## 5. ESTABLISHMENT OF INFORMATION CENTRES

Computerized information centres have been established at NOPWASD and ORDEV central levels and, on a demonstration basis, at the Governorates of Daqahliya and Fayoum. Information units have also been set up at Mansoura and Obshwai markaz of these governorates and at their local village levels.



INFORMATION UNIT AT MANSOURA MARKAZ

## 6. INSTALLATION OF COMPUTERS AND TRAINING

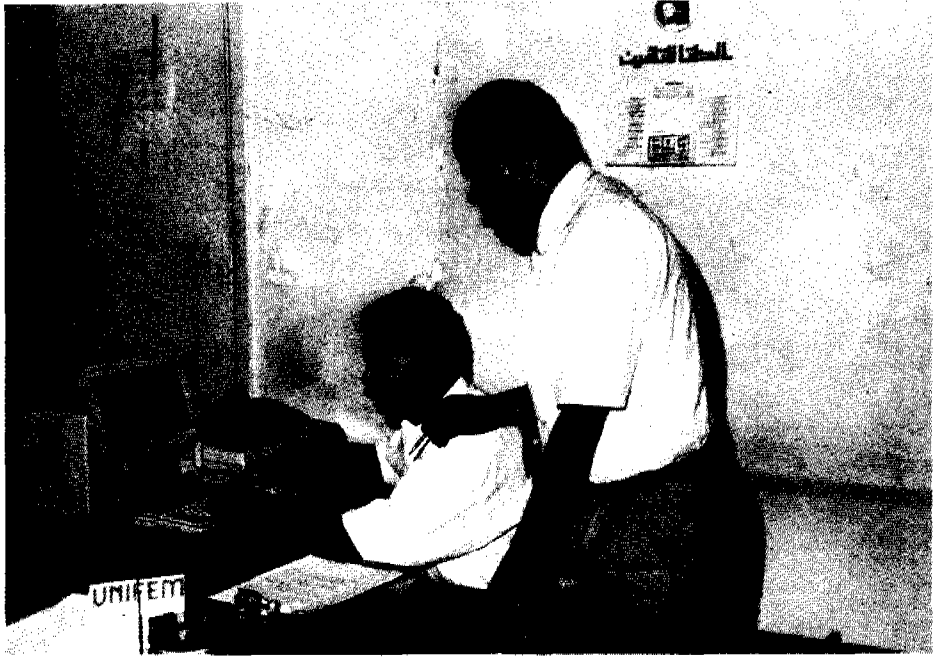
The project has procured and installed the following computer hardware:

- One high-capacity COMPAQ at the Information Centre of NOPWASD to function as the terminal point to the computerized management system.
- One IBM PC/AT at the Information Centre of ORDEV;
- One IBM PC/AT at the Information Centre of Fayoum Governorate;
- One IBM PC/AT at the Information Centre of Daqahliya Governorate.
- One IBM PC/AT at the Information Unit of Mansoura Markaz, Daqahliya Governorate.

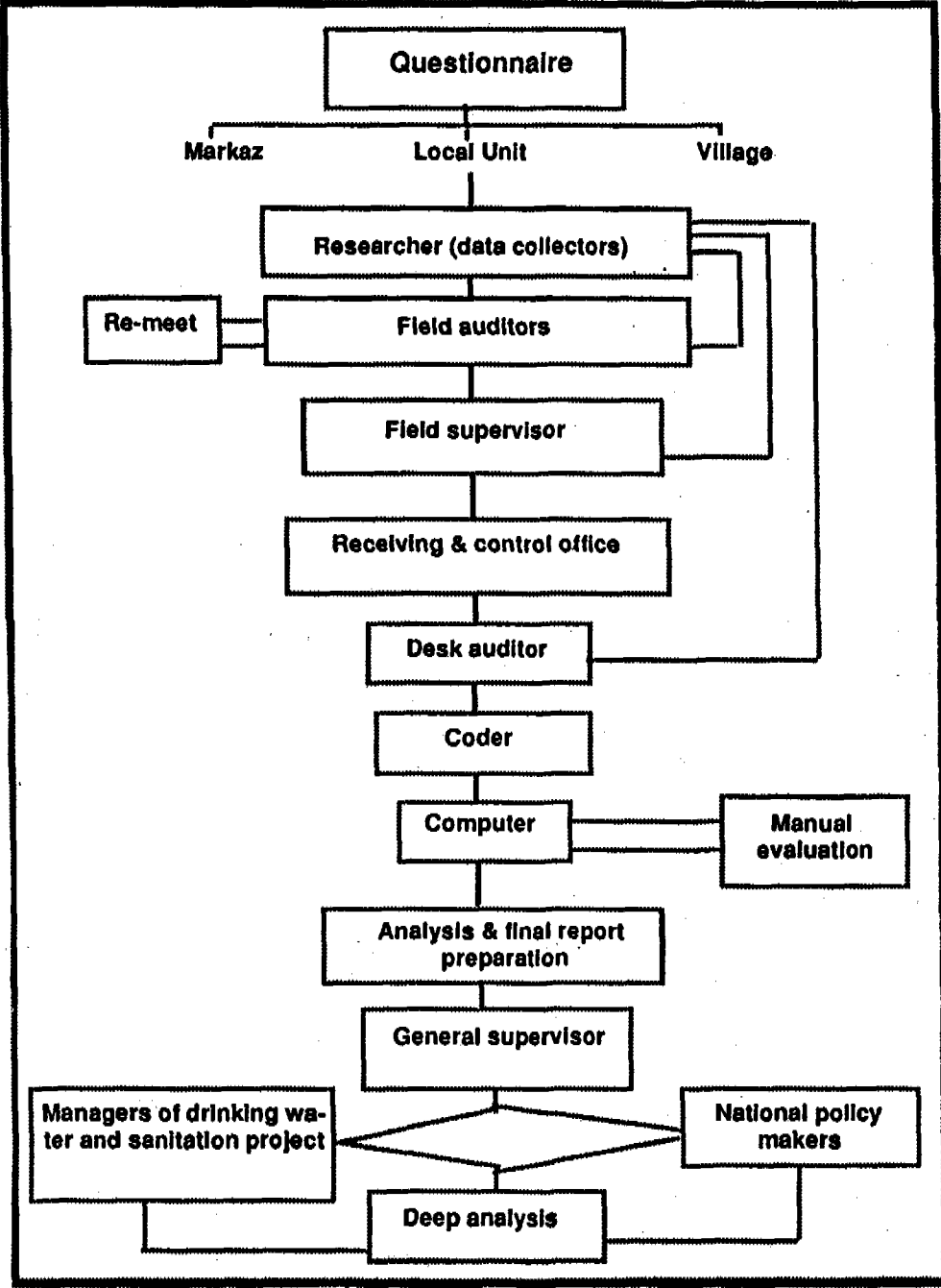
Software has been developed by Arabsoft based on data prepared by the project under a contractual service agreement.

Associated training has been provided under the project as follows:

- Training, under contractual service agreement with Arabsoft, of 11 computer operators at three levels:
  - Disk Operating System - 1 week
  - Data Base Management (dBASE III+) level I - 1 week
  - Data Base Management (dBASE III+) level II - 1 week.
- Continued on-the-job training, by project information systems professional staff, of computer operators at NOPWASD, ORDEV, Fayoum and Daqahliya Governorates, and Mansoura Markaz for a period of one year.
- Training, under contractual service agreement with Arabsoft, of 11 computer operators from NOPWASD, ORDEV, Fayoum and Daqahliya, and Mansoura Markaz on data collection software.



COMPUTERIZATION OF DATA



DATA PROCESSING FLOWCHART

## **7. SECTOR NEWSLETTER**

The project initiated a semi-annual newsletter, as recommended by the consultant experts, and 1500 copies of the first issue were distributed to sector agencies and local authorities in January 1989. The newsletter covered subjects such as sector news, technologies, water quality, financing, human resources, etc.

The newsletter was well received and played an important role in communication between sector agencies. After four issues had been prepared by the project office on a demonstration basis, the responsibility for publication and distribution was taken over by NOPWASD which will continue to produce a journal at quarterly intervals.

## **8. REFERENCE LIBRARY**

On account of shortage of funds, the building up of a reference library has been delayed within the project. However, support has been given, based on consultant recommendations, to the establishment within NOPWASD, in conjunction with the Information Centre, of a library which can be used for reference purposes by the sector agencies.

# EVALUATION

The outputs of the project in respect of Sector Information Management can be defined in terms of:

- documentation produced
- numbers of persons trained
- institutional development
- operations initiated.

These are summarized below.

## 1. DOCUMENTATION

The following reports, documents and publications, referenced in the final section of this document, have been produced under the project:

- Assignment Report by Ben Aston, WHO Consultant, October-December 1985.
- Assignment Report by Ian N.Crosskell, WHO Consultant, May-June 1988.
- Assignment Report by Ian N.Crosskell, WHO Consultant, October 1988.
- Operational information system manual for data collection forms. American University in Cairo, Volumes I, II & III, 1990.
- Evaluation report on training of data collectors. American University in Cairo, 1990.
- Evaluation report on training of computer operators. Arabsoft, 1991.
- Aqua News, Water Supply and Sanitation Sector Newsletter. Project Staff, 4 Issues, 1989-1991.

## **2. TRAINING OF PERSONNEL**

The following personnel have been trained through the project in subjects pertinent to the Sector Information Management System:

- 50 data collectors, principally from the Governorates of Fayoum and Daqahliya, in data collection and management at the American University in Cairo;
- 11 computer operators through six courses on computerization and information management by Arabsoft;
- 11 computer operators through two courses on data collection software by Arabsoft.

## **3. INSTITUTIONAL DEVELOPMENT**

The project has been effective in influencing the infrastructural changes needed to improve the information management of the sector by assisting in the establishment of the computerized Information Centres at NOPWASD, ORDEV, Fayoum, Daqahliya and Mansoura. It has also, through the preparation of appropriate data collection forms and training of field staff, brought about changes in the ways in which information is collected, analyzed, forwarded, sorted, consolidated and disseminated.

## **4. OPERATIONS INITIATED**

Under the project, the following relevant operations have been started:

- Data collection in two markaz, Obshwai of Fayoum and Mansoura of Daqahliya, using forms prepared by the project and trained personnel of local information units guided by the project information systems professional staff, in collaboration with NOPWASD and ORDEV information personnel.



- Handling of collected data at different levels:
  - Data collected at village level are handled manually and transferred to markaz level;
  - Additional data collected at markaz level, together with collected village data, are sorted out, computerized and transferred to the governorate level Information Centre where the data are analyzed and sent to NOPWASD;
  - At NOPWASD, data are further analyzed/stored and/or disseminated to relevant authorities and ministries; and
  - Analyzed data at the central level are used for national planning, and system and quality monitoring.



DATA COLLECTION AT MIT MAZAH VILLAGE

## LINKAGES

The diagram on Information System Layout displays the inter-ministerial linkages in the Sector Information Management system. The involvement of the ministries is mentioned in the following paragraphs.

### Ministry of Health

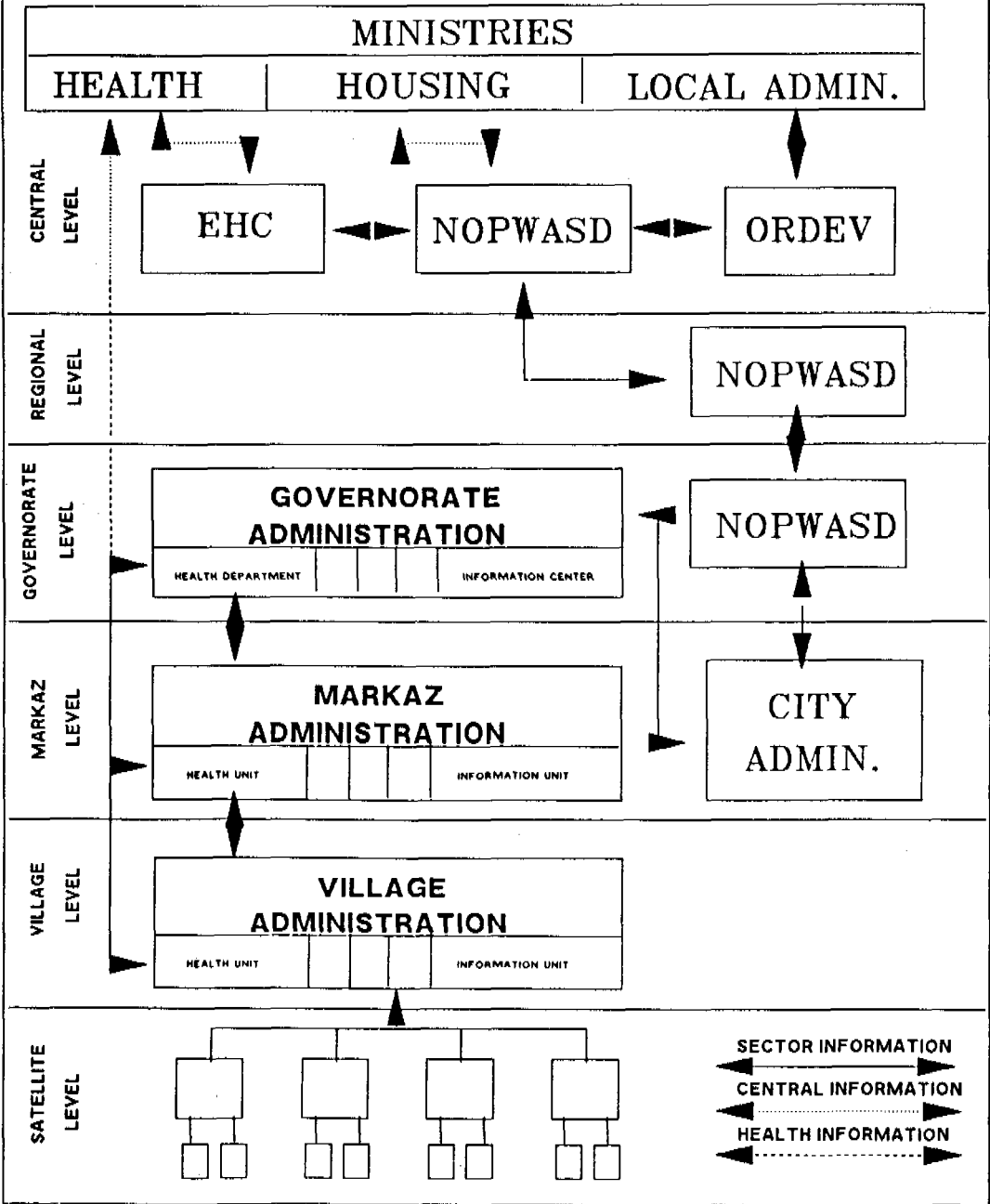
The Environmental and Occupational Health Centre (EOHC) at Imbaba, Cairo, is responsible for testing the quality of water from the Nile, detecting changes and making this information available to the central information service. The report of the Ministry of Health from governorates on health status related to water supply and sanitation are analyzed at the central level and the summarized data made available to NOPWASD for storage in the sector information management system for ready access.

### Ministry of Housing and Public Utilities

The National Organization for Potable Water and Sanitary Drainage (NOPWASD), which is a responsibility of this Ministry, has been designated as the central focus of the sector information management system. The Information Centre, established at NOPWASD, with the support of the project in computer hardware and training, receives the data collected at the village level, through markaz and governorates, where they are successively added to, sorted and entered in a computer, where available. Here they are analyzed, stored and disseminated as appropriate to the concerned sector offices. NOPWASD is organizing decentralization to four offices at the regional level, so that, in addition to the offices that it has within each governorate, another data screening level will eventually become established. Whereas NOPWASD has formal linkages directly with most city administrations, it relies on the channel of communications from villages through markaz and governorates, except where it has specific projects under its development.

NOPWASD has direct linkages with EOHC and ORDEV, and these organizations are expected to feed information to it and receive feedback of processed data.

# INFORMATION SYSTEM LAYOUT



## Ministry of Local Administration

The Organization for Reconstruction and Development of Egyptian Villages (ORDEV) is an organization responsible to this Ministry. While water supply and sanitation improvement in villages is a priority interest of ORDEV, it obviously has other interests outside this sector. However, since ORDEV is the Government Implementing Agency of the UNDP/WHO/UNICEF project and because of ORDEV's direct contacts at the village level, it has been agreed that linkage between ORDEV and NOPWASD for data processing and sharing is important. Consequently, the project has supported the establishment of an Information Centre at ORDEV which has close liaison with that at NOPWASD.

## Governorates

Although in the initial stages the project has concentrated its efforts in establishing the data collection and information management system in the two governorates of Fayoum and Daqahliya, the intention is to link all the governorate offices to the centrally operated system by establishing information units in them. There have been direct links with these two governorates which have been supportive of the project and which have assisted in the collection of information from village and markaz levels. As the system develops and further funds become available, training of staff from other governorates will be undertaken and the programme implemented.

## **FUTURE ACTIVITIES**

The activities to be carried out in the future under this project in the field of sector information systems management are essentially related to consolidation of the system already initiated and extended gradually to other governorates and markaz. The following activities will be undertaken:

At NOPWASD, continued support to the Information Centre in respect of:

- supervised on-the-job training of computer staff
- assistance in technical aspects of data processing
- evaluation of output
- assistance in the preparation and dissemination of a newsletter
- establishment of the sector reference library.

At ORDEV, continued support to the Information Centre in respect of:

- on-the-job training of computer staff
- facilitation of transfer of data to NOPWASD
- assistance in processing and analysis of data.

At EOHC, strengthening of linkages for data transfer to NOPWASD and the inclusion of water quality data in the sector systems database.

In governorates, continued support to the information centres established at Fayoum and Daqahliya, through training of computer operators, evaluation of data processing, supervision of information linkages, etc., and, as funds become available, the establishment of computerized information centres in offices of other governorates, together with training of staff, as necessary.

At markaz, based on the experience with the initial information units established at Obshwaiowi in Fayoum and Mansoura in Daqahliya, introduction, as funds become available, of similar units in other markaz in order to improve the coverage of the information collection and management system. In addition, support will be provided to the further training of computer operators, data collectors and associated staff.

At the village level, assistance, as required, to facilitate data collection and transfer, including supervision of training of data collectors.



INFORMATION PRINT-OUT  
DAQAHLIYA GOVERNORATE

# REFERENCES

## Project Reports

1. Aston, B. Assignment report on a design and introduction of a sector information system for drinking water supply and sanitation in Egypt. December 1986.
2. Crosskell, I.N. Assignment report on information system for Egypt: Review and improvement of the sector information system for drinking water supply and sanitation in Egypt. June 1988.
3. Crosskell, I.N. Assignment report on information system for Egypt: Review and improvement of the sector information system for drinking water supply and sanitation in Egypt. October 1988.
4. Operational information system manual for data collection forms and questionnaires: Drinking water supply and sanitation supply project, Volumes I, II & III. Institute of Management Development, The American University in Cairo, 1990.

## Associated Reports

5. Report on International Consultation on Information Management using the CESI System. Unpublished document WHO/CWS/EHE, Geneva, June 1991.

## Relevant Documents/Publications

6. National and Global Monitoring of Water Supply and Sanitation. IDWSSD Publication No. 2, WHO, Geneva, 1982.