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**INFORMATION MANAGEMENT
IN THE
WATER AND SANITATION SECTOR
IN
MOZAMBIQUE**

REPORT OF A FIELD MISSION

August 15 to August 30, 1995

by

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and
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**The Hague
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ABBREVIATIONS AND ACRONYMS

AACR2	Anglo-American Cataloguing Rules, 2nd edition
AAAS	American Association for the Advancement of Science
AHM	Arquivo Histórico de Moçambique (Historical Archive of Mozambique)
ARA	Administração Regional de Águas (Regional Water Administration)
ARA-Sul	Administração Regional de Águas do Sul (Regional Water Administration - South)
CABI	Commonwealth Agricultural Bureaux International (United Kingdom)
CDA	Centro de Documentação e Informação do Sector Agrário (Information and Documentation Centre of the Agrarian Sector)
CD-ROM	Compact Disc-Read Only Memory
CFPAS	Centro de Formação Profissional de Águas e Saneamento (Professional Training Centre for Water and Sanitation)
CGPI	Coordenador Geral de Projectos Integrados (General Coordinator of Integrated Projects)
CHAEM	Centro de Higiene Ambiental e Exame Médico (Environmental Hygiene and Medical Examination Centre)
CTA	Technical Centre for Agricultural and Rural Cooperation
DAP	Repartição de Administração e Pessoal (Department of Administration and Personnel)
DAS	Departamento de Águas e Saneamento (Department of Water and Sanitation)
DEPI	Departamento de Estudos, Planeamento e Investimentos (Department of Studies, Planning and Investments)
DGRH	Departamento de Gestão de Recursos Hídricos (Department of Water Resources Management)
DNA	Direcção Nacional de Águas (National Water Directorate)
DPOPH	Direcção Provincial das Obras Públicas e Habitação (Provincial Directorate of Public Works and Housing)
DRH	Departamento de Recursos Hídricos (Department of Water Resources)
DSD	Direcção dos Serviços de Documentação (Documentation Services Directorate)
EAN	Empresa de Águas de Nampula (Nampula Water Company)
EPAR	Estaleiro Provincial de Água Rural (Provincial Rural Water Workshop)
ESA(s)	External support agency(ies)
GEOMOC	State Drilling Company
GIS	Geographic Information System
HIDROMOC	State Hydraulic Company
IDRC	International Development Research Centre
IEC	Information, Education and Communication
IIM	Instituto Industrial de Maputo (Industrial Institute of Maputo)
INDER	Instituto de Desenvolvimento Rural (Institute of Rural Development)
INPF	Instituto Nacional de Planeamento Físico (National Institute of Physical Planning)
IRC	International Water and Sanitation Centre
KIT	Koninklijk Instituut voor de Tropen (Netherlands Royal Tropical Institute)
LNETI	Laboratório Nacional de Engenharia e Tecnologia Industrial (National Engineering and Industrial Technology Laboratory) (Portugal)
MAP	Ministério de Agricultura e Pescas (Ministry of Agriculture and Fisheries)
MCMA	Ministério para a Coordenação do Meio Ambiente (Ministry for the Coordination of Environmental Affairs)
MIS	Management Information System(s)
MOPH	Ministério das Obras Públicas e Habitação (Ministry of Public Works and Housing)
MZM	Mozambican Meticals
NGO	Non-Governmental Organization
NLG	Netherlands Guilders
NUFFIC	Netherlands Organization for International Cooperation in Higher Education
PAABP	Programa de Abastecimento de Água aos Bairros Periféricos (Peri-Urban Water Supply Programme)
PALOP	Países Africanos de Língua Oficial Portuguesa (Portuguese-speaking African Countries)
PEC	Programa de Educação Comunitária (Community Education Programme)

PMS	Project Management System
PNSBC	Programa Nacional de Saneamento a Baixo Custo (National Low-Cost Sanitation Programme)
PRONAR	Programa Nacional de Água Rural (National Rural Water Programme)
SADC	Southern African Development Community
SAREC	Swedish Agency for Research Cooperation with Developing Countries
SDC	Swiss Development Cooperation
SDISA	Sistema de Documentação e Informação do Sector Agrário (Documentation and Information System of the Agrarian Sector)
SEHA	Secretaria de Estado de Hidráulica Agrícola (State Secretariat of Agricultural Hydraulics)
SURN	Support Unit Region North
UDC	Universal Decimal Classification
UEM	Universidade Eduardo Mondlane (Eduardo Mondlane University)
UnB	Universidade de Brasília (University of Brasilia)
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UNDP	United Nations Development Programme
USD	United States Dollars
WRAP	Water Resources Assessment and Planning (project)

EXECUTIVE SUMMARY

This report presents the main findings, conclusions and recommendations of a mission to assess the role that information and documentation services could play in the water and sanitation sector in Mozambique. The mission was carried out by the IRC International Water and Sanitation Centre in August 1995, funded by the Dutch Embassy in Maputo and IRC.

Many of the developments taking place in the water sector in Mozambique centre on the National Water Directorate (DNA). They will place heavy demands on the limited supply of qualified manpower. The problems of the provinces are exemplified by Nampula Province, which, despite its economic importance and high priority in water development plans, has the second lowest coverage level in the country.

A lot of effort is put into *information management in the DNA, mainly in data management and management information systems*. These also receive a lot of attention in new development projects. By contrast, the provision of documentary information and Information, Education and Communication have received less attention. The proliferation of projects with implications for information management indicates a need for better coordination to avoid wasteful duplication of effort. There are many gaps in information provision. Some institutions in related fields have established information systems which offer possible models. The DNA could benefit by cooperating with these institutions to make the best use of the information and expertise available.

Increasing sector activity in Nampula lends urgency to the need to provide library and documentation services in the province in general, and in the capital in particular. Even in key institutions, information systems and services are not adequate to meet the needs of users. Three possible locations for a sector documentation centre in Nampula are considered.

Much remains to be done to improve the provision of documentary information. Some key institutions have no libraries or documentation centres at all. Nevertheless, there is a core of useful, organized and - in principle - accessible documentation which needs to be recorded, strengthened and made more accessible.

The numbers of potential users of documentary information are small, but they have a wide range of information needs. Numbers will increase as measures to strengthen capacity in the sector take effect. Most potential users are located in Maputo. A key problem is how to meet the needs of provincial users efficiently, effectively and at reasonable cost.

In general, access to information in the water and sanitation sector, particularly in the provinces, is extremely limited, and measures for the dissemination of information are ineffective. Current plans and projects are concerned mainly with data management and management information systems. Limited attention is given to Information, Education and Communication activities, and the need for specialized documentary information is largely ignored. This means that projects are ignoring the expressed information needs of the sector. There is a real need at all levels for better access to documentary information, including

documents produced in Mozambique and those from external sources. There is little or no such information available at provincial level.

The general picture of information management in the water and sanitation sector in Mozambique is not encouraging. There may be relatively few potential users of documentary information, concentrated mainly in Maputo, but they have a wide range of information needs, which are not being met. Proposals for developing information and data management within the framework of general sector projects generally fail to address one of the major obstacles to improving the provision of information to the sector, namely, the lack of qualified staff in all areas of information work.

The report's recommendations for improving information management in the water and sanitation sector in Mozambique focus mainly on the provision of documentary information by the DNA and in Nampula Province. Recommendations relating to other institutions are intended to provide a general indication of actions needed to improve their contribution to effective information management in the sector.

Recommendations 1 to 4 inclusive apply mainly to the DNA, and provide for:

- the appointment of a National Water Information Advisory Committee
- the establishment of an Information Management Unit
- the appointment of a National Consultant
- the establishment of a National Water Information and Documentation Centre.

Recommendation 5 applies to Nampula Province and provides for:

- the establishment of a Provincial Water Information and Documentation Centre for Nampula Province.

Recommendations 6 to 12 inclusive apply both to the DNA and the proposed information and documentation centre in Nampula, as well as to other institutions in the sector. They deal with the provision of: physical facilities; finance; staff; managerial support; collections and services; access to information; and the need for sensitization of decision-makers and technical staff. The body of the report concludes with proposals for implementing the recommendations, possibly within the framework of existing or proposed general sector development projects. Draft project proposals for implementing the recommendations relating to the DNA and Nampula are included in appendices.

PREFACE

This report presents the findings, conclusions and recommendations of a mission to Mozambique undertaken by two staff members of the IRC International Water and Sanitation Centre at the request of the Royal Netherlands Embassy in Maputo, in August 1995. The mission was funded jointly by the Embassy and IRC.

The Terms of Reference for the mission are reproduced in full at Appendix 1. In summary, the mission was required to

1. produce an inventory of the main current sources of sector documentation and information, indicating what is readily available, where can it be found and how, and who are the users
2. provide a documentation and information needs assessment, primarily for the rural- and peri-urban water and sanitation sector
3. identify the key players in information and documentation dissemination and their respective roles
4. describe the typical conditions constraining the setting-up of the required information and documentation services
5. present a pilot project proposal for information and documentation services, including a preliminary cost estimate.

In accordance with the Terms of Reference, the conclusions and recommendations focus mainly on the provision of documentary information for the water and sanitation sector in Mozambique, giving special attention to the National Water Directorate (DNA) and Nampula Province. When the Terms of Reference were drawn up, it was considered that the pilot project proposal would probably be linked to the Nampula Province Rural Water Supply project, which was to be implemented by the United Nations Children's Fund (UNICEF) and the National Rural Water programme (PRONAR) with funding from the Government of the Netherlands. When the mission arrived in Nampula, however, it was found that this project was very much behind schedule, and that it accordingly did not offer the most appropriate framework for a pilot project on information management. Alternative proposals are put forward in this report.

The report is divided into three parts. For the benefit of readers who are not already acquainted with Mozambique, Part I provides an overview of the water and sanitation sector in the country, with a separate chapter on Nampula Province. Part II describes in rather more detail the current situation with regard to information management in the sector, dealing not only with the DNA and Nampula, but also with other national and regional institutions and projects whose information activities have some relevance for the water sector. Part III presents the mission's findings, conclusions and recommendations.

A first draft of this report was submitted for comment, through the Netherlands Embassy in Maputo, to representatives of the institutions visited during the mission. The final text has

been amended to take account of comments and suggestions received during subsequent months. It is hoped that it will provide a basis for further, more detailed planning for the development of documentary information systems and services for the water and sanitation sector in Mozambique.

In submitting this report, the authors would like to record their grateful appreciation for the support provided by the numerous colleagues mentioned in the programme of the mission at Appendix 2, who generously gave of their time and expertise to provide answers to many of the queries raised by the mission. Notwithstanding the willing help provided by these colleagues, the errors and omissions of this report are the sole responsibility of the authors.

The Hague, June 1996

PART I

**THE WATER AND SANITATION SECTOR
IN
MOZAMBIQUE**

CHAPTER 1

THE WATER SECTOR AT THE NATIONAL LEVEL

INTRODUCTION

The Republic of Mozambique is located on the south-eastern coast of Africa, bordering Malawi, Swaziland, South Africa, Tanzania, Zambia, and Zimbabwe. It has an area of some 800,000 square kilometres and its coastline extends over 2,470 km from North to South. The climate varies from tropical to sub-tropical.

Mozambique is a member of the Southern African Development Community (SADC), a regional economic and social development organization to which Botswana, the Comoros, Lesotho, Madagascar, Malawi, Mauritius, Namibia, South Africa, Swaziland, Zambia and Zimbabwe also belong.

Mozambique has an estimated population of 18 million and an annual population growth rate of 2.87 percent. About 20 percent of the population live in urban areas. Half of the urban population live in the city of Maputo, and some 80 percent of all urban inhabitants live in peri-urban or slum areas. The infant mortality rate is 126 per 1,000 and life expectancy is 49 years. Only about 33 percent of the population are literate, and for 90 percent the main economic activity is agriculture. The average national income is USD 80 per capita.

The country is divided into ten provinces, each one headed by a governor and divided into several districts, each of which has its own administration. The city of Maputo has the status of a province. The provinces and their capitals are as follows: Cabo Delgado (Pemba), Gaza (Xai-Xai), Inhambane (Inhambane), Manica (Chimoio), Maputo (the City of Maputo), Nampula (Nampula), Niassa (Lichinga), Sofala (Beira), Tete (Tete), Zambézia (Quelimane). In addition to the provincial capitals, the towns of Nacala, in Nampula Province, and Chokwé, in Gaza Province, also have the status of cities. Since colonial times, almost all decision-making, planning and administration were concentrated at the central level, in Maputo. This situation still persists, but decentralization of these activities to the province, district and community levels is now a major element in current government policies.

For some 20 years, both before and after it attained independence from Portuguese colonial rule in 1975, Mozambique has suffered from prolonged armed conflict in most parts of the country. This led to the displacement of large sections of the population and the destruction of much of the physical infrastructure. Mozambique is now one of the poorest countries in Africa.

During the colonial period, responsibility for water supply and sanitation in the cities rested with the municipal councils. These systems were characterized by the contrast between the advanced levels of service provided to the 'cement city', where the colonists lived, and the much lower levels of service in the peripheral zones, where the majority of Mozambicans resided. Operation and maintenance were carried out by technicians who were mainly of

Portuguese nationality. In the rural areas, there was no water supply programme, except for a few isolated initiatives.

In 1975, after independence, the departure of most of the Portuguese technicians and the dismantling of the colonial structures led to the abandonment of many of the urban and semi-urban water supply and sanitation systems. The hydrological network, which comprised some 260 hydrological stations and 340 rainfall stations, almost totally collapsed during the civil war. The network was never rationalized to cover the whole country; many bodies were involved in drilling and data recording, and some data archives suffered big losses during the decolonization period and afterwards.

The main water-related sectors in Mozambique have been identified as: public water supply; irrigated agriculture; energy production; industry and commerce; sewerage and drainage; and the environment. Following the recent end of the civil war, a large number of new development projects are being started or planned in the water sector. Overall responsibility for directing and coordinating the development of the sector rests with the National Water Council (Conselho Nacional de Águas).

WATER LAWS AND POLICIES

The legal basis for current activities in the water sector in Mozambique is provided by the Water Law of 1991. One of the responsibilities of the state, according to the law, is to carry out a general inventory of water resources and revise it periodically. This inventory should include potential surface and groundwater, use, needs, and the balance of water resources and needs. The law also provides for the establishment of a National Water Registry Office for water rights registration.

A National Water Policy (which also includes measures related to sanitation) was approved by the government in 1995. It gives first priority to the satisfaction of basic needs, particularly those of rural populations and low-income groups, and emphasizes the importance of participation by the beneficiaries in the planning, implementation, operation and maintenance of water supply and sanitation services. Water should be priced in accordance with its economic and social value, with the aim of ensuring cost recovery.

The operational management of water resources is to be decentralized to the river basin level, while water supply and sanitation will become the responsibility of autonomous local agencies. In future, central government will not be directly involved in implementation of water supply and sanitation services; instead, it will be concerned with establishing priorities, orientation, definition of minimum service levels, the acquisition and provision of information, and regulation of the activities of service providers.

Emphasis will be placed on the integrated management of water resources, balanced investments and the development of institutional capacity, as well as the involvement of the private sector. Providing the data needed for the integrated management of water resources will require the rehabilitation of the hydrometeorological network to the level which existed in 1973. This is to be given immediate priority, at an estimated annual cost of more than USD 2 million. Steps will be taken to prepare action programmes at national and provincial levels to ensure the implementation of the policy.

INSTITUTIONS IN THE WATER AND SANITATION SECTOR

Brief descriptions of some of the main institutions and programmes active in the water and sanitation sector at the national level in Mozambique are provided below. Not all of these were visited during the mission, which was mainly concerned with the National Water Directorate (Direcção Nacional de Águas: DNA) and its constituent departments and associated programmes and institutions.

National Water Directorate

The National Water Directorate (DNA) was established in 1977. It forms part of the Ministry of Public Works and Housing (Ministério das Obras Públicas e Habitação: MOPH). One function of this Ministry, as defined in a preliminary version of the National Water Policy, is to promote continued inventories of water resources and water demand and establish an adequate water information system.

At the time the mission was carried out, the main organizational elements of the DNA were as follows:

Department of Studies, Planning and Investments (Departamento de Estudos, Planeamento e Investimentos: DEPI)

Department of Water Resources (Departamento de Recursos Hídricos: DRH)

Department of Water and Sanitation (Departamento de Águas e Saneamento: DAS)

- Peri-Urban Water Supply Programme (Programa de Abastecimento de Água aos Bairros Periféricos: PAABP)

Department of Administration and Personnel (Repartição de Administração e Pessoal: DAP)

National Rural Water Programme (Programa Nacional de Água Rural: PRONAR)

- Community Education Programme (Programa de Educação Comunitária: PEC)

Professional Training Centre for Water Supply and Sanitation (Centro de Formação Profissional de Águas e Saneamento: CFPAS)

The DNA functions under the overall guidance of a Board of Directors, comprising the Director, his Deputy and the Heads of the Departments, and a Technical Board comprising the members of the Board of Directors and the heads of the various sections dealing with technical aspects. There is also a Technical Advisory Unit which reports directly to the Director. The headquarters of the DNA are located in Maputo, in rented premises in a multi-storey office block.

A recently completed study of the water supply and sanitation situation in twelve major provincial towns proposed the establishment of a different Advisory Unit to assist the Director of the DNA. The study noted that:

... permanent improvement of sector performance is only possible when the institutions at central level are strengthened simultaneously with the local level water companies

and proposed five projects designed to support this aim, as follows:

- DNA Advisory Unit
- DNA Strengthening Project
- Central Support Project
- Regional Support Project
- Training Support Project

The proposed DNA Advisory Unit is intended as a special and temporary advisory unit to strengthen the capacity of the DNA to formulate policies and strategies.

Another project, the Water Resources Assessment and Planning (WRAP), provides for the establishment of new Regional Water Administrations (ARAs) and the development of the technical support capabilities of the DNA.

Under other proposals for the restructuring of the DNA, a new Department of Water Resources Management (Departamento de Gestão de Recursos Hídricos: DGRH) will absorb the present DRH and most of DEPI; the investment activities of DEPI will become a separate Investment Department. The National Low Cost Sanitation Programme (Programa Nacional de Saneamento a Baixo Custo: PNSBC) (see below) will shortly be transferred from the Institute of Rural Development (Instituto de Desenvolvimento Rural: INDER) to the DNA, initially within DAS and subsequently as part of a new Department of Low-Cost Sanitation to be established in the future.

Within DAS, the PAABP promotes the establishment, operation and maintenance of community water sources in peri-urban areas. The success of the programme depends on its acceptance by users, and it is therefore closely involved with the PRONAR Community Education Programme (PEC). In Nampula, for example, PAABP employs animators who have been trained by PRONAR in the PEC approach. The PAABP also works closely with the local water enterprises in the provinces.

The role of PRONAR is to coordinate, plan, implement and supervise rural water supply initiatives. Although it works on the basis of community participation, some of the staff who work with the communities lack experience and training. The training available at the national level, through CFPAS, is considered to be too technical, and PRONAR itself provides re-training courses for animators in the provinces in an attempt to fill the gap. All PRONAR training programmes include social aspects. The offices of PRONAR are located in rented accommodation in the Maputo offices of the national electricity company, some distance from DNA headquarters.

The CFPAS is responsible for the methodological and pedagogical organization, orientation and coordination of the training and recycling of sector workers at the basic and middle levels. Of some 4,725 workers in the water sector in Mozambique, at least 1,500 have passed through CFPAS. The Centre is located some distance away from the DNA headquarters in Maputo, and occupies converted former industrial premises which provide adequate space for workshops, laboratories, classrooms, etc.

Ministry of Health

Within the Ministry of Health (Ministério da Saúde), the Department of Environmental Health is responsible for the control of drinking water quality and for environmental health, including sanitation and the control and abatement of water-borne diseases. Priority is given to preventive medicine. The main international cooperating and financing agency is the World Health Organization (WHO). There are many development projects in the health sector, but the sector receives a very small proportion of the total government budget.

The Ministry has a central laboratory and several provincial laboratories for water analysis. At the provincial level, The Ministry also maintains networks of Environmental Hygiene and Medical Examination Centres (CHAEM), each of which has a water and sanitation department. These centres already exist in the city of Maputo, in Sofala and in Nampula; new ones are being established in Zambézia, Inhambane and in the Maputo Province. At district level, there are Health Sections.

The training programmes at the Regional Centre for Hygiene Promotion in Maputo are designed to serve the needs of all the Portuguese-speaking African countries (Países Africanos de Língua Oficial Portuguesa: PALOPs). Staff also attend short courses on water and sanitation in Zimbabwe. Contact is also maintained with training institutions in Brazil.

Ministry of Agriculture and Fisheries

The Ministry of Agriculture and Fisheries (Ministério de Agricultura e Pescas: MAP) has been involved with the water sector in the past chiefly through the State Secretariat of Agricultural Hydraulics (Secretaria de Estado de Hidráulica Agrícola: SEHA), which was mainly concerned with irrigation. However, SEHA is said to have lost most of its momentum and standing in recent years as many of its functions have been moved to the office of the General Coordinator of Integrated Projects (Coordenador Geral de Projectos Integrados: CGPI).

Ministry for the Coordination of Environmental Affairs

The Ministry for the Coordination of Environmental Affairs (Ministério para a Coordenação do Meio Ambiente: MCMA) is a new Ministry, created in December 1994. Before that, since 1992, it functioned as the National Environment Commission. Its aim is to create the necessary conditions for the effective management of the environment through a National Environmental Management Programme with a focus on environmental sanitation, particularly in urban areas.

The quality of life in cities and peri-urban areas due to the expansion of the urban population during the war is a key problem. Maputo, for example, has capacity to treat only a part of its waste water, while other cities, e.g. Beira, discharge waste water direct to the sea.

The Ministry is responsible for developing policy and strategies for environmental protection throughout Mozambique, especially in urban areas. Its role is to define policies and monitor their implementation by other ministries. The existing legislation is old and needs adapting to the present situation. The revision of the legislation is a priority; draft legislation has already been prepared and submitted to the legislature.

Negotiations are under way to bring the National Institute of Physical Planning (Instituto Nacional de Planeamento Físico: INPF) under this Ministry. In the provinces, the Ministry operates through representatives of the Institute.

Plans are being made for the creation of three regional centres to deal with specific aspects of sustainable development, in Nampula (urban areas), Zimonho (rural areas), and Xai-Xai (coastal areas).

Eduardo Mondlane University

The Faculty of Engineering of the Eduardo Mondlane University (Universidade Eduardo Mondlane: UEM) offers course options in sanitary and hydraulic engineering. Of some 700 students in the Faculty, about 200 are attending courses in sanitary engineering, mainly in the Chemistry Department. There is a connection with the Technical University of Delft and other foreign universities. About 30 percent of the staff in the Faculty of Engineering are foreigners, including Dutch and Russian. A few students are from other PALOPs.

There is a reasonable level of external support to UEM, which also has various agreements with Portuguese bodies, such as the National Engineering and Industrial Technology Laboratory (Laboratório Nacional de Engenharia e Tecnologia Industrial: LNETI), and links with Brazilian institutions, including the University of Brasília (Universidade de Brasília: UnB).

Seminars, such as a forthcoming one on hydraulics, are organized for updating the knowledge of water sector managers. The Faculty also has links with the community in general. Academic staff are involved in external projects and programmes, e.g. at the DNA, and the university is sometimes contracted by donors and others to carry out research studies, e.g. in studies of biomass and manioc. Several UEM lecturers also teach on the hydraulic engineering courses at the Industrial Institute of Maputo (Instituto Industrial de Maputo: IIM).

National Low-Cost Sanitation Programme

The National Low-Cost Sanitation Programme (PNSBC) was created in 1985, with the aim of spreading the construction of latrines throughout the country through a programme to promote Improved Latrines ('Latrinas Melhoradas'). The programme is guided by a supervisory group including representatives of various government agencies, including the Ministry of Health, the MCMA and the DNA. The central management unit currently has nine higher level technical staff. The PNSBC has been managed up to now by INDER,

which is linked to the Ministry of Agriculture and Fisheries, but will shortly be transferred to the DNA, where it will eventually form the major part of a new Department of Low-Cost Sanitation, as noted above.

Decentralization is a crucial element to ensure the sustainability of the programme, which programme covers the whole country through nineteen centres and thirty-three production units, nine of which are in Maputo. Mobile construction units are being set up in Nampula and Quelimane. The PNSBC also plans to extend its activities to rural areas, where PRONAR has already been active. At the provincial level, planning and policy for the programme will be separate from operation and implementation. A national policy for low cost sanitation is awaiting final approval.

GEOMOC and HIDROMOC

GEOMOC is the national state company responsible for drilling wells for water supply, while HIDROMOC is the state enterprise in charge of the import, distribution and installation of equipment for water supply in the country, as well as for the import of chemicals, spare parts and other materials. It also builds small water treatment plants. It covers the whole country through its headquarters in Maputo and two regional branches.

Industrial Institute of Maputo

The Industrial Institute of Maputo (IIM) has a Department of Hydraulics and Construction which provides three-year training courses for employees of water enterprises in hydraulics and sanitary engineering. There are currently 124 students enrolled in the Hydraulics course, which is an activity of a joint project of the DNA and the Swiss Development Cooperation (SDC).

After completing their courses, students may return to their jobs or go to university. The courses at IIM are at a higher academic level than those at the CFPAS. Many of the lecturers in technical subjects at IIM are either employees of the DNA or faculty members at the Eduardo Mondlane University.

Other Institutions

In addition to national and local government institutions, many international and bilateral agencies are active in the water sector. International external support agencies (ESAs) working in the sector include the United Nations Development Programme (UNDP), the World Bank and the United Nations Childrens Fund (UNICEF). Bilateral agencies from Denmark, Finland, France, Germany, the Netherlands and Switzerland, as well as the European Union, are also active in the sector, and have formed an informal 'Water Sector Group' with the aim of coordinating their efforts. International non-governmental organizations (NGOs) such as OXFAM, CONCERN and World Vision, also play an important role in some areas.

DECENTRALIZATION

The process of decentralizing responsibilities in the water sector has begun, but is still at a very early stage. It is expected to be a slow process, as the provinces vary greatly in their capacity for implementation. Human resources at the provincial level are considered to be very weak, both in quality and quantity - staff are mostly basic level technicians mainly trained in e.g. hydrometry, not water supply and sanitation.

The introduction of the idea of democracy in Mozambique is said to have created an attitude of non-cooperation among many people due to a lack of understanding of what it really means. In many cases, there is a lack of interest in community-based activities since this change. It is difficult to gain acceptance of the idea of payment of community contributions, and even more difficult to mobilize participation in construction. In this situation, reliance has to be placed on the traditional political structures which are beginning to function again. In some villages the headman, or 'régulo', should be consulted about proposals for community-based activities in his area.

Regional Developments

There are a number of plans and proposals for the establishment of regional institutions and mechanisms with responsibility for sector developments in several provinces: for example, a proposed Regional Support Project for Nampula, Beira and Maputo provides for the establishment of three regional support centres, while the MCMA plans to create three regional Centres for Sustainable Development, including one in Nampula. Each of these will focus on a special topic; that in Nampula will focus on urban problems, while that in Xai-Xai will deal with the problems of coastal areas. This Ministry also has Provincial Delegations for Physical Planning.

A proposal for decentralizing the activities of the DNA through the creation of Regional Water Administrations (Administrações Regionais de Águas: ARAs) conceives of them as autonomous bodies legally distinct from the government. Each will have a Management Board including representatives of water user associations, local authorities, and government agencies with water responsibilities. It is recognized that such a concept can be considered controversial for a country like Mozambique, since it requires the limited human resources available to be spread all over the country. Nevertheless, experience has shown that even essential water resources activities like data collection are being deferred or neglected by the local authorities.

The process of establishing the ARAs has been delayed for various reasons, including:

- weak technical and managerial capacity of local human resources
- the inventory of water resources rests with the Hydrometric Sectors, which are involved with other urgent problems and do not give priority to this one
- the lack of legal and institutional mechanisms to regulate drilling activities, which would ensure that data collected by drilling companies

comes to the notice of the DNA, impedes the inventory of groundwater potential

- the lack of participatory mechanisms for water users to participate in management.

Regional Water Administration - South

The only ARA to have been established so far is the Regional Water Administration - South (Administração Regional de Águas do Sul: ARA-Sul), which was created in November 1993 to be responsible for the hydrological network in the South of Mozambique. This responsibility is gradually being transferred from the provincial to the regional level to improve data quality. It is a capacity-building project in which substantive training and education are important tools. ARA-Sul has 27 staff involved in project activities. Its organization is reported as being still very incomplete and unsatisfactory in some aspects. There is a lack of adequate institutional relationships with users, with a tendency to focus mainly on major users, leaving out small farmers because they are usually not organized. The transition to decentralization means that proper communication between DNA and ARA-Sul is essential.

The structuring of ARA-Sul has suffered delays for the same reasons as the general decentralization of DNA activities through the ARAs, outlined above.

Provincial Water Supply Companies

All the provincial capitals (including Maputo) and other major towns have their own urban water supply companies (Empresas de Água). At present, the DNA directly supervises the water companies providing services in the twelve major provincial cities. In the district capitals, water supply is the responsibility of the local authorities.

The aims of the Central Support Project proposed by the Provincial Towns Water Sector Study include the coordination of support efforts targeted at water companies.

CONCLUSION

Major developments and changes are taking place in the water sector in Mozambique, many of which are either centred on the DNA itself or will affect its future activities to a greater or lesser degree. These developments will place heavy demands on the limited supply of qualified manpower, not only within the DNA, but also in the provinces.

CHAPTER 2

THE WATER SECTOR IN NAMPULA PROVINCE

INTRODUCTION

The province of Nampula is reported to have the second lowest coverage of water supply in Mozambique and the highest priority in both short and long term plans for water supply. The province also has the highest and densest population in Mozambique. In 1992, the estimated population of the province was 2.8 million in an area of 81,000 km², with an estimated growth rate of 2.4 percent per annum and frequent outbreaks of cholera. It has a high agricultural potential. There are five regional administrations and eighteen districts in the Province.

Responsibility for water supply and sanitation in the province is shared by a number of organizations, including:

- the Provincial Directorate of Public Works and Housing (Direcção Provincial das Obras Públicas e Habitação: DPOPH)
- the Provincial Rural Water Workshop (Estaleiro Provincial de Água Rural: EPAR)
- the provincial branch of the National Low-Cost Sanitation Programme (PNSBC)
- the Nampula Water Company (Empresa de Águas de Nampula: EAN)
- the water companies of other towns in the province.

Support is also provided by various international and bilateral external support agencies and NGOs.

PROVINCIAL DIRECTORATE OF PUBLIC WORKS AND HOUSING

The Provincial Directorates of Public Works and Housing (DPOPHs) represent the Ministry of Public Works and Housing (MOPH) in each province. Each DPOPH has a Department of Water and Sanitation (DAS) which reports both to the Provincial Directorate and to the National Water Directorate (DNA). The DPOPH in Nampula is generally responsible for all aspects of public works and housing in the province, including water supply and sanitation, which is the concern of a separate department within the Directorate.

The objective of the DNA is to have a minimum of three middle level technicians in each such department, giving priority to Niassa, Nampula and Zambézia provinces. In Nampula, the DAS at the DPOPH has six technical or professional staff, and will be strengthened by

the recruitment of one higher level engineer and two middle level technicians under the Swiss Development Cooperation (SDC) project referred to above.

One of the major problems expressed by the Head of the Department is lack of transport to enable staff to visit the districts. Without transport, the Department cannot do anything - for example, the hydrometrists cannot reach field sites to collect data.

There are plans for the construction or rehabilitation of water sources in the province by EPAR, GEOMOC and HIDROMOC, within the framework of projects funded from a variety of sources. In 1994, a survey of existing water sources in Nampula was carried out by the SANAGUA consulting firm on behalf of the Ministry of Agriculture and Fisheries (MAP), with funding from the World Bank. This was a pilot project covering all aspects of the water situation in the province, for possible replication in other provinces. Information management aspects of the SANAGUA survey are considered in Chapter 5.

PROVINCIAL RURAL WATER WORKSHOP

The Provincial Rural Water Workshops (EPARs) are responsible for executing construction works in rural areas in accordance with plans and projects prepared by the National Rural Water Programme (PRONAR) and the local DPOPH. There is no legal framework for the EPARs. The EPAR in Nampula has a total staff of 45, including twelve animators working in five districts under the PRONAR Community Education Programme (PEC). For the purposes of the PEC, the province is divided into three areas, each covering several districts. The effectiveness of EPAR Nampula in terms of construction works is constrained by the capacity of PEC to prepare the communities. It is hoped that the monitoring performance of PEC in Nampula will be improved through the efforts of a World Bank-financed adviser now working in EPAR.

NAMPULA WATER COMPANY

The Nampula Water Company (EAN) is housed in very cramped and overcrowded conditions in the compound of the Nampula Electricity Company. It has a total staff, at all levels, of about 120. There are about fifteen core technical staff, among whom the three best qualified (including the Director) are middle level technicians. The few skilled people are seriously overworked.

Some of the technical staff have been trained at the Professional Training Centre for Water Supply and Sanitation (CFPAS) in Maputo, others in Cuba or East Germany. Staff are sometimes sent on short courses in Zimbabwe, but some have difficulty with the English language. The Director suggested that in Nampula, the Ministry of Labour Training Centre has a good infrastructure for training courses.

A project of the Peri-urban Water Supply Programme (PAABP) for the Northern region is based at the EAN. It is proving difficult to orient the project towards community participation, partly because of the approach adopted by donors, but also because of the attitudes within the local water companies. The companies think they lose money in the peri-urban areas, but this is not so, because their inhabitants often pay as much or more than those in the inner cities. An attempt to initiate a process of reflection on these issues at the national

level, through producing documents and organizing seminars on community participation, has not been successful, in part because of the lack of properly trained people at all levels. The peri-urban problem is worst in provincial capitals, but also exists in smaller towns; for example, systems designed for 10,000 in inner city areas now have to serve many more people.

DEVELOPMENT PROJECTS AND PROPOSALS

As noted in Chapter 1, decentralization of the water sector in Mozambique is expected to be a slow process, due in large part to the lack of human resources at the provincial level. Nampula is the location of various water and sanitation projects and proposals aimed at improving the situation. Some are of regional scope, while others are confined to the province itself or to specific subsectors, geographical areas or administrative subdivisions within it. Examples of some of the projects being funded, or proposed for funding, by the Netherlands Government are outlined below.

Support Unit Region North

A Support Unit Region North (SURN), which will give support to the DNA in the management of water resources in the Northern provinces, is being established under a bilateral project of the Netherlands Government. An important role of SURN will be to provide management support to the water enterprises in small towns and villages, with the emphasis on non-technical aspects such as management and human resources development. However, it may also have a big role in technical support, for example in connection with a NLG 8 million project for technical works in the city of Nampula. A team of expatriate specialist advisers and local staff will be provided under the SURN project. They will be based in the city of Nampula and will work in close association with the EAN.

Community Institutional Support for Small Piped Supplies

This is another bilateral project funded by the Dutch Government. It is being carried out by the Dutch Delegation in Nampula. A special group provides administrative support to the project. This work includes administration and physical control system, collection and storage of information for the project.

Integrated Rural Water Supply Project

This project is also funded by the Netherlands Government and managed jointly by the United National Children's Fund (UNICEF) and PRONAR. It aims to contribute significantly to increasing rural water supply coverage in the Province through the construction of over 800 new water sources, and to improve overall planning and implementation procedures in EPAR Nampula and extend the capacity of PEC in the province. The project plans to provide community education materials for the PEC team based on materials produced earlier and used in other provinces; however, it appears that PRONAR has been slow in developing such materials and in taking up offers of technical support from UNICEF in this area. The implementation capacity of EPAR is to be increased by the establishment of three new regional workshops in different locations in the province. At the provincial level, PEC staff are to be trained to develop new training materials, plan operations and monitor impact, while

basic training and materials are to be provided at district level. Short training courses are to be provided for water committee members and training in handpump maintenance for the village mechanic teams. Three specialist staff are to be employed through PRONAR to advise and guide the project.

Other Projects

Other projects being implemented or considered include:

- the creation of mobile latrine construction units under the PNSBC
- the creation by the MCMA of a Regional Centre for Sustainable Development in Nampula, focusing on urban problems
- a study on diarrhoeal diseases by the Department of Environmental Health of the Ministry of Health
- a local government reform and engineering project which aims to reinstate the autonomy of five pilot cities, including Nampula
- an SDC project for providing institutional support to the provinces, which provides for the decentralization of water departments and water enterprises, initially in the Northern provinces of Niassa, Nampula and Zambézia, and later in other provinces.

CONCLUSION

The problems of the water sector at the provincial level in Mozambique are well illustrated by the situation in Nampula Province, which despite its economic importance and the fact that it has high priority in water supply development plans, still has the second lowest coverage level in the country.

PART II

INFORMATION MANAGEMENT

IN

THE WATER AND SANITATION SECTOR

CHAPTER 3

INFORMATION MANAGEMENT IN THE NATIONAL WATER DIRECTORATE

INTRODUCTION

Information management in the water and sanitation sector generally involves activity in one or more of four main areas, as follows:

Data Management

- concerned with the collection, processing, storage and retrieval of hydrometric and other scientific and technical data

Management Information Systems (MIS)

- concerned with the information and data needed for the planning, administration, day-to-day operation, management, monitoring, performance and evaluation of specific institutions, organizations, programmes and projects

Specialized Documentary Information

- concerned with problems and solutions, methods and techniques, the results of research and field studies, sources of equipment, expertise and materials, and so on

Information, Education and Communication (IEC)

- the type of information used in public information campaigns, which are directed at the general public and sector policy makers rather than sector professionals, and which includes activities of 'animation', community participation, awareness-raising, and so on.

As noted in the Preface, this report focuses mainly on specialized documentary information, with the emphasis on information for operational activities in sector institutions, particularly (in this chapter) in the National Water Directorate (DNA) and its associated institutions and programmes, and (in Chapter 5) in Nampula Province. However, some consideration is also given to data management, management information systems and Information, Education and Communication to the extent that they are already covered by existing or proposed sector projects in Mozambique. Chapter 4 provides an overview of the information management situation in some other institutions of relevance to the water and sanitation sector.

INFORMATION MANAGEMENT IN DNA HEADQUARTERS

According to its internal regulations, the duties of the DNA as a whole include the following with implications for information management:

- to promote permanent inventories and balances of water resources and water needs ... establishing and operating for this purpose an adequate system for the collection and treatment of information, especially hydrological and hydrogeological information
- to encourage research in the field of hydraulics and water resources and guarantee the training and recycling of staff
- to promote campaigns for training, education and dissemination about problems of water management.

The *Provincial Towns Water Sector Study* emphasizes that

To improve management at the various levels, a minimum requirement is that necessary information is produced at regular intervals to monitor the activities. The basis for all reliable information at all levels is a reliable form of record keeping and reporting ... the higher the management level, the more condensed the information.

In support of the proposed establishment of an Advisory Unit to assist the Director of the DNA, the study report suggests that consultancies should be provided to develop project MIS for the Department of Water and Sanitation (DAS) and the water companies.

Information management activities in the various departments of the DNA are considered separately below. Here it may be noted that, under the proposed restructuring of the DNA, the new Department of Water Resources Management (DGRH) will be responsible for, among other things, data collection, information management, documentation and the dissemination of information. The major tasks of data acquisition will be carried out by the hydrological and geohydrological sections and an information and general assistance section.

INFORMATION MANAGEMENT IN DEPI

The internal regulations of the DNA define the following responsibilities of the Department of Studies, Planning and Investments (DEPI) with implications for information management:

- supervising the conservation and safety of major water works by means of the establishment and monitoring of programmes of observation and maintenance
- promoting the necessary measures for the inventory and registry of hydraulic infrastructures

- ensuring the implementation of a water information system in collaboration with other departments of the DNA
- studying, proposing and supervising the development and use of the computer systems of the DNA
- organizing and elaborating systematic information on the financial execution of projects
- preparing financial reports.

DEPI is also responsible for the main Library and Technical Archive of the DNA.

The DNA Library and Technical Archive

The main Library and Technical Archive of the DNA are administered by DEPI, but do not appear in its organogram as a separate section of the Department.

The two units have a total of five staff, some of whom have received basic technical training on local short courses. Both units are located on the 11th floor of the DNA Headquarters building, and housed in very overcrowded conditions. They formerly occupied a bigger area on the 11th floor, but after a general re-organization of office space in the DNA, they were pushed together into practically half the space they formerly occupied. This not only created extremely difficult working conditions for both staff and users, but also raises the possibility of excessive floor loading. The archive alone contains 24 full height steel cupboards full of documents, plus two built-in cupboards, a periodicals rack and four staff desks, in a floor area of only 44 square metres. It is hoped that the space problem may be solved if the DNA is able to move to new premises, or perhaps construct new a new building.

In the past, copies of all project documents were deposited in the Technical Archive, which now contains some 3,000 documents. The depository system does not appear to be functioning effectively any more. The archive is organized by river basin, and has a computerized catalogue with author and subject indexes. The catalogue uses the Mini-micro CDS/ISIS software, version 3.0 developed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the PORBASE entry format developed by the National Library of Portugal.

The main users of the Archive are engineers involved with projects. The Archive is responsible for issuing official document registration numbers to DNA staff who are preparing technical reports. A 'dead archive' of old material is housed in a general storeroom in the car park on the ground floor. It appears that old archives are not transferred to the Historical Archive of Mozambique (Arquivo Histórico de Moçambique: AHM) for preservation, although there are regulations requiring government departments to do so.

The Library contains some 2,800 publications organized in a broad subject arrangement with a basic card catalogue. There is no computerized catalogue of the Library's documents as yet, although the computer in the Archive has ample hard disk space for this purpose. The Library is used by university students as well as DNA staff. Most users prefer to use

materials in Portuguese. Books are issued on loan, but the staff have no power to require their return. A list of new acquisitions is issued from time to time.

There is a system for purchasing books for the Library, but funds are very limited. After the end of an earlier United Nations Development Programme (UNDP) project to develop the Library, only a few books have been acquired. This project provided an experienced library assistant for two years. Basic materials such as stationery and office supplies are lacking. One reason for the comparative neglect of the Library and Archive may be a lack of clearly defined lines of responsibility at the managerial level.

The Library has no links with the Library of the Ministry of Public Works and Housing (MPOPH), which is said to be in an even worse situation.

The draft terms of reference for the Central Support Project proposed in the *Provincial Towns Water Sector Study* refer to the use of a technical library for the project, although no specific provision is made for the development of such a library. It is not clear whether or not this refers to the existing main library of the DNA.

The DNA Informatics Centre

One of the official functions of DEPI is to prepare, propose and supervise development plans for computer systems to be used by DNA. One section of DEPI is the Informatics Centre, the main functions of which are now to maintain the DNA computers, instal standard applications packages, and provide training in computer use for DNA and MOPH staff and others (including personnel from enterprises and other organizations). There is a small production unit in the Centre which produces computer manuals to support those who need assistance.

Originally, all DNA databases and databanks were maintained by the Centre, with some being duplicated elsewhere for security reasons. Now hydrometric data are being processed in the respective sections using personal computers, and the Informatics Centre is mainly responsible for providing support and helping to solve hardware problems. The Centre used to do some programming, for example in the development of a program for rainfall records, but this has now been stopped.

The lack of up-to-date versions of applications and virus protection software is a serious problem. When such software is needed, the DNA has to make contracts with external firms due to the lack of capacity in the Centre. The Centre staff have difficulty in keeping up-to-date with new developments in the computer field. The Centre's budget depends heavily on donations. There was at one time a Unesco project supporting the Centre, but this has come to an end.

INFORMATION MANAGEMENT IN DAS

The Department of Water and Sanitation (DAS) has its own technical archive of approximately 1,100 documents relating to its own activities. These are housed in six steel storage cabinets in a very small room near the entrance to the Department, in very cramped conditions and with no facilities for consulting the documents.

The collection includes correspondence, documents relating to international cooperation activities, such as requests for funding or consulting services, and technical reports. Copies of these documents are not sent to the main DNA Technical Archive, but key documents such as contracts are kept at the central level. Records of the contents of the DAS archive are kept in book form; the archive is not computerized, and there is thus no possibility of retrieving information rapidly.

The archive is organized by secretarial staff with no formal training in documentation or information management. It is used by DAS staff and some external users, such as consulting firms, who have connections with DAS. In the DAS Peri-Urban Water Supply Programme (PAABP), the staff noted that a lack of monitoring was a constraint on the effectiveness of the programme; they know, for example, how many sources have been constructed in Maputo, but not how many work.

The *Provincial Towns Water Sector Study* includes detailed terms of reference for a Project Management System for DAS and a DAS Strengthening Project, both of which include various provisions for the development of information and filing systems, as well as a proposal for the eventual integration of the Project Management System into an overall management information system (MIS). The aim of these proposals is to create an environment which will allow the management of DAS to programme or take decisions based on regular, timely, complete and reliable information. The planning of the system is to be based on a study of information needs and existing information flows, and the system should generate useful information, not only for the DNA, but also for outside organizations, using standard project management software.

The proposals for a Project Management System state that the

DAS filing system must be assessed and adjusted to allow easy access to related information e.g. project documents, credit agreements, contracts, etc.

The expected outputs of the DAS Strengthening Project include:

- an operational management information system (MIS), including the Project Management System
- an effective physical filing system
- a clear system of communication within DAS
- regular communication with water companies, etc.

The activities to be undertaken within this project include:

- a review of the Project Management System (PMS)
- assessment of additional information requirements

- a review of the system and procedures for internal and external communication and information exchange
- the development of the PMS into an MIS
- the design, development and testing of the MIS
- expanding the PMS manuals to cover the MIS
- on-the-job training
- a review of the physical filing systems and file information requirements, including printed MIS information.

The project proposal provides for the recruitment of an Institutional Development Expert with a proven record of working with MIS for a period of 12 man-months, and a local MIS expert, also for 12 man-months, to work partly on this project and partly on the proposed Central Support Project. Assessing the likely training demand resulting from its proposals, the study notes that, for strengthening the DAS, senior management will need training in using MIS for policy and strategy formulation.

INFORMATION MANAGEMENT IN DRH

The following responsibilities of the Department of Water Resources (DRH) have implications for information management:

- create and maintain data observation and processing services for the quality and quantity of surface and ground water, and sediment transport
- organize and process hydrological and hydrogeological data and proceed to register water resources, maintaining the archives and registers up-to-date
- organize data for the elaboration of development programmes for hydrographic basins and hydrological year books
- promote the creation and ensure the operation of special networks for hydrological prevention, with emphasis on flood warning systems
- promote research on the hydrological and hydrogeological characteristics of the country.

The Hydrology Section of the DRH is responsible for geohydrological studies and for the collection of hydrological and hydrogeological data and its analysis. It maintains various paper archives and electronic databanks, including an archive of rainfall and river data and groundwater databank on 3,500 drilled wells from the GEOMOC archive. Existing data on 1,800 shallow dug wells and 800 small dams have not yet been included in this databank.

The archives also lack data on privately drilled wells from the colonial period. Several water basin maps have been digitized and the groundwater database has been linked to a Geographic Information System (GIS) for geographical output of borehole data. Hydrological studies are carried out in such areas as salt intrusion and rainfall measurements for rainwater harvesting.

Most of the hydrological data are said to be of good quality, with long series of data up to independence. There are geological maps covering the whole country, and a hydrogeological map (scale 1:1,000,000) published in 1992 which also covers the whole country.

The importance of the groundwater databank is shown by the frequent requests received from organizations working in the field of water supply through groundwater. The paper archive of rainfall and river data is also said to function reasonably well. Although the data in the paper archive and the databanks are of high value, and would be difficult and expensive, if not impossible, to replace, the archive is not fireproofed and no security copies of the databanks are maintained in other locations to prevent total loss of the data in case of disaster.

INFORMATION MANAGEMENT IN DAP

The main responsibilities of the Department of Administration and Personnel (DAP) in the DNA relating to information management are to direct and ensure the provision of typing and filing services, and to organize and propose plans for professional training.

INFORMATION MANAGEMENT IN PRONAR

Although the official role of the National Rural Water Programme (PRONAR) in respect of rural water supply is clearly defined, it cannot be properly carried out. Many rural water projects are started without PRONAR's knowledge. There is a lack of stronger regulatory instruments and a need to sensitize NGOs working in the provinces to the need to cooperate with PRONAR. PRONAR has about 110 animators working in the provinces, but more are needed. Re-training courses for animators in the provinces are given with support from UNICEF, which includes the updating of training materials. These materials are mainly pictorial, with training guidance in Portuguese for the animators. PRONAR has direct links with the DPOPH in each province for data collection and planning.

Information management is regarded as a serious problem in PRONAR. The lack of information is seen as a major constraint on the programme. Mechanisms for information transfer from the centre to the provinces and vice versa are not satisfactory; for example, PRONAR is said to have collected useful documents from Guinea Bissau during a visit in 1993, but not to have done anything to disseminate the information to the provinces. The organization has problems with office filing and correspondence management due to lack of personnel and effective systems. It has no library, but maintains an archive of technical information including drawings collections and all construction documents on small urban piped water supply systems from the colonial period at PRONAR. The existence of this archive is not widely known. The importance of preserving such useful information is recognized, but an appropriate physical location is needed; the existing rented premises are not at all suitable.

INFORMATION MANAGEMENT IN CFPAS

The Professional Training Centre for Water and Sanitation (CFPAS) has a good library with ample space and furniture for readers and books. The accessions register records that the library has 561 different titles in stock, but many of these are held in multiple copies as textbooks for classroom use. Many titles are translations from other languages. The total number of volumes in stock is not known. One problem which the staff of the CFPAS face is that of standardization of technical terminology and usage in Portuguese. The library has three staff, who have received some training in documentation techniques. The Centre publishes a bi-annual journal, *Água*, which is sent to all Directors and Heads of Departments in the DNA, and to all ex-students. This journal (like other activities of the CFPAS) is being supported by the Swiss Development Cooperation (SDC).

CONCLUSION

A considerable amount of effort is already being put into information management activities in the DNA, mainly in the areas of data management and management information systems. These aspects also receive a lot of attention in a number of new development projects involving the DNA. By contrast, the provision of specialized documentary information (the main concern of this report) and Information, Education and Communication activities have received less attention and are in great need of investment if they are to play their proper role in the development of the sector. The proliferation of projects and proposals with implications for information management indicates a clear need for better coordination of these activities if wasteful duplication of effort is to be avoided.

CHAPTER 4

INFORMATION MANAGEMENT IN OTHER INSTITUTIONS

INTRODUCTION

At the national level, as indicated in Chapter 3, the mission was mainly concerned with information management within the National Water Directorate (DNA) and its associated institutions and programmes. However, no institution can operate in complete isolation, particularly where information management is concerned. In order to obtain a clearer understanding of the context within which the DNA has to operate, the mission therefore attempted to find out about the information management situation in other sector institutions at the national and regional levels. The results are presented in this chapter, which makes no claim to be comprehensive or exhaustive in this respect.

MINISTRY OF HEALTH

The Ministry of Health's network of water analysis laboratories is said to be the most reliable source of information on water quality in Mozambique. It also maintains epidemiological databanks, including the results of studies of the distribution of diarrhoeal and other diseases related to water quality and the management of solid wastes, for areas of risk. Surveys of the existing situation are carried out in the affected areas and the results are passed to the Peri-urban Water Supply Programme (PAABP). A study in the suburbs of Maputo, for example, showed that, while there were in theory three water sources to serve 9,000 population, only one of them was functioning. A similar study is to be done in Nampula. The existing information on such studies has not yet been systematized; the Department of Environmental Health is trying to do this.

The Ministry is involved in community participation and the dissemination of information to communities through local 'medical agents' (*agentes de medicina*) in rural areas. The community agents have basic level education, while preventive medicine technicians, who work in the Provincial Directorates of Health, have middle level education. Medical agents are trained in the implementation of programmes in preventive health. Regional training courses for medical agents are held every two years, with external support from agencies such as the World Health Organization (WHO).

The Department of Environmental Health has a library, but due to a recent move to new premises, it is not well organized at present. Two thirds of the library materials are in English. There is also a general library for the Ministry of Health, which is said to be better organized. The national focal point for health information is located in the Documentation Centre of the Department of Training, Documentation and Publications of the National Institute of Health, which has a collection of more than 7,700 books, 20,200 pamphlets and 98 environmental periodicals. The Centre has a staff of five and has received support from the Swedish Agency for Research Cooperation with Developing Countries (SAREC) and the International Development Research Centre (IDRC) of Canada.

MINISTRY OF AGRICULTURE AND FISHERIES

The Documentation and Information Centre of the Agrarian Sector (Centro de Documentação e Informação do Sector Agrário: CDA) of the Ministry of Agriculture and Fisheries (MAP) is the focal point of the Documentation and Information System of the Agrarian Sector (Sistema de Documentação e Informação do Sector Agrário: SDISA). This is an automated information system which aims to:

- provide information on the documentation and information available in Mozambique and at the global level regarding the agrarian sector
- facilitate access to this information and documentation by decision-makers, technicians, teachers, students, consultants, etc. who work in the agrarian sector in Mozambique, so as to meet their specific needs for information.

The SDISA network includes the documentation centres, libraries, technical archives, documentation groups, etc, linked to MAP. One of these, the Documentation Centre of the State Secretariat of Agricultural Hydraulics (SEHA), is reported to have some 2,500 books, including technical works on pumps, etc., and ten environmental periodicals.

MINISTRY FOR THE COORDINATION OF ENVIRONMENTAL AFFAIRS

One of the duties of the Ministry for the Coordination of Environmental Affairs (MCMA) is to systematically collect existing knowledge about national ecosystems. Another is to ensure that environmental monitoring systems are established in the country. A Geographic Information System (GIS) has been in use since last year.

The Ministry has a computerized information system and is a member of the international INFOTERRA information network of the United Nations Environment Programme, with which it has regular contacts. The nation focal point for INFOTERRA is separate from the Ministry's library. The person in charge of the focal point was trained by INFOTERRA to establish a computerized information unit. Information received through INFOTERRA, which is all in English, is copied and distributed to researchers and others working in the Ministry. The Ministry's library is open to outsiders. The library and focal point are part of the Department of Environmental Education, which is responsible for the dissemination of information to the public and for sensitization.

The Ministry publishes a fortnightly periodical, *Nosso Ambiente*, which is distributed to organizations, ministries, enterprises and individuals. It organizes seminars and workshops for people working in development projects, producing support materials, guidelines etc., model terms of reference for projects (awareness raising), and a manual on carrying out environmental studies.

The Ministry is conscious of the need for compatibility of information systems in the country. It is in process of establishing databanks, e.g. on biodiversity, which include the results of various studies (including some on water supply and sanitation). Ministry staff need information on the sanitation situation in the city of Maputo, on drainage, and on other

aspects of the environmental situation in the country. Information received must be compatible with the GIS. There is a big need for information on the existing environmental situation in Mozambique - it is only available in operational organizations such as the municipalities. Information is needed for defining policies.

EDUARDO MONDLANE UNIVERSITY

Faculty of Engineering Library

The Library of the Faculty of Engineering is one of fifteen semi-autonomous faculty libraries in the Eduardo Mondlane University (UEM) which are coordinated and supported by the central Documentation Services Directorate (Direcção dos Serviços de Documentação: DSD) of the university (see below). It has a staff of six. The library clerk in charge received a 6-months initial training programme followed by some short courses.

The library has a collection of some 25,500 volumes on aspects of engineering, and receives 1,000 current periodicals. It serves the four departments in the Faculty. Each department has one staff representative connected with library; they do the initial classification of new books, and the library then adds the classification numbers. The library is classified by the Universal Decimal Classification (UDC) and catalogued by the *Anglo-American Cataloguing Rules, 2nd edition* (AACR2). It has a card catalogue with author, title and classified sequences. A computer was recently supplied to the library under a programme of assistance from the Netherlands Organization for International Cooperation in Higher Education (NUFFIC), but has not yet been used for cataloguing; much preparatory work needs to be done before the existing records can be computerized.

There are 95 seats in the reading room, which was recently restored with financial support from NUFFIC. The collection is on closed access, with documents shelved by broad subjects and registration number. The library is open for eleven hours a day. It provides lending services to students, staff and external users, and issues a list of new acquisitions (books and periodicals). Problems faced by the library include delays and demurrage charges involved in clearing shipments of books through customs, and a lack of interlibrary cooperation, even with the library of the Mozambique Engineering Laboratories next door, which contains 17,500 books and has a staff of four.

Documentation Services Directorate

The Documentation Services Directorate (DSD) of the UEM coordinates the work of the fifteen faculty libraries, for which it provides a centralized acquisitions service and maintains a union catalogue. The Director and one of her assistants are at present the only professionally qualified librarians in the UEM library system; however, three staff are presently attending university degree courses in Brazil, and two in Botswana. The latter take a preliminary English course before going to Botswana.

Three of the faculty libraries, for Agronomy, Law and Economics, are already automated. The Agronomy Library has a Compact Disc-Read Only Memory (CD-ROM) installation (computer, CD-ROM drive and a number of databases on CD-ROM) supplied under a joint programme of the Commonwealth Agricultural Bureaux International (CABI), the Technical

Centre for Agricultural and Rural Cooperation (CTA) and the Royal Tropical Institute (KIT) in Amsterdam. The Library now needs USD 10,000 to update the databases. The DSD plans to instal a CD-ROM workstation during the next few months.

The UEM depends on donors for some 80 percent of its total library budget. It is participating in some projects of the American Association for the Advancement of Science (AAAS) designed to support and improve library automation in African countries.

NATIONAL LOW-COST SANITATION PROGRAMME

The National Low-Cost Sanitation Programme (PNSBC) has no library, and the staff face difficulties in knowing what is happening in other countries - especially other Portuguese-speaking countries. They also need information on technical aspects, techniques of community participation, and management techniques for both middle level and project managers. Also, although the programme has funds for many short term consultancies, the staff have difficulty in identifying suitable consultants. There is a system for monitoring the programme's achievements every two months, using cards. An internal evaluation is done every year.

The PNSBC has a special section dealing with community participation which trains animators for community education. There are animators in sixteen of the nineteen production units. There is one medium-level course at CFPAS, developed by the programme and adapted by CFPAS. Efforts to educate communities only began in the last two years - they now include the use of street theatre in nine cities and in rural areas in Cabo Delgado and Tete. In one performance observed in Maputo, the outline of the play was prepared by staff of PNSBC, with the actors improvising within this framework.

As in many other sector institutions and programmes, in the PNSBC there is a lack of information on how to deal with the needs and possibilities of working with women as well as men, how to involve women in projects, and so on.

GEOMOC

The State Drilling Company, GEOMOC, inherited the archives of the Water Department of the former Division of Geology and Mines. However, these were never properly organized; data on boreholes drilled by the Water Department are inaccurate, more than 50 percent of the well logs are incomplete, and they do not cover the whole of Mozambique. There is no archive of formation samples. Retrieval of data from these archives is still very difficult despite attempts to update the data. Data on drilled wells from the GEOMOC archive are now held in a databank at the Hydrology Section of DRH (see Chapter 3).

INDUSTRIAL INSTITUTE OF MAPUTO

The Industrial Institute of Maputo (IIM) has a general library covering all subjects taught at the Institute, while the Department of Hydraulics and Construction maintains a small separate collection of some 500 copies of 29 different titles dealing specifically with hydraulics. Books for both collections have been obtained with the assistance of the Swiss Development

Cooperation (SDC). The staff find that Brazilian books are more practical and more attractively produced than those from Portugal.

Due to the lack of suitable material in Portuguese, lecturers in the Department are developing manuals which aim to bring together relevant information on the subjects taught. Five such manuals have been completed, two are at the proof stage, one in manuscript and three still to be written. The manuals are printed at the Ministry of Health Printing Centre and sold to students for MZM 10,000 (half the cost of production).

HISTORICAL ARCHIVE OF MOZAMBIQUE

The Historical Archive of Mozambique (AHM), which is administratively attached to the UEM, is, in fact, the national archive, and is a major source of all types of documentary information on most aspects of Mozambique. It occupies 50 rooms in four buildings in the centre of Maputo and will soon occupy another storage building.

The AHM has legal deposit privileges which enable it to receive copies of all Mozambican publications, and there are also regulations requiring government departments to deposit their archives with the AHM. Valuable material relating to Mozambique (including documents on public works), which is held in archives in Portugal, has been microfilmed by the AHM. A programme for collecting materials from the provinces, including documents from libraries of the colonial period, has been very successful. For the present, the provincial archives will act as repositories for district archives. Recently, the AHM has created 'transitional' archives of studies and reports relating to transitory activities. The AHM has a good library, containing more than 14,500 books, 1,500 periodicals, 1,500 maps, 50,000 photographs and postcards and 500 posters. There is also a sound archive. The collections are said to be very well used. The AHM has not been very active in collecting material on science and technology, due to lack of resources.

The AHM has been very active in providing and promoting training in archives and records management, documentation and library science. The success of the AHM in developing its programmes and building its collections is thought to be due, at least in part, to the maintenance of good relations and contacts with ministers. The institution has also received strong support from SAREC for many years.

DECENTRALIZATION AND INFORMATION MANAGEMENT

An important aspect of decentralization is how to organize documentary information in support of it. Mechanisms for information transfer from the centre to the provinces and vice versa are not satisfactory. There is a need to create a better flow of information between the provincial and the central levels. The lines of administrative subordination are clear; what is lacking is capacity.

Regional Developments

The terms of reference for a Regional Support Project in Nampula, Beira and Maputo, included in the *Provincial Towns Water Sector Study*, propose that these three regional support centres should be involved in the preparation and implementation of water campaigns.

According to the draft project document for the *Water Resources Assessment and Planning* (WRAP) project, the new Regional Water Administrations (ARAs) are to be established through the restructuring of the Hydrometric Sectors and participation in the rehabilitation of the hydrometric network. They will initially concentrate on hydrometry, borehole supervision and the collection of borehole data. In principle, there are eleven Hydrometric Sectors, which operate within the Departments of Water and Sanitation of the Provincial Directorates of Public Works and Housing (DPOPHs); however, the hydrometric sectors lack priority and proper funding. The proposed WRAP project provides for the re-establishment of three such sectors.

Regional Water Administration - South

Major responsibilities of the Regional Water Administration - South (ARA-Sul) in relation to information management include:

- water resources assessment, including hydrometric services, hydrological studies and computerized databases
- water management, including involvement of users, dissemination of information to users, registry of water demands and uses
- collecting and maintaining an updated hydrological database required to manage river basins through four basin management units which perform operational duties like hydrological measurements.

The aims of the ARA-Sul project include the development of:

- a strategic hydrometeorological and water quality network for all river basins under ARA-Sul, especially regarding water quality on international rivers, with a protocol for transferring data to the DNA
- water resources databases for the ARA-Sul basins, including data on levels, discharges and water quality parameters, rainfall and evaporation, borehole data, etc., developed in coordination and compatible with national databases at the DNA
- a reliable database on water use and water demand, to create a historical record
- the capacity to provide DNA with the information needed for it to adopt a stronger negotiating position on shared river basins, including processed data on availability in recent years, past water demands and effective water use, development projects in basin, etc.
- computer models for reservoirs
- efficient information communication between DNA and ARA-Sul; ARA-Sul will get information from DNA on groundwater, reports and

borehole data, including data from some paper archives, while ARA-Sul staff will be trained to collect geohydrological data and will cooperate with DNA in establishing a small groundwater maintenance network

- a regular system of providing relevant information, especially regarding water availability to water users
- a Regional Registry of Water Rights Databank (Cadastro Regional de Agua) providing information on new licences and concessions, etc., and designed in coordination with DNA so that data may easily be transferred to a national databank.

There is at present no systematic dissemination of information to users (e.g. water stored in reservoirs, forecasts of flows). In future, the dissemination of information to water users will be done primarily through the establishment of Basin Committees, which will receive regular information on water development perspectives in upstream countries.

One of the tasks of ARA-Sul is to promote community participation in the conservation and development of water resources. Its activities in respect of water management are meant to include the involvement of users, but there is a lack of adequate institutional relationships with users and a tendency to focus mainly on major users, leaving out small farmers because they are usually not organized. The lack of suitable mechanisms for water users to participate in management has been identified as one of the obstacles to the process of structuring ARA-Sul and decentralizing the DNA through this and other ARAs.

Essential skills to be developed under a proposed training programme for ARA-Sul include hydrological and water resources analysis and assessment and communication and negotiation. Proposals for developing management skills in ARA-Sul point out that

exposure to other management arrangements in different countries and cultural settings can be enlightening and inspiring

- which has implications for the provision of adequate specialized library and documentation services to enable ARA-Sul staff to find out what is being done elsewhere.

Provincial Water Companies

The Central Support Project put forward in the *Provincial Towns Water Sector Study* includes proposals for the development and introduction of MIS for water companies. The expected outputs include a well organized channel of communication between DNA and the water companies, facilitating the use of the project's technical library and easy access to training materials from the CFPAS. The activities to be undertaken will include supervising the operation and maintenance of MIS for water companies and the compilation of MIS data.

MIS are required both for the management of projects and for monitoring the performance of water enterprises, providing detailed data on the water company and its supply systems. Staff in water enterprises (an estimated 77 trainees) will therefore also need training in MIS.

The development of MIS for water enterprises is expected to require 39 man-months of input and will include:

- increased awareness of company management on MIS
- analysis of information needs and review of existing information flow
- systems analysis and design
- development of manuals
- design and implementation of training courses
- procurement and installation of equipment and materials
- systems installation and start-up.

CONCLUSION

There are many gaps in information provision for the water sector in Mozambique, and many problems remain to be solved. However, some institutions in related fields have been able to establish operational information systems, services and even networks which offer possible models for the water sector. The DNA and other sector institutions could benefit by cooperating with these other institutions in order to make the best possible use of the information and expertise already available in Mozambique.

CHAPTER 5

INFORMATION MANAGEMENT IN NAMPULA PROVINCE

INTRODUCTION

The terms of reference for the mission required it to present, as part of its results, a pilot approach or proposal to introduce or test information and documentation services for the water sector in Mozambique,

probably linked to the Nampula Province Rural Water Supply project.

The programme for the mission accordingly included a short visit to Nampula to investigate this possibility. It was found that the implementation of this project had been seriously delayed, for a variety of reasons. The specialist staff had not yet been recruited and most of the project materials had not yet been delivered. It seemed unlikely that the situation would improve rapidly enough to make it possible to develop a pilot information and documentation project within the framework of the Rural Water Supply project. The mission therefore visited other institutions in Nampula in an attempt to identify a suitable location for such a pilot project.

PROVINCIAL DIRECTORATE OF PUBLIC WORKS AND HOUSING

In general, the Provincial Directorates of Public Works and Housing (DPOPHs) should be the main sources of information on the situation of the water sector in their areas, but they tend to be very weak in this respect. Although they are, in principle, responsible for hydrometry in their areas, they often lack data on the numbers of functioning water sources and coverage, and there is a general need for mechanisms to update information and obtain feedback from people in the field.

In Nampula, there is no library or documentation centre serving the DPOPH as a whole, but the Department of Water and Sanitation (DAS) has a small collection of technical books and a technical archive, neither of which is systematically organized. Provision for the purchase of technical books and journals is included in the budget plan for the second half of 1995.

The Director and senior managers of the DPOPH experience problems in obtaining information from the districts, from other provinces and from other countries. These problems affect managers in all areas covered by the Directorate, but water and sanitation is considered to be the poorest in terms of information. The problems faced during a recent survey of water sources in the province by the SANAGUA consulting firm exemplify the difficulties of collecting, processing and disseminating reliable data and information from the field in the present conditions in Mozambique.

The lack of suitable human resources to carry out the SANAGUA survey was a key problem. The collection of data was carried out mainly by basic level technicians with little experience

in this field. Data on the population to be served were to be collected by direct local survey. This proved in practice to be of limited reliability; apart from the fact that records were practically non-existent, those responsible were not in a condition to give reliable information. In many localities, there was great difficulty in obtaining the information required, and sometimes it was impossible to obtain it. Systematic and credible data on the population already served were therefore not available. One interviewee said that most of the data had been collected from records in district offices, not from field visits.

The survey was also intended to provide data on water quality by collecting water samples in the field and sending them for analysis by the Nampula Provincial Water Laboratory of the Ministry of Health. However, the problems encountered in transporting water samples from the field to the laboratory meant that bacteriological analyses, which had to be done within 24 hours after the samples were collected, could not be carried out because the samples did not reach the laboratory in time. It was also found that many water sources were sealed, while others were dry or inoperative.

Within these limitations, the SANAGUA database provides information on such topics as the numbers of wells, boreholes and other sources in different locations, their general state of conservation, and the quality of the water provided, together with estimates of the cost of repair or construction in each case. The master database is maintained on a microcomputer in the DAS. In addition, there is a physical archive of record cards, completed in the field, with other documents attached. The system is maintained by a hydrometrist. A copy of the database is held at the Provincial Rural Water Supply Workshop (EPAR), but updating can only be done on the master file.

Despite some doubts about the reliability of the data, the SANAGUA database is considered to provide a useful general overview of the existing water sources in the province. However, there is a lack of human resources to analyze the data properly and take appropriate action. It has been suggested that seminars should be organized to present the results of the survey to a wider audience. There is also felt to be a need for a mechanism to update the information and involve people in the field by providing them with feedback on the results of the survey and the application of these results.

UNICEF is currently working to make the database familiar and accessible to DAS staff as well as finding a way to keep the database up-to-date. One of the tasks of a UNICEF water adviser working in Nampula is to provide on-the-job training in this area.

PROVINCIAL RURAL WATER WORKSHOP

The Provincial Rural Water Workshop (EPAR) in Nampula has no library or documentation centre. Despite its limitations, the data in the SANAGUA database, a copy of which is held at EPAR, are considered very useful and are much used, mainly by the staff of the Community Education Programme (PEC) and the Production Section.

Discussion of information management problems at EPAR Nampula focused mainly on the needs of PEC staff, who complained that they receive very little documentary information from PRONAR - usually only when surplus copies are available. The flow of information to the provinces, particularly information about community participation, is said to be

declining. In the past, regular supplies of posters and leaflets for use in community mobilization were received from PRONAR, but nothing had been received for some time until just before the mission arrived, when several sets of coloured pictures with questions on the reverse, for use by animators, were received. These were financed by UNICEF.

The effectiveness of PEC is severely constrained by the lack of communication and training materials. There are one or two technical manuals produced in other parts of Mozambique, but no facilities available locally for producing materials, such as posters, of local relevance. Radio messages are transmitted on a programme for the rural areas called Radio Rural. EPAR used to have a space in the programme for its own messages but this is now interrupted.

The lack of properly skilled animators in most of the districts is a major constraint on the effectiveness of PEC. In addition, the animators are said to lack power and proper support. The animators only work in districts where the EPAR Production Section plans to undertake construction. The process of mobilization of the population in a community begins before construction. A community meeting is called to discuss the project, select the location of the water source and nominate two groups of people; one to constitute a water point committee and another, of four people, to be trained as mechanics. The mechanic teams do not receive any income. The community groups are trained locally by the animators; sometimes several groups from neighbouring villages are trained at the same time. Construction begins after two or three community meetings.

The régulos are in a position to know how best to mobilize their own communities, and the organizers of PEC in Nampula Province are planning to organize seminars with the régulos to exchange ideas on how to do this. However, the lack of transport specifically for PEC activities is a serious problem; often the animators are unable to make visits according to the schedule because of lack of transport. Those living away from the PEC headquarters in Nampula often have to walk to the villages where they work, so can only visit communities near their homes. Those who are able to stay away overnight often lack proper accommodation, subsistence allowances and equipment to carry out their work properly.

The animators are each able to attend three or four preparatory meetings a month. They try to visit each newly-constructed source after 90 days. Their role is changing, in that they are now expected to instal the pumps and supervise their maintenance, as well mobilizing the communities. Most of the animators are women. The animators sometimes give lectures on hygiene in schools, but have no suitable teaching materials. They used to have pamphlets and similar materials to leave in the schools, but do not have them any more.

The only local source of relevant documentation on community participation is the Ministry of Health. Information is also disseminated by this Ministry through posters. There were good contacts with the health sector in the past, but these have declined in recent times. Manuals and pamphlets on community education were formerly supplied by the Department of Health through PRONAR, but none have been received for 18 months. The Ministry of Health employs some basic health aides in areas without health centres, but they face similar problems to the PEC animators.

NAMPULA WATER COMPANY

Staff of the Nampula Water Company (EAN) who were interviewed by the mission considered the present situation as regards information to be very bad. The company has no library or documentation centre, and management information is inadequate. Basic data on water production are unreliable, there is no information on leaks or the number of repairs done in past years, and while financial data exist, they are not in a form which is readily accessible. The tradition of centralization in Mozambique means that information and documents produced in Maputo are not available in the provinces - even including, for example, proposals for projects which will affect the provinces concerned.

Information is needed both for skills development at the middle level, in the form of publications, and for lower level technicians, in the form of training materials. There is a need for information about new products available on the market - senior staff recently had to make a trip to Malawi to visit a pipe factory merely in order to prepare specifications. There is also a need for information on alternative approaches or systems for the management of public standposts in peri-urban areas, including such aspects as fair water rates and cost recovery. In the inner cities, the need is more for management information related to such aspects as leakages and stock control.

Proposals in the *Provincial Towns Water Sector Study* for the development of MIS (see above) were considered by EAN staff to be over-ambitious, in that they failed to take account of the limited levels of ability of the existing staff. They felt that there was a need for a slower, step-by-step approach to the introduction of MIS in the provincial water companies, including training, seminars, etc. Without proper training, staff do not know what they need to know, nor where to find it. Information also gets lost when staff changes occur.

COMMUNITY INSTITUTIONAL SUPPORT FOR SMALL PIPED SUPPLIES PROJECT

This project has a small working collection of technical documents, but according to the project coordinator, a lot of the information needed by the project is still lacking. Project staff have identified a variety of information needs, including basic operation and maintenance data on frequency of pump breakdowns, availability of spare parts, etc., as well as information on health education, local communities, and the workings of the local administration. It is felt that too much emphasis is being placed, in current activities and projects, on hydrological data: this is undoubtedly useful, but meteorological data, especially on rainfall, are considered to be even more important for water supply.

The basic problem is said to be the physical control of documents and information. The proper storage of records is considered to be a problem in all government departments, while effective data collection needs constant motivation and attention. There is felt to be too much demand for data from above, without obvious need or usefulness; only local engineers can make use of many of these data. It is essential to give feedback to those who supply data so that they can see how it is being used.

There is a need for training in participatory techniques. The project has prepared its own training materials, using drawings prepared by a local designer, and employs its own team

of animators. The use of graphic training materials is essential, as half the participants on local courses for plumbers, etc. cannot read or write. The link with training activities is important for documentation services.

CONCLUSION

During its very brief visit to Nampula, the mission was only able to visit a small number of key institutions in the provincial capital, and was thus able to obtain only limited insight into the existing situation of information provision for the water sector in the province. It was clear, however, that even in these key institutions, information systems and services were quite inadequate to meet the needs of both managers and technical staff.

The increasing amount of sector activity taking place in Nampula lends added urgency to the need to provide adequate library and documentation services in the province in general, and in the capital in particular. This need seems to be generally recognized, both in national and provincial sector institutions and in donor agencies working in the province. It has been suggested that at least one documentation centre should be established, containing both technical documents such as project reports and general reference materials in Portuguese, English and French, together with international and national periodicals.

Three possible locations for such a sector documentation centre were suggested to the mission:

1. Water and Sanitation Department, Provincial Directorate of Public Works and Housing

The central role of the Department in planning and coordinating sector developments in the province led several interviewees to suggest that a provincial documentation centre should be located there. Although its existing collection of books and documents is not properly organized, it houses the SANAGUA database and will soon be strengthened with the recruitment of additional senior and middle-level staff under the SDC project mentioned above.

2. Nampula Water Company

This was also suggested as a possible location for a water sector documentation centre for Nampula. It already has reliable storekeeping systems, and acts as a focal point for other water companies in the province, whose staff frequently visit the EAN in search of advice and information. The Director of the EAN enthusiastically supports the idea of a pilot project to establish such a centre, recognizing the need an organized collection of documents under the control of an appropriately trained person, as well as for the systematic organization of technical data. The main obstacle to locating a library or documentation at the EAN is the lack of space.

3. Support Unit Region North

The SURN project has also been suggested as a possible mechanism for providing support to the development of library and documentation services in the region, perhaps including the recruitment of a librarian. However, the lack of space in the premises allocated for the SURN offices again creates a serious obstacle. One solution might be to locate a library or documentation centre elsewhere in the town, possibly in a rented house. Furniture for the centre could be constructed locally, and it was suggested that the head of the Nampula Public Library could provide support, including training for documentation staff.

In principle, and subject to limitations of space and resources, there is no reason why all three of these institutions should not establish their own documentation centres. However, if limited resources are to be used to the full, and wasteful duplication of effort avoided, it will be necessary to identify one such centre as the principal provincial documentation centre, responsible both for coordinating the development of other centres within the province, and for acting as a focal point for liaison with documentation and information services at the national level.

PART III

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 6

INTRODUCTION TO FINDINGS AND CONCLUSIONS

This part of the report aims to consolidate the main findings and conclusions of the mission and present recommendations based upon them. It is organized in accordance with the Terms of Reference of the mission, which, in summary, required it to:

1. produce an inventory of the main current sources of sector documentation and information, indicating what is readily available, where can it be found and how, and who are the users
2. provide a documentation and information needs assessment, primarily for the rural- and peri-urban water and sanitation sector
3. identify the key players in information and documentation dissemination and their respective roles
4. describe the typical conditions constraining the setting-up of the required information and documentation services
5. present a pilot project proposal for information and documentation services, including a preliminary cost estimate.

In accordance with the Terms of Reference for the mission, the conclusions and recommendations focus mainly on the provision of documentary information for the water and sanitation sector in Mozambique, giving special attention to the National Water Directorate (DNA) and, so far as the provinces are concerned, to Nampula Province. However, the urgent need for the effective coordination of development efforts in respect of all types of information provision is also addressed, and some general suggestions for improving information management in the sector as a whole are also included.

The findings and conclusions are based on the information received, either in documentary form or through comments by persons interviewed, during the visits to sector institutions in the country. They are presented in three chapters, as follows:

- Chapter 7. Sources of Documentation and Information
- Chapter 8. Documentation and Information Needs
- Chapter 9. Key Players and Constraints.

Recommendations based on the conclusions are presented in Chapter 10, while project proposals for the development of information and documentation services, both at the national levels and in Nampula Province, are presented in appendices.

CHAPTER 7

SOURCES OF DOCUMENTATION AND INFORMATION

INTRODUCTION

This chapter summarizes the main features of the main sources of documentation and information for the sector, described in more detail in Chapters 3, 4 and 5 above.

NATIONAL WATER DIRECTORATE

The responsibilities of the National Water Directorate (DNA) with regard to maintaining inventories of water resources and an information system for hydrological information are carried out by various departments and units within the DNA, as outlined below.

Department of Water Resources Management

The proposed new Department of Water Resources Management (DGRH) will be responsible for data, information and documentation on water resources. Proposals for creating this department include an 'information and general assistance section'. It is not clear if this has any connection with the existing DNA Library and Technical Archive.

Department of Studies, Planning and Investments

The Department of Studies, Planning and Investments (DEPI) is responsible for: implementing a water information system; developing computer systems; providing information on project finances; monitoring; and maintaining the inventory of hydraulic infrastructures, as well as the main Library and Technical Archive of the DNA. The Technical Archive contains 3,000 documents and has a computerized catalogue. Its main users are project engineers. The Library contains 2,800 publications with a basic card catalogue. It is used by DNA staff and university students.

Department of Water and Sanitation

The technical archive of the Department of Water and Sanitation (DAS) contains 1,100 documents which are recorded in a book register; there is no computerized catalogue. The archive is used by DAS staff and external users who have connections with DAS. The *Provincial Towns Water Sector Study* includes proposals for developing information and filing systems, including management information systems (MIS), within DAS.

Department of Water Resources

The Department of Water Resources (DRH) has wide-ranging responsibilities for hydrological and hydrogeological data on water resources. Its Hydrology Section maintains various archives and databanks, uses a Geographic Information System (GIS) and is involved in creating and maintaining geological and hydrogeological maps.

Department of Administration and Personnel

The Department of Administration and Personnel (DAP) is concerned mainly with the internal filing systems of the DNA.

National Rural Water Programme

The National Rural Water Programme (PRONAR) does not have a library. It maintains a technical archive of documents on small urban piped water supply systems. The existence of this archive is not widely known, so it is underused.

Professional Training Centre for Water and Sanitation

The Professional Training Centre for Water and Sanitation (CFPAS) has a good library with 561 titles in stock, many of which are translations. The number of volumes in stock is not known. The library is used by students and staff of the CFPAS.

MINISTRY OF HEALTH

The most reliable source of information on water quality in Mozambique is said to be the network of water analysis laboratories of the Ministry of Health. The Ministry also maintains epidemiological databanks. There are libraries in the Ministry itself and the Department of Environmental Health. The Documentation Centre of the Department of Training, Documentation and Publications of the National Institute of Health is the national focal point for health information.

MINISTRY OF AGRICULTURE AND FISHERIES

The Ministry of Agriculture and Fisheries (MAP) maintains the Information and Documentation Centre of the Agrarian Sector (CDA). This is the focal point of the Documentation and Information System of the Agrarian Sector (SDISA), which includes various documentation centres, libraries, etc., linked to the Ministry. The Documentation Centre of the State Secretariat of Agricultural Hydraulics (SEHA), which is a member of SDISA, has 2,500 books.

MINISTRY FOR THE COORDINATION OF ENVIRONMENTAL AFFAIRS

The Ministry for the Coordination of Environmental Affairs (MCMA) has a computerized information system and is the national focal point for the international INFOTERRA information network of the United Nations Environment Programme. It also has a library which is open to outsiders.

EDUARDO MONDLANE UNIVERSITY

The Library of the Faculty of Engineering at the Eduardo Mondlane University (UEM) has 25,500 books and receives 1,000 current periodicals. It provides services to students, staff and external users. The Documentation Services Directorate (DSD) of the UEM is not itself

a source of information for the water sector, but is potentially an important source of advice and expertise in library and information development.

OTHER INSTITUTIONS AT THE NATIONAL LEVEL

Other document collections of importance for the water and sanitation sector include the archives of the Water Department of the former Division of Geology and Mines, maintained by GEOMOC; the general library of the Industrial Institute of Maputo (IIM) and that of its Department of Hydraulics and Construction; and the Historical Archive of Mozambique (AHM). The latter (which also maintains a library and a sound archive as well as the main historical archive) is not only a major source of all types of documentary information on most aspects of Mozambique, but also another important source of advice and expertise on library and information development.

REGIONAL WATER ADMINISTRATIONS

The new Regional Water Administrations (ARAs) will participate in the rehabilitation of the hydrometric network, include the collection of borehole data. The one ARA to have been established so far, the Regional Water Administration - South (ARA-Sul) has various responsibilities in relation to information management, including the maintenance of computerized databases, the dissemination of information to water users, the maintenance of a registry of water demands and uses, and ensuring efficient information communication with the DNA.

NAMPULA PROVINCE

The only document collections identified by the mission in Nampula were the small collection of technical books and the technical archive of the Department of Water and Sanitation (DAS) of the Provincial Directorate of Public Works and Housing (DPOPH). The DAS also maintains the computerized SANAGUA database containing information on water sources in the province. Neither the Provincial Rural Water Workshop (EPAR) nor the Nampula Water Company (EAN) has a library or documentation centre. The Community Institutional Support for Small Piped Supplies project has a small working collection of technical documents, but a lot of the information needed by the project is still said to be lacking.

CONCLUSION

The findings with regard to sources of documentary information show that, while much remains to be done, particularly at the provincial level, and while some key institutions have no libraries or documentation centres at all, there are, nevertheless, some quite substantial collections of both local and foreign documents, some of which are well-organized and indexed and accessible to users from outside their parent institutions. There is thus a core of useful, organized and - in principle at least - accessible documentation in Mozambique which needs to be properly recorded, further strengthened and made more widely and more easily accessible to users.

CHAPTER 8

DOCUMENTATION AND INFORMATION NEEDS ASSESSMENT

INTRODUCTION

This review of documentation and information users and their needs is based on documentary sources and the results of interviews carried out during the mission. There was no time during the mission to carry out a more formal questionnaire survey of information needs, which would be an essential prerequisite to any more detailed planning for the development of documentary information services for the sector.

INFORMATION USERS

According to data provided by the Professional Training Centre for Water and Sanitation (CFPAS), there are currently about 4,700 workers employed in the main water sector institutions at national and provincial levels in Mozambique. A small proportion of these are illiterate, while the majority have received schooling only up to grade 9. It is considered that only sector workers who have attained grade 10 or above may be regarded as potential users of documentary information - i.e. be able and willing to obtain information through reading, rather than through other methods, such as participation in training courses.

The CFPAS data show that there are only 360 sector employees in the whole country with 10th or 11th grade education, or employed as Middle or Higher Level technicians (Nível Médio or Nível Superior). This group, which may be considered the main potential users of documentary information (other than students in technical colleges and the university) accounts for only 8 percent of all staff in the main sector institutions. While 33 percent of all sector workers are located in Maputo, 61 percent of the potential users are based there, and 83 percent of these are employed in only three institutions: the National Water Directorate (DNA), including CFPAS and the National Rural Water Programme (PRONAR); the Maputo Water Company; and HIDROMOC. The main concentrations of potential users of documentary information in the provinces are in Sofala (29 users, or 8 percent of the total) and Nampula (24 users or 7 percent).

The total number of potential users of documentary information in Mozambique is thus very limited, and they are concentrated mainly in Maputo. Nevertheless, although there are few such persons in the provinces, the range of their information needs may be as broad as that of the majority who are located in Maputo.

The information needs of the 92 percent of sector workers with education below 10th grade will need to be met by methods other than the direct supply of documents - e.g. through training. This implies a strong need for documentary support to training institutions and activities in Maputo and the provinces.

INFORMATION NEEDS

Comments by persons interviewed during the mission indicate a widespread need for better access to information among sector professionals. In PRONAR, for example, as noted above, the lack of information is considered to be a major constraint on the programme. A need for better information about the information sources which are already available, both within Mozambique and at the international level, was also expressed. There is a particular need for a general inventory of what already exists in Mozambique, including information in institutions in health and other fields related to the water sector. A lot of information is thought to be already available, but it is disorganized and its existence often unknown.

Interviewees expressed specific needs for more information on the general water and sanitation situation in Mozambique and for 'concrete information' on projects, for planning purposes. In the area of regulation and standardization, there is a need for information on legislation for the water sector, on safety standards for dams, and on standards for technical terminology and usage in Portuguese.

There is felt to be a great lack of technical documents about existing works or projects and infrastructure, including, for example, the technical designs for existing dams. There is a demand for current information and technical manuals at a relatively high level; what is most needed are technical manuals produced by people with much experience, not basic textbooks. Such manuals, e.g. on the construction of standposts, are particularly needed in the provinces, where the local administrations responsible for the management of services often do not have the required technical knowledge. There is a need to establish libraries and small technical documentation centres in the provinces, containing basic works of reference and national and international periodicals.

Several persons interviewed expressed a need for more information about the experiences of other countries, including other African countries - especially those upstream of Mozambique - other Portuguese-speaking countries in general, and other Portuguese-speaking African countries (PALOPs) in particular. A need for a basic bibliography for the sector in Portuguese was also identified. Important information and data on the Mozambican situation may exist in Portugal, and there is a need to find out what exists there and take steps to obtain copies.

Some idea of the breadth and depth of information requirements in the sector may be obtained from the following examples of specific information needs referred to by interviewees or in documents studied by the mission:

- acceptable inventory of water resources
- actual water uses of upstream countries
- aquifers in the sedimentary formations of the Karoo
- characteristics of small lakes
- communication and negotiation techniques
- community participation
- current and future industrial water demand
- demand management
- detailed information on national water resources as a whole

- drainage
- environmental impact assessments
- extent of use of shallow and tube wells
- financial and technical information required to maintain water company performance
- hydrological and hydrogeological data for Northern provincial towns
- hydrological data and hydraulic works relating to international rivers
- hydrology and water resources engineering
- hydrometeorological data for water resources planning
- information for defining policies
- information on the sanitary situation in Maputo
- macroeconomic appraisals
- new technologies of latrine construction in densely-populated peri-urban areas
- number of functioning water sources, coverage
- number of small dams
- planning and management skills
- silting process of main reservoirs
- surface water - groundwater relationship
- water quality and environmental quality
- water using activities
- willingness and affordability of water consumers to pay for water supply
- women's involvement in water supply and sanitation.

Specific types of document mentioned by interviewees and in the source documents included:

- bidding documents and specifications
- bills of quantities
- construction drawings
- contracts
- correspondence
- cost estimates
- design drawings
- equipment manuals
- installation designs and instructions for electrical equipment
- laboratory and soil test results
- material for awareness raising
- manuals
- plans
- supplies records
- surveys
- technical reports
- vehicle records
- water quality data.

CONCLUSION

While the numbers of potential users of documentary information in the water sector in Mozambique are quite small, the breadth and depth of their information needs is quite considerable. The numbers of potential users can also be expected to increase as measures to strengthen human resources and capacity in the sector begin to take effect. While most of the potential users at present are located in Maputo, the much smaller numbers working in the provinces have a similar range of information needs. One of the key problems to be faced in improving information provision in the sector as a whole will be how to meet the needs of provincial users efficiently, effectively and at reasonable cost.

CHAPTER 9

KEY PLAYERS AND CONSTRAINTS

INTRODUCTION

This chapter aims to identify the key players in information management in the water sector in Mozambique, and the constraints they have to face - and, if possible, overcome - in order to provide adequate information services to the sector.

KEY PLAYERS IN INFORMATION MANAGEMENT

In terms of the planning, organization and management of information systems and services for the sector, the National Water Directorate (DNA) is now, and seems likely to remain, the key player at the national level. It already has clearly-defined responsibilities for information management in the sector, and is the focus of a number of major projects designed, at least in part, to enhance that role. Any further proposals for the improvement of information management in the sector must necessarily aim to build on these strengths and aim to overcome existing weaknesses in the capacity of the DNA to perform its role satisfactorily.

Although the DNA is undoubtedly the key player in this field, it will not be able to achieve successful results in terms of improved information dissemination without the support and willing collaboration of other institutions such as the Eduardo Mondlane University (UEM), the Industrial Institute of Maputo (IIM) and the Historical Archive of Mozambique (AHM), as well as financial support and technical advice from donors.

At the regional and provincial levels, also, the DNA will need to collaborate closely with the Regional Water Administrations (ARAs), the various regional support units, the Provincial Directorates of Public Works and Housing (DPOPHs) and their Water and Sanitation Departments (DAS), the water companies, the Provincial Rural Water Workshops (EPARs) and their Community Education Programme (PEC) components, as well as the local branches of HIDROMOC and GEOMOC, in planning and implementing improvements in information provision.

If the situation in Nampula is at all typical of that in the provinces as a whole, however, none of these provincial level institutions can be said to be 'key players' in information management at present. In principle, the main responsibility for planning and coordinating information provision for the water sector in Nampula Province should rest with the DAS of the DPOPH Nampula; but although the DAS has a small collection of technical books and a small technical archive, and maintains the SANAGUA database on water sources in the province, it lacks the capacity, at present, either to develop these facilities for its own purposes, or to take the lead in promoting information development for the sector in Nampula. Another potential key player, the Nampula Water Company, is keen to develop documentation and information services but is even more lacking in capacity and facilities than the DAS.

The generally limited capacity in information management at all levels in Mozambique at the present time means that international agencies and bilateral donors will play an important role in promoting and supporting information development, both through direct support of information management projects as such, and through ensuring that appropriate information management components are included in general sector projects. The international agencies will include the United Nations Development Programme (UNDP), the World Bank and the United Nations Children's Fund (UNICEF), while the main bilateral donors are likely to be those represented on the Water Sector Group, namely: Denmark, Finland, France, Germany, the Netherlands, Switzerland and the European Union. UNICEF and the Swiss Development Cooperation (SDC) have both expressed interest in supporting the development of information and documentation services in the country, and SDC is already implementing a project for the translation of IRC publications into Portuguese. International NGOs such as include OXFAM, CONCERN and World Vision will also have a part to play.

The important role of institutions concerned with information management in general, rather than with the water and sanitation sector as such, must also be recognized. At the national level, as noted above, these will include the AHM and the Documentation Services Directorate (DSD) at UEM; at the international level, they may include such organizations as the Pan African Development Information System (PADIS) of the United Nations Economic Commission for Africa, among others.

CONSTRAINTS ON INFORMATION MANAGEMENT

In general, the major constraints affecting the establishment, operation and development of information services in the water and sanitation sector are similar to those affecting sector institutions in the country in general.

Perhaps the most important group of constraints, which has accordingly been given most attention below, are those related to human resources; namely, lack of adequate numbers of suitably-qualified staff, lack of training facilities and unsatisfactory conditions of service. Other important constraints are: lack of coordination in information provision; poor communication within and between sector institutions; inadequate physical facilities; inadequate finance; and lack of managerial support.

Other constraints which particularly affect the provision of documentary information include the language problem and general difficulties in organizing the effective dissemination of information in Mozambique.

Human Resources

While there is a large potential market in Mozambique for information professionals, there is at present an almost total lack of qualified information staff. In reviewing the human resources requirements for information management in the water and sanitation sector in Mozambique, separate consideration needs to be given to the somewhat different needs of staff working in the fields of:

- librarianship, documentation and information science
- management information systems (MIS)

- scientific and technical data management
- Information, Education and Communication.

There is also a need to consider the possible staffing requirements for the general management and coordination of these four areas of information activity.

Human resources for librarianship, documentation and information science

In the whole country, there are believed to be not more than ten or twelve persons with higher level qualifications in librarianship, documentation or information science (excluding persons trained in computer science). These are employed in the Historical Archive of Mozambique (AHM), the Documentation Services Directorate (DSD) at the Eduardo Mondlane University (UEM), the Ministry of Agriculture and Fisheries (MAP), and the British Council.

The total number of persons working in library and documentation units, either in Mozambique as a whole, or in the water and sanitation sector in particular, is not known. Most of those employed in such units have been trained only through short courses organized by local institutions such as the AHM and UEM, or foreign organizations like the British Council, Unesco and the Brazilian Cultural Centre.

The DNA has five persons working in its general Library and Technical Archive, and two in the Informatics Centre. The CFPAS Library has a staff of three. The DAS Technical Archive is staffed on a part-time basis by a secretary. Most of these staff have received a limited amount of training through short courses, though in some cases this training was undertaken several years ago.

A major obstacle to the recruitment of trained information staff is that those who are trained in this area are reluctant to accept low government salaries. In the DNA, although the library and archives staff provide technical support to various development projects, they are not usually considered as part of the project staff and so do not receive the same incentives as project staff.

Short courses in library and documentation are given from time to time by local librarians or visiting foreign experts. The AHM entered the field of training in 1983 by offering a course leading to a UEM Licentiate in History with specialization in librarianship and documentation. There were eleven licentiates from this programme. Some remained at the AHM, while others returned to their own institutions. The AHM subsequently began to offer short courses at basic and middle level in archives, librarianship and documentation, with the participation of a Brazilian expert. Later, courses in related areas, such as informatics, were added. The Law for the National Archives System, 1992, provides the basis for the activities of the AHM in respect of training in records management.

Despite the efforts of the AHM, the UEM and other organizations, training facilities in librarianship, documentation and information science in Mozambique are still very limited, and there is very little continuing education in this field. The short courses given by foreign experts are generally not adapted to local needs and promote the norms, methods and

techniques of their home countries, which are often different from each other. There is usually no follow-up to these courses.

A very small number of persons are currently pursuing academic courses in librarianship and information science at foreign universities, in Botswana, Brazil and the United Kingdom. Most of these are members of the staff of the UEM library system.

To meet the need for a permanent training facility for information and documentation in Mozambique, the AHM and UEM are joining forces to introduce a 3-year BA course in the Faculty of Letters at UEM, starting in the 1995-96 academic year. The first year will provide a general introduction to information science, after which students will specialize in either archives or librarianship. Ten students, out of a total of 200 applicants, have already been enrolled for the first year of this course. It is hoped to launch a similar course for the provinces at a later stage. This course is being developed specifically to counter the lack of recognition of qualifications in librarianship and documentation, especially at lower levels.

A basic cause of the lack of professionally-qualified information staff in most sector institutions is the lack of recognition, on the part of employers, of the fact that effective information management requires effective information managers with proper academic and professional qualifications in such fields as librarianship, documentation and information science. Staff with lower-level qualifications are also needed to perform many of the routine tasks in libraries and documentation centres, but they need direction and guidance from professional staff if they are to be fully effective.

Staff working in libraries and documentation units in the sector have hitherto had very limited access to education and training in librarianship, documentation and information science at any level, particularly within Mozambique. However, this situation may be expected to improve, at least so far as professional education is concerned, when the new BA course at the UEM begins.

One reason for the shortage of trained staff at any level in sector libraries and documentation units is the low salaries paid to government personnel. For many government officials, some compensation is provided in the form of financial and other incentives paid to those working on sector development projects. So far, at least in the DNA, such incentives do not appear to have been paid to library and documentation staff because they are not working within the framework of a specific project; but they provide information and documentation support to most projects, and it would seem reasonable for their contribution to be recognized through some form of incentive linked to the projects they support.

Human resources for management information systems

Several proposals for strengthening human resources in the area of management information systems (MIS) are contained in current development projects such as the *Provincial Towns Water Sector Study*. In addition to providing for the recruitment of various foreign and local experts to advise on the development of MIS in the sector, these proposals emphasize the need for training of both operating staff and users of these systems. There is a need for senior management to be trained in the use of MIS for policy and strategy formulation and for the staff of water enterprises and DAS to be trained in using MIS for performance

management. Staff from water enterprises will also need training in the application of new systems and procedures for record-keeping.

Human resources for scientific and technical data management

Despite its lack of staff with qualifications in information management as such, the DNA has, according to the WRAP project proposal, a considerable capacity to perform the tasks of hydrometry, data collection, data processing and data analysis. Nevertheless, the rehabilitation of the hydrometeorological network will require new programmes of capacity building and training or re-education. In ARA-Sul, for example, staff need to be trained to collect geohydrological data, the operation of national water resources databanks, data entry, quality control and the processing and management of information. Current development projects foresee the recruitment of various experts to advise and assist in these tasks.

Human resources for Information, Education and Communication

The general educational level of persons involved in contact with communities through the Community Education Programme (PEC) is not considered satisfactory. It is necessary to apply different strategies in different situations; for this, one needs training. The CFPAS has been organizing courses for animators since 1993/94, but they are still considered to be very technical. PRONAR organizes regional refresher courses for animators in the provinces. These are sometimes directed more at new animators, to compensate for a lack of such training at the centre. The regional courses are given with support from the United Nations Children's Fund (UNICEF), which includes the updating of training materials. These are mainly graphic materials, with training notes in Portuguese for the animators. Training of animators is also done by the National Low-Cost Sanitation Programme (PNSBC). There is one medium-level course at CFPAS, designed by PNSBC and adapted by CFPAS.

The Ministry of Health provides training for its community agents at the Regional Centre for Hygiene Development in Maputo, which also serves health personnel from the other PALOPs. There are also courses for the training of agents in the provinces, and some staff have attended short courses in Zimbabwe. The Institute of Agronomy also provides general training in community mobilization and animation techniques.

Coordination

Information management activities of all kinds in the water and sanitation sector in Mozambique at present are completely uncoordinated and largely unplanned. Such a limited amount of activity is taking place in this field at present that little overlap or duplication of effort is apparent. Nevertheless, the extremely limited resources - particularly human resources - available for information management make it essential to avoid unnecessary duplication wherever possible.

The risk of duplication of effort seems likely to increase if many of the existing proposals for improving the collection and management of hydrological data and the establishment of project management and management information systems, in various institutions and at various levels, are eventually implemented. Some of these proposals do include limited provision for the creation of coordinating mechanisms, such as the Information and General

Assistance Unit proposed under the Provincial Towns project, or for the appointment of expert advisers with some responsibilities for the planning and coordination of information systems. However, the proposals themselves often seem to overlap, giving rise to a danger that uncoordinated actions in the future will lead to further waste of scarce resources and fail to deliver information, at the right time and the right format, to those who need it most.

There is a clear and urgent need for the creation of an effective mechanism for promoting and coordinating information development plans, programmes and activities in the water and sanitation sector in Mozambique. Equally clearly, such a mechanism should be established within the DNA, as the lead agency in the sector at the national level.

Communication

Communication among the various sector agencies, particularly between the DNA and its departments on the one hand, and regional, provincial and local bodies (such as ARA-Sul, the water enterprises and NGOs) and the general public, on the other, is generally felt to be very weak. The Department of Water and Sanitation (DAS), for example, cannot maintain effective control of water enterprises because the required management information is often inaccurate, incomplete, too late, or even missing due to problems of long distance communication. The transition to decentralization means that the establishment of effective communication channels is an urgent necessity.

Physical Facilities

Most of the few existing library and documentation units in the sector suffer from unsuitable and inadequate physical facilities, including lack of space, furniture and appropriate information handling equipment. This problem is particularly acute in the Library and Technical Archive of the DNA, which should be one of the principal collections in the country.

Finance

A major constraint on the development of documentary information provision in the sector is the general lack of adequate financial provision to support library and documentation activities, whether within regular institutional budgets, through projects specifically designed to support such activities, or within the budgets of general sector development projects.

Managerial Support

Perhaps due to a general lack of awareness, among both decision-makers and potential users of information, of the importance and usefulness of information in the development of the water and sanitation sector, the top management in most sector institutions do not seem to have been successful, so far, in bringing information management fully into the mainstream activities of their institutions. Information units such as libraries, documentation centres and archives have low status and are often not located at the most appropriate and effective points in the organizational structures of their parent institutions. Library and documentation staff in the DNA Library and Technical Archive, for example, complain that, although the unit is

nominally part of the Department of Studies, Planning and Investments (DEPI), they do not receive adequate support from the top management of the Department.

Language

A basic obstacle to the more effective use of books, libraries and other information sources is the fact that the reading habit is generally not well-developed, even among university students. Those who do seek information from such sources often have to use a second language - usually English. Knowledge of English is spreading rapidly, particularly among the younger generation, and is probably more widespread in Mozambique than in other PALOPs, but for many potential information users language still remains a barrier, not only to the use of information sources, but also to effective participation in training courses and other sector activities in neighbouring countries.

There is a lack of suitable publications in Portuguese and a need for translations of existing documents at the international level. Consultants (including the present mission) are often required to submit their reports in English, and are rarely obliged to write reports in Portuguese. The number of foreign technicians, from many different linguistic backgrounds, who are working in Mozambique also gives rise to problems due to the lack of standardization of technical terminology. There is an urgent need for the standardization of terminology for the sector, both in Portuguese and between Portuguese and other languages.

Dissemination of Information

One of the key problems in ensuring the more effective use of information in the water and sanitation sector in Mozambique is how to disseminate to the rest of the country what is available in Maputo.

The dissemination of scientific and technical data is very weak. In the DNA, for example, although former proprietary attitudes towards the ownership of data are changing to the extent that the DNA sells data to other users who ask for it, there is still no active dissemination programme, nor are data fed back to the provinces which supplied the raw data in the first place. One of the main objectives of one new project in this field is to improve the dissemination of data.

Various means of dissemination of information are employed at present, including: the press; the publication of annual reviews; monthly, quarterly and annual reports; newsletters and periodicals, such as the bi-annual journal, *Agua*, published by the CFPAS, and the fortnightly *Nosso Ambiente*, issued by the Ministry for the Coordination of Environmental Affairs; distribution of photocopies, as done by the INFOTERRA focal point in the same Ministry; technical manuals, such as those developed at the Industrial Institute of Maputo (IIM); training materials and guidelines; hydrographic monographs; and radio broadcasts.

Current sector development projects demonstrate a wide-ranging concern for better dissemination of data and information within the country. The objectives of the Water Resources Assessment and Planning (WRAP) project, for example, include the publication and dissemination of information, establishing good public relations through publications, presentations, seminars for general awareness raising and promotion of the importance of

water for sustainable development, the economic value of scarce resources and the wise use of natural resources, including making the public aware of the importance of groundwater protection through an information campaign.

Proposals for the development of the Regional Water Administration - South (ARA-Sul) also note that, despite the fact that the dissemination of information to water users, especially regarding water availability, is meant to be one of the main lines of activity of the organization, it is not being done systematically. The proposals provide for Basin Committees to receive regular information on water development perspectives in upstream countries and to develop in ARA-Sul the capacity to provide the DNA with the information needed for a stronger negotiating position on shared river basins, as well as a protocol for transferring data on water quality in international rivers to the DNA. They also aim to promote efficient information communication between DNA and ARA-Sul, ensuring, for example, that ARA-Sul will get information from DNA on groundwater, including reports and borehole data, while ARA-Sul will convey to DNA information regarding new water licences and concessions, etc.

The Terms of Reference for the proposed Project Management System for the Department of Water and Sanitation (DAS) at DNA indicate that the system should generate useful information for outside organizations.

CONCLUSION

Access to information in the water and sanitation sector in Mozambique, particularly in the provinces, is extremely limited, and existing measures for the dissemination of information are almost completely ineffective. While several current plans and projects for the sector, at national, regional and provincial level, do make provision for improvements in information management, these are concerned mainly with data management, through the rehabilitation of the hydrometric network, and with the introduction of management information systems in sector agencies. Only limited attention is given to developing capacity in Information, Education and Communication activities, and apart from the occasional reference to the need for improved filing systems, the need for specialized documentary information is almost totally ignored.

In ignoring documentary information in this way, the various projects are also ignoring the expressed information needs of the sector. It is clear from interviews with sector staff that there is a real and widespread need for better access to documentary information at all levels. This includes both documents produced within Mozambique and dealing specifically with local conditions and problems, and documents from external sources which provide information on the problems and solutions found in other countries. As regards the provision of documentary information in the provinces, if Nampula is typical, there is little or no such information available at provincial level, except possibly in project offices.

The general picture of the infrastructure of information management in the water and sanitation sector in Mozambique is not encouraging. There may be relatively few potential users of documentary information in the sector, who are concentrated mainly in Maputo, but they have a wide range of information needs. These needs are not being met by the existing facilities for the dissemination of information, most of which are very weak. There are a

number of current proposals for developing information and data management facilities within the framework of general sector development projects, but they generally fail to address one of the major obstacles to improving the provision of information to the sector, namely, the lack of qualified staff in all areas of information work.

CHAPTER 10

RECOMMENDATIONS

INTRODUCTION

This section of the report presents the mission's recommendations for improving documentary information management in the water and sanitation sector in Mozambique. Where appropriate, these are accompanied by explanatory notes and, in some cases, by outline project proposals which set out in more detail the actions and resources required to implement the general recommendations. The project proposals are presented in Appendices 4 to 6.

The recommendations are presented in three groups, relating respectively to:

1. the National Water Directorate
2. Nampula Province
3. sector institutions in general.

As noted above, the recommendations focus mainly on the provision of documentary information by the National Water Directorate (DNA), at the national level, and in Nampula Province. Recommendations relating to other institutions are of a general nature and are intended to provide a general indication of the main actions which need to be taken to enable them to improve their contribution to effective information management in the sector.

NATIONAL WATER DIRECTORATE

The following recommendations aim to meet the need for an effective mechanism for promoting and coordinating information development plans, programmes and activities in the water sector, and to improve documentary information management within the National Water Directorate.

Recommendation 1. Appointment of a National Water Information Advisory Committee

It is recommended that:

A National Water Information Advisory Committee, comprising representatives of the various departments of the National Water Directorate (DNA) and other sector institutions and including information users, and information specialists from other sectors, be appointed to advise the Information Manager and the National Director on the development of information systems and services in the sector. The Information Management Unit should provide the secretariat for the Committee.

Recommendation 2. Establishment of an Information Management Unit

It is recommended that:

An Information Management Unit be established at the headquarters of the National Water Directorate (DNA), to be responsible for

- *promoting and coordinating the planning, development and operation of all kinds of information systems, and the training of information personnel and users, within the DNA and its associated institutions at national and provincial levels*
- *ensuring the compatibility of these various systems with each other and with other national, regional and international information systems*
- *assuming overall managerial responsibility for the DNA Library and Technical Archive and any other libraries, archives or other organized document collections within the DNA*
- *initiating contacts and exchanges with other information systems and organizations concerned with information on water supply and sanitation*
- *acting as the secretariat for the National Water Information Advisory Committee.*

A draft project proposal for the creation of the Information Management Unit is presented in Appendix 4. This provides for the appointment of an Information Management Adviser for a minimum period of twelve months, to help initiate and develop the Unit and its activities and train local staff, and for the appointment of an Information Manager to head the Unit as counterpart for the Information Management Adviser. Terms of reference and job descriptions for these positions are also included.

In the first instance, and pending the establishment of the Information Management Unit and the recruitment of an Information Management Adviser, an existing member of the DNA senior management should be nominated as acting Information Manager to begin to exercise the coordinating function in respect of current and proposed development projects for the sector.

The proposed establishment of an Information Management Unit and the appointment of its staff should be considered in relation to other current proposals for the recruitment of experts in management information systems and the creation, under the Water Resources Assessment and Planning (WRAP) project, and within the proposed Department of Water Resources Management (DGRH), of an Information and General Assistance Section. It should be noted, however, that although the WRAP proposal provides for a staff of one Head of Section and twelve support staff for the Section, it appears that none of the staff are intended to have higher level academic or technical qualifications. Proposals for capacity building activities under this project concentrate on the training of academic and technical staff; the project

thus appears not to include any provision for training the lower level staff of the Information and General Assistance Section. More importantly, the project proposal does not define the scope and nature of the Section's responsibilities in any detail.

Recommendation 3. Appointment of a National Consultant

It is recommended that:

A national consultant, with appropriate professional qualifications in information management, be appointed to provide ongoing technical advice and support to the Information Manager and the National Water Information Advisory Committee.

This proposal aims to compensate for the general lack of professionally-qualified information personnel in the water sector in general, and in the DNA in particular, at the present time. A small number of suitable candidates are available locally. Terms of reference for this appointment are included in the draft project proposal for the Information Management Unit at Appendix 4.

Recommendation 4. Establishment of a National Water Information and Documentation Centre

It is recommended that:

The Library and Technical Archive of the National Water Directorate (DNA) be strengthened and developed to serve as a National Water Information and Documentation Centre and the focal point for technical support to the coordinating role of the Information Management Unit, including the provision of technical guidance and support to other documentation units in the sector, and improved provision of documentary information in the DNA itself, as follows:

Physical Facilities

Improve the physical condition of the DNA Library and Technical Archive by providing adequate space, furniture and equipment for its operations, if necessary by moving the unit to another floor in the existing building, pending a possible move to new premises by the DNA as a whole.

Financial Support

Secure better and more reliable financial support for information provision in accordance with the general principles for the sector as a whole, presented above.

Staff

Provide incentives for the staff of the unit based on a percentage of project funds, in accordance with the general principles presented above. In this respect, it may be noted that the DNA is about to implement a performance-related incentives and salary scheme supported by the Swiss Development Cooperation (SDC), and this should include appropriate performance indicators and incentives for library and archives staff.

Managerial Support

Provide more effective managerial support for the units by bringing it under the general operational control of the proposed Information Management Unit, once this has been established. In the meantime, it is proposed that the unit be directly supervised by the Information Manager, when appointed, who should in turn report direct to the National Director of DNA.

Collections

The DNA Library should make a conscious effort to develop a national collection of documents relating to the water and sanitation sector in Mozambique, including both local documents and documents from other countries.

Services

The Library should develop a wider range of information services, including:

- *current awareness products and services*
 - *providing information on current developments in the sector, including new publications, ongoing research and development projects, forthcoming events, new products and services, and so on*
- *literature searching services*
 - *providing bibliographic details of specific documents or sets of documents required by users*
- *document supply services*
 - *providing the originals or copies of complete documents or parts of documents held by the documentation centre or available from elsewhere*

- *query answering services*
 - *providing answers to users' requests for information, ranging from quick reference services designed to provide immediate answers to simple enquiries, to research services designed to investigate complex problems.*

Access

The Library should take the lead in promoting collaboration between sector institutions in making an inventory of what information already exists in Mozambique and make it accessible to users. The Library should be the national focal point for contacts with external information sources, including those available through international electronic networks.

Awareness raising and sensitization

The Library should develop a programme to sensitize DNA decision-makers, technical staff and others, at all levels, to the importance and usefulness of information in their work.

A draft project proposal for the strengthening of the DNA Library and Technical Archive to enable it to act as a National Water Information and Documentation Centre is attached at Appendix 5.

NAMPULA PROVINCE

It is considered that the Water and Sanitation Department of the Provincial Directorate of Public Works and Housing (DPOPH) is the most appropriate location for a Provincial Water Information and Documentation Centre capable of serving as the focal point for documentary information services for the sector in the province as a whole.

Recommendation 5. Establishment of a Provincial Water Information and Documentation Centre

It is recommended that:

A Provincial Water Information and Documentation Centre be established at the Department of Water and Sanitation (DAS) of the Provincial Directorate of Public Works and Housing (DPOPH), Nampula, with the following functions:

- *to provide direct documentation and information services to DAS staff and other sector staff in Nampula Province*
- *to act as a focal point for coordinating the development of other sector documentation centres and services in the province*

- *to act as a focal point for liaison with other documentation and information systems and services, including the Information Management Unit, the Information Advisory Committee and the National Water Information and Documentation Centre.*

A draft project proposal for the establishment of a Provincial Water Information and Documentation Centre in Nampula is attached at Appendix 6. This includes provision for the creation of 20 'basic libraries' of key sector documents in Portuguese and their distribution to other institutions in the province. The Provincial Water Information and Documentation Centre and the basic libraries could be replicated as required in other provinces.

The Portuguese translations of IRC publications currently being funded by SDC (see below) could serve as the core of such a collection. UNICEF has also expressed its willingness to assist in the establishment of a sector documentation centre in the DAS Nampula, following a model already being applied in its own sub-offices in Chimoio and Quelimane. The Information Services section of the UNICEF office in Maputo has offered to assist in setting up such a centre and in ordering resource materials.

GENERAL RECOMMENDATIONS

The following recommendations aim to provide general guidance on ways of improving the management of documentary information in water and sanitation sector institutions in Mozambique. They apply both to the institutions referred to in Recommendation 1 to 5 above, and to other sector institutions in the country. Insofar as they apply to other institutions, the recommendations may need to be adapted to local conditions before being applied in practice.

Recommendation 6. Physical facilities

It is recommended that:

Library, information and documentation units in sector institutions be provided with adequate space, suitable furniture and appropriate information-handling equipment, to enable them to carry out their assigned tasks effectively.

The precise requirements will differ in each case.

Recommendation 7. Finance

It is recommended that:

Library, information and documentation activities be clearly identified as separate line items in the regular budgets of sector institutions, and adequate funds provided on a regular basis within these budgets. In addition, all general sector development projects should include specific financial provision, as separate line items, for library, information and documentation support, including:

- *the production, organization and management of their own documentation, including its transfer to an appropriate permanent location at the end of the project*
- *a financial contribution, based on a percentage of the total project budget, to the costs of maintaining the regular documentation unit or units of the institution in which the project is located.*

Recommendation 8. Staff

It is recommended that:

Sector institutions which maintain information and documentation units take steps to ensure that:

- *they are staffed by persons who have satisfactory general educational qualifications and have received suitable technical training*
- *adequate incentives are provided for library and documentation staff who give information support to general sector development projects, based on a percentage of project funds*
- *they cooperate with the Eduardo Mondlane University, the Historical Archive of Mozambique and other interested bodies in identifying the training needs of their information staff and in developing and implementing appropriate training programmes and courses.*

Recommendation 9. Managerial Support

It is recommended that:

Library and documentation units in sector institutions fall within the overall managerial responsibility of a member of the senior management team, who should be held accountable for the performance and operation of the unit.

Recommendation 10. Collections and Services

It is recommended that:

Steps be taken to promote the planned development of document collections and information services to users in sector institutions, including the creation of basic libraries of standard texts in Portuguese.

In this connection, it may be noted that the Swiss Development Cooperation (SDC) has announced its intention of providing financial support for the translation of a selection of IRC publications (and possibly other documents) into Portuguese. IRC is also attempting to identify other suitable documents in Portuguese which could be included in a basic library of information for the sector.

Recommendation 11. Access

It is recommended that:

Sector institutions take steps to:

- *collaborate in making an inventory of what information is already available within the country, and in making it accessible to users*
- *establish contacts with external information sources, including, where possible, those making information available through international electronic networks such as the Internet.*

Recommendation 12. Sensitization

It is recommended that:

Sector institutions collaborate in developing a programme to sensitize decision-makers, technical staff and others, at all levels, to the importance and usefulness of information in their work.

IMPLEMENTATION OF THE RECOMMENDATIONS

One or other of two existing sector development projects might provide a framework and a means of funding some or all of the above developments. These are the Institutional Support Project financed by SDC, and the Water Resources Assessment and Planning project financed by the Netherlands Government. Both these donors have indicated their interest, in principle, in supporting the development of documentary information services in the sector, and it is proposed that, after evaluating the above proposals, the DNA should initiate discussions with one or both donors with a view to obtaining the necessary financial support.

Work on the translation of selected IRC publications into Portuguese, financed by SDC, has already begun. SDC has also indicated an interest in funding the provision of basic libraries, while UNICEF, as noted above, is willing to support the establishment of a provincial documentation centre in Nampula.

It is suggested that, after receiving and reviewing this report, the Royal Netherlands Embassy in Maputo (to whom the report is addressed) should call a meeting of interested organizations, including, national institutions, bilateral and multilateral external support agencies, and NGOs, to discuss the recommendations and formulate a plan of action. It is recommended that the staff of the DNA Library and Technical Archive, as well as library and information specialists from UEM and AHM, be invited to participate in these discussions. The draft project proposals presented in Appendices 4, 5 and 6 may provide a basis for such a discussion, but require careful assessment by people on the spot to ensure that they are applicable in the rapidly-changing situation of Mozambique.

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TERMS OF REFERENCE

The Terms of Reference for the mission, as defined by the Royal Netherlands Embassy in Maputo, are reproduced below.

Terms of Reference for IRC's Mission to Mozambique on prospects, feasibility of implanting (rural) water sector information and documentation services

Given the overwhelming need for Capacity Building (not only) for the Water sector in Mozambique (well-known to the well-informed, and therefore not elaborated here), appropriate information and documentation services could provide an essential 'building brick' for the total Capacity Building effort that is required.

IRC, participating also in the Operation and Maintenance Working Group of the (international) water Supply and Sanitation Collaborative Council (O&M is one of the essential subject areas of Capacity Building), is well-positioned to investigate the effective role that appropriate information and documentation services could possibly play within the Mozambican (Water sector) context.

The Mission's scope of work will - inter alia - be the following:

- inventory of current main sources of relevant (sub)-sector documentation & information (what is readily available, where can it be found, how, and who are the 'users'?)
- documentation & information "needs" assessment for (primarily) the rural- and peri-urban water & sanitation sector (which "potential" user groups seem to be looking for what sorts of information?).
- identification of (possible) "key players" in information & documentation dissemination (DNA-Central c.q. Provincial levels, donors, NGO's?) and their respective roles(s).
- typical conditions, i.e. in Mozambique, constraining the set-up of the desirable information and documentation services.
- presentation of a 'pilot' approach/proposal -probably linked to the Nampula Province Rural Water Supply project (UNICEF/PRONAR))- to introduce/test information and documentation services, including a preliminary cost estimate.

It will basically be a one-person Mission, but there is no objection whatsoever to have a second (IRC) person accompany the mission leader at IRC's own expense. Whereas the 'information' and documentation services' expertise presently available in Mozambique is believed to be limited, the Mission will attempt to identify some local key resource persons in the subject area, at DNA and/or elsewhere (e.g. UEM).

The Mission will present its findings and recommendations -including a brief Summary in writing- at the end of the Mission in Mozambique at a debriefing meeting at DNA - Maputo (with possible participation of other interested parties, donors, etc).

Not more than one month later, the Mission (IRC) will submit a (draft) Final Report -10 copies to the Netherlands Embassy in Maputo, which will distribute these among concerned parties. This Report may also be useful for presentation at the meeting of the Operation and Maintenance Working Group of the Water Supply and Sanitation Collaborative Council, later in the year (also in Maputo).

PROGRAMME OF THE MISSION

- 16 Aug Arrival in Maputo
- 17 Aug am Briefing, Royal Netherlands Embassy: Mr Klaus Broersma
 pm Briefing meeting at DNA, attended by:
 Mr Miguel Magalhães, Head, DAS
 Mr Rui Gonzales, National Coordinator, UNDP Project
 Mr Manuel Alvarinho, Chief Advisor to the Director of DNA
 Ms Carla Barros Costa, IIM
 Ms Joana Gonzaga, Director, CFPAS
 Ms Suzana Saranga, DRH
 Mr Pierre-Olivier Henry, CFPAS/SDC
 Mr Luis Almeida, DRH
 Mr Julião Nguenha, DAS
- 18 Aug am Interviews with DNA staff: Mr Manuel Alvarinho; Mr Rui Gonzales; Mr Julião Nguenha;
 Mr Manuel Thrunhofer, DAS/SDC
 pm DNA Library and Technical Archive: Ms Olga Noe Langa Novela (Librarian); Ms Olimpia
 Boca (Archivist)
 Interviews with DNA staff: Mr Filimão (Informatics Centre); Mr Albert Zanting (Hydrology)
 SDC: Mr Malte Lipczinski
- 19 Aug Review of documentation supplied
- 20 Aug Review of documentation supplied
- 21 Aug am CFPAS: Ms Joana Gonzaga
 pm PNSBC: Mr Paulo Óscar Monteiro, National Coordinator
 IIM: Mr Samuel Vasco, Director; Ms Ecaterina Mirtchesca
- 22 Aug am PRONAR: Ms Angelina Xavier; Mr Leo Stolk; Ms Esther Argyle (UNICEF)
 pm MCMA: Mr Rogério Wamusse
 Travel to Nampula
- 23 Aug am EPAR Nampula: Mr Silvestre Macie Júnior, Director; Ms Guida, Head of Animation; Mr
 Jorge Alfredo Ouana; Ms Elidia Jabo
 pm DPOPH Nampula: Mr Gabriel Opincai, Provincial Director; Mr Bartolomeu Lobat, Head,
 DAS; Eng. Olga, the SANAGUA database supervisor.
- 24 Aug am Community Institutional Support for Small Piped Supplies: Ms Herma v.d. Ley
 EAN: Mr Benjamin Mai-Mai, Director; Mr Germain Bakker
 pm Dutch Cooperation in Nampula: Mr Jost Hovenkamp
 Travel to Maputo
- 25 Aug am Ministry of Health. Department of Environmental Hygiene. Section of Food Hygiene: Dr
 Angelo Manjate
 pm UEM: Mr Geraldo Nhumaio, Faculty of Engineering; Mr Jossias S. Sengulane, Faculty of
 Engineering Library; Ms Wanda do Amaral, Head, DSD
- 26 Aug Study of background documentation
- 27 Aug Study of background documentation
- 28 Aug am DNA Library and Technical Archive: Ms Olimpia Boca (Archivist)
 pm DNA: Mr Luis Elias, National Director
 Interview with Mr Nelson Matsinhe, UEM
- 29 Aug am AHM: Dra. M.I. Nogueira da Costa, Director
 pm Preparation for debriefing at DNA
- 30 Aug am Debriefing, Royal Netherlands Embassy: Mr C. van Honk; Ms M. A. Oldenburg
 Debriefing meeting, DNA: attended by representatives of institutions visited in Maputo,
 UNICEF, Royal Netherlands Embassy
 pm Departure to Amsterdam

DOCUMENTS CONSULTED

Boletim da República de 3 de Agosto de 1991. Lei de Águas, Lei das Empresas Públicas.

Conselho de Ministros. Resolução no 7/95 de 8 de Agosto de 1995. Política Nacional de Águas.

Instituto de Desenvolvimento Rural. *Manual de latrinas melhoradas.* Programa Nacional de Saneamento a Baixo Custo, Maputo, 1994.

Moçambique. Ministério de Agricultura. Projecto de Reabilitação e Desenvolvimento dos Serviços Agrícolas. Inventário das infraestruturas de abastecimento de água, Província de Nampula. Relatório final. Versão provisória. 31 Jan. 95. Vol. 1/3 (Parte I, II, III, IV).

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Mozambique. Ministry of Construction and Water. National Directorate of Water - DNA, National Rural Water Supply Programme - PRONAR and United Nations Children's Fund - UNICEF. Integrated Rural Water Supply Project - Nampula Province (1993-1996). Maputo, July 1993.

Mozambique. Ministry of Public Works and Housing. National Directorate of Water. Proposal for a National Water Policy: preliminary version, January 1995. Maputo, January 1995.

Netherlands. Ministry of Foreign Affairs, Directorate General for International Cooperation and Moçambique. Ministério de Obras Públicas e Habitação. Administração Regional de Águas-Sul. Water Resources Capacity Building Programme. Formulation Mission, 26 June - 21 July 1995. Institutional Support ARA-Sul. Draft project document. 20 July 1995.

Netherlands. Ministry of Foreign Affairs. Directorate General for International Cooperation and Moçambique. Ministério de Obras Públicas e Habitação. Water Resources Assessment and Planning. Draft project document, July 20, 1995.

Revista Água. Nos. 10, 11, 12 and 13. (Centro de Formação Profissional de Águas e Saneamento)

ESTABLISHMENT OF AN INFORMATION MANAGEMENT UNIT

1. Introduction

- 1.1 The project outlined in this draft proposal provides for an Information Management Unit to be established at the headquarters of the National Water Directorate (DNA) in Maputo. The proposed Unit would be headed by an Information Manager appointed from among existing DNA senior staff, who would be advised for an initial period of one year by an externally-recruited Information Management Adviser. A National Consultant would also provide technical advice and support both during and after the period of office of the Adviser. The Unit would fall under the direct authority of the National Director of the DNA, and act as Secretariat for the proposed National Water Information Advisory Committee.

2. Development objective

- 2.1 To strengthen the capacity of the National Water Directorate to plan, establish, operate and maintain efficient and effective systems and facilities for the collection, processing, storage, retrieval and dissemination of management information and technical information.

3. Immediate objective

- 3.1 To establish within the National Water Directorate, under the direct authority of the National Director, an Information Management Unit (IMU) capable of performing the following functions efficiently and effectively:

- promoting and coordinating the planning, development and operation of all kinds of information systems, and the training of information personnel and users, within the DNA and its associated institutions at national and provincial levels
- ensuring the compatibility of these various systems with each other and with other national, regional and international information systems
- assuming overall managerial responsibility for the strengthening and development of the DNA Library and Technical Archive to serve as a National Water Information and Documentation Centre, and for the general operation of this and any other libraries, archives or other organized document collections within the DNA
- initiating contacts and exchanges with other information systems and organizations concerned with information on water supply and sanitation
- acting as the secretariat for the National Water Information Advisory Committee.

4. Strategy

- 4.1 To demonstrate the commitment of the DNA to the successful implementation of the project by:
- (a) formally establishing the Unit as an administrative entity under the direct authority of the National Director of the DNA
 - (b) providing suitable and adequate accommodation and furniture for the Unit
 - (c) appointing an Information Manager (see Appendix 4.A) to act as head of the Unit and counterpart for the Information Management Adviser
 - (d) recruiting other local staff as indicated in section 6 below

- (c) providing an adequate recurrent budget to enable the Unit to perform its functions properly
- (f) providing general administrative and logistical support to the Unit.

4.2 To seek foreign technical assistance for the project in the form of:

- (a) the supply of an Information Management Adviser (see Appendix 4.B) for a minimum period of twelve months, to help initiate and develop the Unit and its activities and train a local counterpart and other local staff
- (b) the supply of information handling equipment and supplies sufficient to enable the Unit to operate effectively for a minimum period of three years.

5. **Outputs**

5.1 The main output of the project will be the supply of technical and management information and data to users within the National Water Directorate and elsewhere through a number of separate information systems, including the proposed National Water Information and Documentation Centre to be established as described in Appendix A.5.

6. **Inputs**

6.1 **Manpower**

- 1 x Information Manager (head of the Information Management Unit) as Programme Coordinator and counterpart to the Information Management Adviser
- 1 x Information Management Adviser (12 months: technical assistance)
- 1 x secretary

6.2 **Accommodation**

- 1 x office for Information Manager (10m²)
- 1 x office for Information Management Adviser (10m²)
- 1 x office for secretary (10m²)
- Traffic and utility space @ 40% of above (12m²)

TOTAL SPACE REQUIRED: 42m²

6.3 **Equipment**

- 3 x microcomputer workstation with CD-ROM (Compact Disc--Read Only Memory) drive and modem
- 1 x Uninterrupted Power Supply (UPS) unit
- 1 x voltage stabilizer/surge protector for UPS
- 1 x laser printer and power cables
- 1 x voltage stabilizer/surge protector for printer
- 1 x photocopier

6.4 **Furniture**

- 2 x executive desks with typing return
- 1 x secretarial desk with typing return
- 1 x printer table
- 3 x office tables
- 2 x occasional tables
- 2 x executive swivel chairs

- 1 x secretarial swivel chair
- 5 x upright chairs
- 4 x casual seating units
- 3 x 4-drawer vertical filing cabinets
- 3 x single-sided glass-fronted bookshelves
- 3 x storage cupboards

6.5 **Supplies**

General office supplies: desk trays, paper punch, file folder and guider, paper clips, rubber bands, drawing pins, liquid paper and thinner, pencils, pens sharpeners, typewriter ribbons and lift-off tapes, typing paper, etc.

Computer supplies: floppy disks, disk storage, cleaning kits, security cables, printer ribbons, acoustic printer cushion, listing paper, etc.

Photocopying supplies: toner, spares kits, paper, etc.

6.6 **Finance**

It is not possible, at this stage, to determine the costs of all the inputs listed above. This will require detailed study by the National Water Directorate and potential donors, supported by quotations from local and foreign suppliers.

Appendix 4.A

INFORMATION MANAGER

1. **Job description**

- 1.1 The Information Manager will be directly responsible to the National Director for the overall planning, development, coordination and management of all information and data systems and services in the National Water Directorate.
- 1.2 The specific responsibilities of the position will include:
 - (a) formulating information policy for the National Water Directorate and the water and sanitation sector as a whole
 - (b) preparing guidelines and methodologies for the collection, processing, storage and retrieval of information on water and sanitation
 - (c) promoting effective coordination and collaboration between all institutions, organizations and departments involved or interested in the water and sanitation sector
 - (d) ensuring the compatibility and standardization of systems for the collection, storage and retrieval of data and information within the National Water Directorate and among other institutions in the water and sanitation sector
 - (e) developing effective mechanisms for the dissemination of data and information to users
 - (f) identifying the training needs of information personnel in the National Water Directorate
 - (g) identifying appropriate training facilities and opportunities for information personnel in the National Water Directorate
 - (h) organizing inservice and other training activities for information personnel in the National Water Directorate

- (j) selecting and procuring information management hardware and software for use by the National Water Directorate
- (k) ensuring the active participation of the National Water Directorate in appropriate local, regional and international information networks and programmes
- (l) day-to-day management of the Information Management Unit
- (m) supervising the strengthening and development of the DNA Technical Library and Archive to serve as a National Water Information and Documentation Centre
- (n) acting as Secretary to the National Information Advisory Committee
- (o) such other duties as the exigencies of the service may from time to time require.

2. **Specification**

2.1 The Information Manager will act as coordinator of the entire information management programme and should, if possible, be selected from among the existing senior professional staff of DNA. The person selected should have:

- (a) appropriate educational or professional qualifications in a relevant discipline
- (b) substantial practical experience at a senior management level in the water and sanitation sector in Mozambique
- (c) a strong interest in information management and a willingness to undergo training in this field
- (d) the ability to communicate effectively with professional colleagues in the DNA and other agencies
- (e) a pleasant personality with the ability to relate well to colleagues and information users.

Appendix 4.B

INFORMATION MANAGEMENT ADVISER

1. **Terms of reference**

1.1 The Information Management Adviser will advise and assist the Information Manager in the planning, development, coordination and management of all information and data systems and services in the National Water Directorate, including:

- (a) the formulation of information policy
- (b) the preparation of operating guidelines, manuals and methodologies
- (c) the coordination of information activities in the water and sanitation sector
- (d) the standardization of data and information systems
- (e) the dissemination of data and information to users
- (f) the identification of training needs of information personnel
- (g) the identification of appropriate training facilities and opportunities
- (h) the organization of inservice and other training activities
- (j) the selection and procurement of information management hardware and software
- (k) participation by the National Water Directorate in appropriate local, regional and international information networks and programmes.

2. **Specification**

2.1 The person selected as Information Management Adviser should have:

- (a) substantial practical experience in planning, developing and directing information management systems in developing countries, preferably in the water and sanitation sector
 - (b) educational or professional qualifications in a relevant sectoral discipline
 - (c) postgraduate qualifications, or the equivalent, in information science or information management.
-

Appendix 4.C

NATIONAL CONSULTANT

1. **Terms of reference**

- 1.1 The National Consultant will provide ongoing technical advice and support to the Information Manager and the National Water Information Advisory Committee on the implementation of the recommendations of this report and the general development of documentary information services in the water and sanitation sector.

2. **Reporting**

- 2.1 The consultant will report to the Information Manager.

3. **Qualifications**

- 3.1 The person appointed as consultant should have:

- (a) a university degree or the equivalent, preferably in a scientific or technical subject
- (b) postgraduate qualifications in information science or librarianship
- (c) substantial practical experience in the development and management of technical documentary information centres
- (d) a good knowledge of the information sector in Mozambique
- (e) preferably, previous knowledge and experience of information work in the water and sanitation sector.

- 3.2 The person selected should have the necessary communication skills and personal qualities to enable him or her to work effectively with members of the staff of the National Water Directorate at all levels.

- (f) formal training for professional qualifications in information science
- (g) management training
- (h) development training (in interpersonal relationships, etc.).

6.3 Accommodation

(a) Accommodation for staff

- 1 x office for Director (10m²)
- 3 x workspaces for assistants (3 x 10m²) = (30m²)
- 3 x workspaces for attendants (3 x 10m²) = (30m²)
- 1 x workspace for typist (10m²)
- 1 x workspace for messenger (5m²)

TOTAL for staff: 95m²

(b) Accommodation for users

10 x reading spaces @ 2.3m² = 23m²

(c) Accommodation for document collections

Space for 10,000 documents @ 200 per m² = 50m²

(d) Traffic and utility space

40% of total (a)-(c) (168m²) = 67m²

(e) TOTAL ACCOMMODATION REQUIRED

Total of (a)-(d) = 235m²

+ 10% for expansion = 24m²

TOTAL = 260m²

6.4 Equipment

- 3 x microcomputer workstation with CD-ROM (Compact Disc--Read Only Memory) drive and modem (1 each for Director, Assistant (library) and Assistant (provincial services))
- 1 x Uninterrupted Power Supply (UPS) unit
- 1 x voltage stabilizer/surge protector for UPS
- 1 x laser printer and power cables
- 1 x voltage stabilizer/surge protector for printer
- 1 x photocopier
- 1 x microfiche reader

6.5 Furniture

The following list is intended only to provide an indication of the kinds of furniture likely to be required. A final list, with quantities and specifications, should be prepared as part of the process of planning the accommodation for the Centre, and should take account of furniture already available.

executive desks with return

- (b) providing suitable and adequate accommodation for the Centre
- (c) recruiting a professionally-qualified librarian, documentalist or information scientist (see note 7.2) as Director of the Centre
- (d) recruiting a local staff member with at least para-professional qualifications in librarianship, documentation and information science to act as Head of Provincial Services
- (e) formally designating the existing staff members in charge of the Library and Technical Archive as Head of Library and Head of Technical Archive respectively
- (f) encouraging and assisting both new and existing staff to take advantage of education and training opportunities to update and improve their qualifications and skills in librarianship, documentation and information science
- (g) providing an adequate recurrent budget to enable the Centre to perform its functions properly, including regular provision for the purchase of locally-published information materials and an adequate foreign exchange component for the purchase of materials published abroad
- (h) providing general administrative and logistical support to the Centre.

4.2 To seek foreign technical assistance for the project in the form of:

- (a) the supply of information materials, including books, periodicals, reports, maps, audio-visual materials, etc., published outside Mozambique, for a minimum period of three years
- (b) the supply of furniture, information processing and storage equipment and supplies sufficient to enable the Centre to operate effectively for a minimum period of three years
- (c) the provision of training opportunities for the local staff of the unit, including, where appropriate, fellowships for training and study tours abroad.

5. **Outputs**

5.1 The main outputs of the project will be the provision of technical information, original documents or copies of documents containing technical information, or bibliographical details of documents containing technical information, originating from anywhere in the world, to users in the water and sanitation sector anywhere in Mozambique or in other countries.

6. **Inputs**

6.1 **Manpower** (including existing staff)

1 x Director of the Centre (see Appendix 5.A)
 1 x Assistant (Library)
 1 x Assistant (Archive)
 1 x Assistant (Provincial Services)
 3 x library attendants
 1 x typist
 1 x messenger

6.2 **Training**

At this stage, it is possible only to indicate in general terms the kinds of training required. They will include:

- (a) general orientation to information work
- (b) basic technical training in library and documentation methods
- (c) specific orientation to water-related information
- (d) general training in the use of computers in information work
- (e) specific training in the use of the Mini-micro CDS/ISIS software and of databases on CD-ROM (Compact Disc--Read Only Memory)

ESTABLISHMENT OF A NATIONAL WATER INFORMATION AND DOCUMENTATION CENTRE

1. Introduction

- 1.1 This draft project proposal is concerned with the strengthening of the DNA Library and Technical Archive to enable it to act as a National Water Information and Documentation Centre serving, not only the staff of the National water Directorate, but also users from other institutions, both in Maputo and elsewhere in Mozambique.

2. Development objective

- 2.1 To strengthen the capacity of the National Water Directorate to apply the experience and knowledge of other water supply and sanitation institutions in other countries in the planning, establishment, operation and maintenance of effective and efficient water supply and sanitation facilities in Mozambique.

3. Immediate objective

- 3.1 To strengthen the DNA Library and Technical Archive to enable it to act as a National Water Information and Documentation Centre capable of performing the following functions efficiently and effectively:
- (a) identifying, locating, selecting, procuring, recording and preparing for use both national and foreign documents of various kinds
 - (b) providing access to these documents, both:
 - indirectly, by means of list of new acquisitions, catalogues, indexes, etc; and
 - directly, through various arrangements for access to the centre (opening hours, etc.) and its collections
 - (c) providing the following types of services to users, among others:
 - answering enquiries, referring enquirers to other sources of information
 - literature searching services
 - current awareness services
 - document delivery services
 - (d) creating and maintaining:
 - a computerized bibliographic database of national documents, both retrospective and current
 - a computerized record of its own document collections
 - a computerized union list of periodical holdings on water supply and sanitation in libraries and documentation centres in Mozambique
 - a computerized union catalogue of national documents on water supply and sanitation held in various libraries and documentation centres in Mozambique
 - (e) preparing input to other national, regional and international information systems

4. Strategy

- 4.2 To demonstrate the commitment of the DNA to the successful implementation of the project by:
- (a) formally establishing the Centre as part of the proposed Information Management Unit under the general supervision of the Information Manager

secretarial desks with return
printer table
office tables
occasional tables
executive swivel chairs
secretarial swivel chairs
upright chairs
casual seating units
4-drawer vertical filing cabinets
glass-fronted bookshelves
storage cupboards
reading tables
archive cupboards
periodical display shelves
atlas table
magazine rack
newspaper rack
control desk

6.6 **Supplies**

General office supplies: desk trays, paper punch, file folder and guider paper clips, rubber bands, drawing pins, liquid paper and thinner, pencils, pens sharpeners, typewriter ribbons and lift-off tapes, typing paper, etc.

Computer supplies: floppy disks, disk storage, cleaning kits, security cables, printer ribbons, acoustic printer cushion, listing paper, etc.

Photocopying supplies: toner, spares kits, paper, etc.

Library supplies: pamphlet boxes, periodical binders, book supports, label holders, book labels, book order forms, index cards, book cards, date stamps, date slips, book pockets, spine marker, book repair materials, etc.

6.7 **Finance**

It is not possible, at this stage, to determine the costs of all the inputs listed above. This will require detailed study by the National Water Directorate and potential donors, supported by quotations from local and foreign suppliers.

Appendix 5.A

DIRECTOR NATIONAL WATER INFORMATION AND DOCUMENTATION CENTRE

1. **Job Description**

- 1.1 The Director of the National Water Information and Documentation Centre will be directly responsible to the Information Manager for the overall planning, development, coordination and management of the Centre and its services, including services to the provinces.

- (a) ensuring the effective implementation by the Centre of library, documentation and archives routines, including identification, acquisition, processing, storage, circulation, reproduction, weeding and disposal of documentary information sources
- (b) planning and ensuring the implementation of effective documentary information services to DNA personnel and other users based in Maputo
- (c) planning and ensuring the implementation of effective documentary information services to users in the provinces, including advice on the establishment of local documentation centres in the provinces, the distribution and maintenance of basic libraries to provincial centres, and the delivery of information by means of postal and telecommunications services
- (d) advising on the selection, acquisition and use of information and documentation equipment, including computers, and operational tools, including classification schemes, indexing languages, software, etc.
- (e) supervising the staff of the Centre
- (f) advising the Information Manager on the formulation of information policy for the National Water Directorate and the water and sanitation sector as a whole.

2. **Specification**

2.1 The person appointed should have:

- (a) a university degree, or the equivalent, preferably in a relevant scientific or technical discipline
- (b) postgraduate qualifications in librarianship, documentation or information science
- (c) substantial practical experience in the development and management of technical documentary information centres
- (d) a good knowledge of the information sector in Mozambique
- (e) preferably, previous knowledge and experience of information work in the water and sanitation sector.

2.2 The person selected should have the necessary communication skills and personal qualities to enable him or her to work effectively with colleagues and information users at all levels.

ESTABLISHMENT OF A PROVINCIAL WATER INFORMATION AND DOCUMENTATION CENTRE IN NAMPULA

1. Introduction

- 1.1 This draft project proposal is concerned with the establishment of a Provincial Water Information and Documentation Centre at the Department of Water and Sanitation (DAS) of the Provincial Directorate of Public Works and Housing (DPOPH) in Nampula. This is intended as a pilot project to test and demonstrate the feasibility of establishing such a centre in a provincial capital. The proposed centre would be administratively part of DAS Nampula, but would receive technical and documentary support from the National Water Information and Documentation Centre at DNA headquarters in Nampula.

2. Development objective

- 2.1 To strengthen the capacity of water and sanitation sector personnel in Nampula Province to apply the experience and knowledge of other water supply and sanitation institutions in Mozambique and other countries in the planning, establishment, operation and maintenance of effective and efficient water supply and sanitation facilities in the province.

3. Immediate objective

- 3.1 To establish a Provincial Water Information and Documentation Centre at the Department of Water and Sanitation (DAS) of the Provincial Directorate of Public Works and Housing (DPOPH) in Nampula, capable of performing the following functions effectively:
- (a) providing documentation and information services to DAS staff and other sector staff in Nampula Province, including:
 - identifying, locating, selecting, procuring, recording and preparing for use both national and foreign documents of various kinds
 - providing access to these documents, both directly and indirectly
 - providing query answering, literature searching, current awareness and document delivery services to users
 - (b) acting as a focal point for coordinating the development of other sector documentation centres and services in the province and for liaison with other documentation and information systems and services in Mozambique, including the Information Management Unit, the Information Advisory Committee and the National Water Information and Documentation Centre
 - (c) acting as a focal point for the distribution of 'basic libraries' of key sector documents in Portuguese to other institutions in the province, for maintaining these collections and for keeping records of their use.

4. Strategy

- 4.2 To demonstrate the commitment of the DNA and the DPOPH Nampula to the successful implementation of the project by:
- (a) formally establishing the Centre within the Department of Water and Sanitation of DPOPH Nampula under the general supervision of the Director of the Department
 - (b) providing suitable and adequate accommodation for the Centre
 - (c) recruiting a local staff member with at least para-professional qualifications in librarianship, documentation and information science to act as head of the Centre

- (d) providing an adequate recurrent budget to enable the Centre to perform its functions properly, including regular provision for the purchase of locally-published information materials and an adequate foreign exchange component for the purchase of materials published abroad
- (c) providing general administrative and logistical support to the Centre from DPOPH Nampula, and technical and documentary support from the National Water Information and Documentation Centre at DNA headquarters.

4.2 To seek foreign technical assistance for the project in the form of:

- (a) the supply of information materials, including books, periodicals, reports, maps, audio-visual materials, etc., published inside and outside Mozambique, particularly in Portuguese, for a minimum period of three years
- (b) the supply of furniture, information processing and storage equipment and supplies sufficient to enable the Centre to operate effectively for a minimum period of three years
- (c) the provision of training opportunities for the local staff of the unit, including, where appropriate, fellowships for training and study tours abroad.

5. **Outputs**

5.1 The main outputs of the project will be the provision of technical information, original documents or copies of documents containing technical information, or bibliographical details of documents containing technical information, originating from anywhere in the world, to users in the water and sanitation sector in Nampula Province.

6. **Inputs**

6.1 **Manpower**

1 x Head of the Centre (see Appendix 6.A)

6.2 **Training**

At this stage, it is possible only to indicate in general terms the kinds of training required. They will include:

- (a) general orientation to information work
- (b) basic technical training in library and documentation methods
- (c) specific orientation to water-related information
- (d) general training in the use of computers in information work
- (e) specific training in the use of the Mini-micro CDS/ISIS software and of databases on CD-ROM (Compact Disc-Read Only Memory)
- (f) development training (in interpersonal relationships, etc.).

6.3 **Accommodation**

1 x office for Head of Centre (10m²)
 4 x reading spaces @ 2.3m² = 9m²
 Space for 2,000 documents @ 200 per m² = 10m²
 40% of above = 12m²

TOTAL ACCOMMODATION REQUIRED = 41m²

6.4 **Equipment**

- 3 x microcomputer workstation with CD-ROM (Compact Disc--Read Only Memory) drive and modem (1 each for Director, Assistant (library) and Assistant (provincial services))
- 1 x Uninterrupted Power Supply (UPS) unit
- 1 x voltage stabilizer/surge protector for UPS
- 1 x laser printer and power cables
- 1 x voltage stabilizer/surge protector for printer
- 1 x photocopier
- 1 x microfiche reader
- 20 x book boxes for basic libraries

6.5 **Furniture**

The following list is intended only to provide an indication of the kinds of furniture likely to be required. A final list, with quantities and specifications, should be prepared as part of the process of planning the accommodation for the Centre, and should take account of furniture already available.

- executive desk with return
- printer table
- office table
- occasional table
- executive swivel chair
- upright chairs
- 4-drawer vertical filing cabinets
- glass-fronted bookshelves
- storage cupboards
- reading table
- archive cupboards
- periodical display shelves
- atlas table
- magazine rack
- newspaper rack

6.6 **Supplies**

General office supplies: desk trays, paper punch, file folder and guider paper clips, rubber bands, drawing pins, liquid paper and thinner, pencils, pens sharpeners, typewriter ribbons and lift-off tapes, typing paper, etc.

Computer supplies: floppy disks, disk storage, cleaning kits, security cables, printer ribbons, acoustic printer cushion, listing paper, etc.

Photocopying supplies: toner, spares kits, paper, etc.

General library supplies: pamphlet boxes, periodical binders, book supports, label holders, book labels, book order forms, index cards, book cards, date stamps, date slips, book pockets, spine marker, book repair materials, etc.

6.7 **Finance**

It is not possible, at this stage, to determine the costs of all the inputs listed above. This will require detailed study by the National Water Directorate and potential donors, supported by quotations from local and foreign suppliers.