



THE REPUBLIC OF UGANDA



**MAIN REPORT
(DOC. 005)**

**MINISTRY OF NATURAL RESOURCES
DIRECTORATE OF WATER DEVELOPMENT**

1995

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UGANDA WATER ACTION PLAN

WATER RESOURCES DEVELOPMENT AND MANAGEMENT

MAIN REPORT

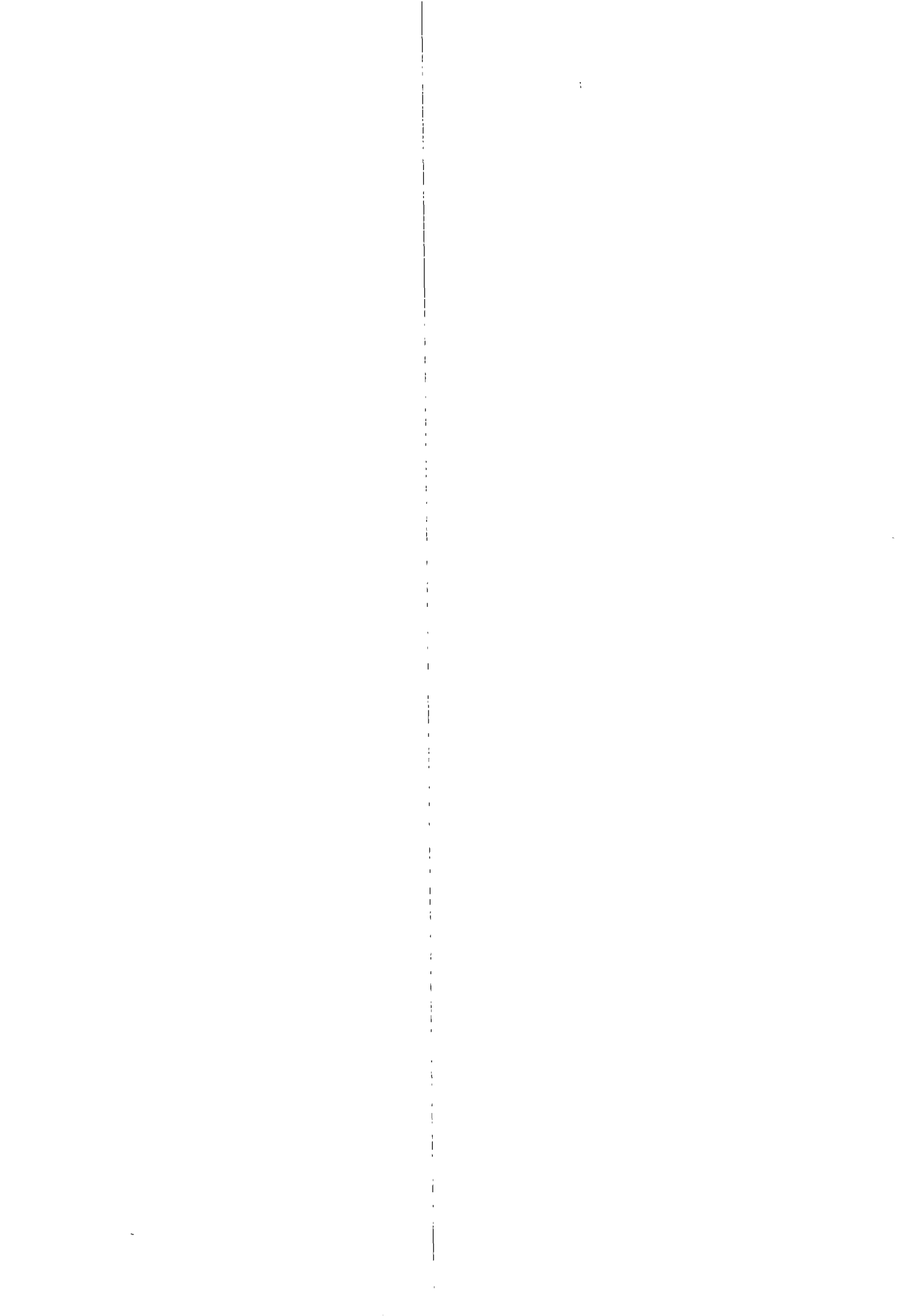
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THE REPUBLIC OF UGANDA

FOREWORD

Water is a major factor in the socio-economic fabric of our society as well as a determining factor in the development potential of our nation. The rapid growth in population and the increased agricultural and industrial production require adequate and safe water supply.

Although Uganda is usually considered a country well endowed with water resources, their seasonal and spatial variability causes specific problems which necessitate proper planning for the development and use of the available resources.

Conflicts are emerging on the sharing of water resources between upstream and downstream users. Upstream riparians may use the water in ways making it either inadequate or its quality unsuitable for the downstream users. In the context of the Nile Basin, Lake Victoria and the River Nile are finite shared water resources and the projected demands of the riparian nations may well exceed the resource.

Viewed within this context there is a clear need for a framework for proper water resources management, through which priorities can be established and optimal use of the nation's water resources planned. I am pleased to report that Government, through the preparation of this Water Action Plan now has provided major pillars of this framework.

The Water Action Plan provides guidelines and strategies for the protection and development of our nation's water resources and a structure for their management. It is intended to be an evolutionary and dynamic framework rather than a traditional prescriptive (top-down) "Master Plan". The guiding principles and various recommendations presented in the Water Action Plan will be instrumental in the formulation of our National Water Policy and have provided important inputs to the new draft Water Bill.

The overall objective of the Uganda Water Action Plan is:

***"to manage and develop the water resources of Uganda
in an integrated and sustainable manner,
so as to secure and provide
water of adequate quantity and quality
for all social and economic needs"***

The Water Action Plan defines actions leading to the establishment of an enabling environment for flexible water resource management with linkages between land and water resources. It defines management roles and identifies appropriate institutional structures for water resources management at national, district and local levels. It also reviews the currently accepted principles on transboundary waters, examines Uganda's international obligations, and argues a case for a rational and equitable utilization of the Nile waters.

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In addition, the Water Action Plan presents an overview of Uganda's water resources situation as a result of a Rapid Water Resources Assessment exercise, and reiterates the need to establish reliable, up-to-date and adequate data information services to facilitate preparation of more elaborate assessments to quantify Uganda's water resource base and demands in details.

The Water Action Plan is recognized in the new water sector legislation as a flexible framework to guide the development, regulation and protection of the nation's water resources. I therefore would like to urge all stakeholders, decision-makers and resource users to be acquainted with the recommendations and strategies imbedded in the Water Action Plan.

Due to the dynamic nature of water resources issues, Government will - as also called for in the new water legislation - regularly monitor, review and update the Water Action Plan to reflect current challenges, new and emerging issues as well as available options.

The Water Action Plan study also identified a number of issues which needed to be addressed and for which an Action Programme has been proposed. This Action Programme is a pragmatic one -- fitting into our existing economic, political and social realities. Implementation of the recommended actions will require a concerted effort on the part of Government and some external assistance. However, the Action Programme is achievable and sustainable because it is moulded within the existing institutional structures - and it recognizes the general financial and human resource constraints. I would like, therefore, to take this opportunity to call upon external support agencies to support the implementation of our Water Action Plan and Action Programme therein.

Finally, I wish to thank all those who contributed in one way or another to the preparation of the Water Action Plan. I also wish to extend Government's special gratitude to Danida for the financial and technical support it has rendered during formulation of this important document which will guide us in instituting proper conservation, management and utilization of the precious water resource we have been endowed with in our rivers, in our lakes, in our wetlands and beneath us in the ground.

WATER IS LIFE - let's cherish it !


Henry Muganwa Kajura
MINISTER OF NATURAL RESOURCES

July 1995



Uganda Water Action Plan

Directorate of Water Development

MAIN REPORT

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Uganda Water Action Plan

Directorate of Water Development

ABBREVIATIONS

BOD	Biological Oxygen Demand
Danida	Danish International Development Assistance
DENRC	District Environment and Natural Resources Committee
DES	District Executive Secretary
DRC	District Resistance Council
DWD	Directorate of Water Development
EIA	Environmental Impact Assessment
ENRD	Environment and Natural Resources
GEMS	Global Environmental Monitoring System
GIS	Geographical Information System
HRDSU	Human Resource Development Unit
NEAP	National Environmental Action Plan
NEMA	National Environment Management Authority
NGO	Non-Governmental Organisation
RC	Resistance Council
RDP	Rehabilitation and Development Plan (1991/92-94/95)
WAP	Water Action Plan
WPC	Water Policy Committee
UNCED	UN Conference on Environment and Development



1 INTRODUCTION

1.1 Background

1.1.1 Water Action Plan development

Project documents entitled "Water Action Plan for Water Resources Development and Management (WAP)", dated January 1993 and October 1993, were agreed between the Government of Uganda and the Government of Denmark (acting through the Ministry of Foreign Affairs - Danida).

The project documents describe two phases of a planning process aiming to develop a Water Action Plan for Uganda.

CONTENTS OF WAP PHASE I	
-	a rapid assessment of the water resources situation in the physical and management context
-	a preliminary proposal for the establishment of an enabling environment for flexible water resources management with linkages between land and water resources, and including suggestions for management roles and functions at various levels, and suitable institutional structures
-	a preliminary outline of a national water resources policy
-	preparation of detailed project proposals for specific projects in the water resources sector

CONTENTS OF WAP PHASE II

- a draft national water resources policy accompanied by target descriptions and brief guidelines
- an outline proposal for appropriate local water resources management levels based on district studies
- an outline proposal for management procedures providing the administrative machinery at national and district levels with guidelines for sustainable water resources management
- a design of a groundwater database and a plan/guidelines for interaction between the various existing and future computerized systems relevant to water resources management
- support to the preparation of regulations supporting the Water Resource Statute regarding surface water and groundwater abstraction as well as wastewater discharge
- an outline of training and capacity building activities supporting the appropriate sectors in water resources management
- a project catalogue with proposed priorities for projects identified during the Water Action Plan Phases I & II
- a draft Water Action Plan synthesizing the activities carried out in a coherent presentation
- implementation and monitoring guidelines for the subsequent Water Action Plan implementation
- a National Seminar for discussion of the draft Water Action Plan by concerned parties

The implementing agency in Uganda is the Directorate of Water Development (DWD) within the Ministry of Natural Resources. A team of Danish consultants has been engaged by Danida to work within the DWD in the execution of the project. The consultant team has been composed of staff members from the VKI Water Quality Institute (leading partner), COWIconsult, Nordic Consulting Group and the Danish Hydraulic Institute.

1.1.2 Guiding principles for the Water Action Plan

The Uganda Water Action Plan is intended to provide a framework for the protection and development of Uganda's water resources. It will provide a flexible and dynamic framework for development and management of the water resources of the country, rather than a traditional prescriptive master plan.

The Water Action Plan deals with aspects of integrated water resources development and management, recognizing the guiding principles emerging from discussions at international conferences, consultations and workshops in Copenhagen (November 1991), Dublin (January 1992) and Rio (UN Conference on Environment and Development, UNCED, June 1992).

GUIDING PRINCIPLES FOR THE WATER ACTION PLAN	
-	fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment
-	land and water resources should be managed at the lowest appropriate levels
-	the government has an essential role as an enabler in a participatory, demand-driven approach to development
-	water should be considered as a social and economic good, with a value reflecting its most valuable potential use
-	water and land use management should be integrated
-	women play a central part in the provision, management and safeguarding of water
-	the private sector has an important role in water management

Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment

Since water sustains all forms of life, effective management of water resources demands a holistic approach, linking social and economic development with protection of natural ecosystems. Effective management links land and water uses across the whole of a catchment area or groundwater aquifer.

Management of water resources at the lowest appropriate level

Management of water resources is here used to designate all actions and interventions (policy making, project planning, design and implementation, conflict resolution, water rights allocation, individuals' use of water for domestic purposes or small scale irrigation etc.)

The appropriate level may be understood as the level at which significant impacts are experienced. If, for instance, a use/management of water in a village only has a possible impact within the village itself, then the community level is the proper management level (RC1). If impacts in terms of reduced amounts of water or impaired water quality concerns a neighbouring village, then the appropriate management level is one level higher than the community level.

At the other end of the scale the appropriate management level may be the national level for major water bodies in cases where no significant quantity/quality impacts are anticipated for the neighbouring states. Where such impacts are significant the management will depend on international agreements on equitable use of common water resources. River basin level is yet another important management level which will be appropriate in other scales of development.

1. A small pond impounded behind an earth dike is serving both the water needs of livestock and the villagers living nearby. No downstream users are impacted negatively. They have themselves taken the initiative to construct the earth dike and are maintaining their facility. They have introduced rules about who can use the water and what the contribution of each member of the community towards the maintenance of the dike shall be. They have managed the water resource (quantity) at the lowest appropriate level - here the village level.
2. The same pond is polluted by cattle being watered and the villagers have introduced a bush fencing of the pond and a cattle trough outside the fence. Pumping to the cattle trough is done by the cattle owners and one major source of pollution has been eliminated. The villagers have managed the water resource (quality) at the lowest appropriate level.

The role of the Government as an enabler in a participatory, demand-driven approach to development

The Government as an enabler means that the Government creates a framework in terms of institutions, laws, regulations and awareness necessary to implement a participatory, demand-driven approach in the management of water resources. Participation means that all levels interested in the particular development are consulted and involved in the planning and implementation of water projects to the degree possible. Demand-driven development is a development fully depending on the user's perception of the need for a particular project or project component.

A rural water supply and sanitation programme is being planned. The Government provides the necessary institutional back-up at the District level as part of the preparations. Health officers, sociologists and technicians are trained and staff cadres supplemented to cope with the expected scope of the water supply programme and to provide back-up for the operation and maintenance. The implementing staff is trained in the participatory, demand-driven approach and communities are visited and informed about the possibility of becoming part of the programme and any cost implications (cash or kind). The community decides, based on their felt need for improved water supply, to join the programme or not. The community is involved in the planning of the extent of their new facilities and contributions are made towards construction and operation and maintenance. The Government has enabled the participatory, demand-driven approach.

Recognition of water as a social and economic good

It is vital to recognize first of all the basic right of all human beings to have access to clean water and sanitation at an affordable price.

Recognition of water as a social and economic good means that water is not considered a free commodity, but rather a valuable resource, which should be used in the best national interest. Using water for one specific purpose means that other opportunities will be lost. In the evaluation of which uses are most desirable, the use which yields the largest socio-economic benefit should be considered as having first priority.

Water as an economic good also implies the use of pricing mechanisms to avoid wasteful use of water and undesirable environmental impact. It is emphasized, however, that there is a difference between estimating the value of the resource and charging the consumers. Social considerations may imply subsidizing water use, but the economic implications of doing so should be realized.

1. Plans have been developed for two irrigation schemes using water from the same stream. However, the stream cannot support both schemes. If either of the schemes goes ahead, the opportunity of implementing the other will be lost. The value of the agricultural production per unit volume of water in either of the two schemes are used as an important decision parameter in the selection process. Other parameters will be the environmental impact, the possible support to other socio-economic developments etc. Water has been recognized as having an economic value relating to the value of the scheme output.
2. Sewage discharges upstream of an intake for water supply will necessitate a full surface water treatment at an urban area downstream. The opportunity cost of allowing the sewage to be discharged at that point is the additional treatment cost for the water supply organization. The polluter will be charged an amount corresponding to the additional treatment cost and the reduced environmental quality. As a consequence the polluter makes the decision that a sewage treatment at the source and an outfall point downstream of the water intake is cheapest. A pricing mechanism has reduced the overall cost and has transferred the cost of pollution to the polluter.
3. A water supply authority aims to avoid wasteful practices among users, but recognizes the need to keep a basic minimum amount of water per user as cheap as possible. The water supply authority chooses a tariff policy with an escalating rate, depending on the amount used, thus subsidizing the small consumers from the charges to the large consumers. A pricing mechanism has been used to suppress high consumption, also taking into account social considerations.

Integration of water and land use management

The guiding principle of integration of water and land use management has its base in the continuous interaction between the water resources and the land use. Deficient agricultural practices may cause soil erosion and silting of water bodies, drainage of wetlands will change the hydrological regime and the water quality and deforestation may cause increased flood peaks and risks of landslides in the case of deforested mountain slopes. It is thus easily understood that a concerted effort within land management and water management is called for in selected areas.

The essential role of women in water management

Women play a central role as providers and users of water at household and community level. However, this role has rarely been reflected in institutional arrangements for the development and management of water resources. The adoption of this guiding principle means that the specific needs of the women, as defined by themselves, should be taken into account and that women must be empowered and encouraged to take part in all levels of water resources programmes.

The important role of the private sector in water management

The increasing emphasis on economic incentives and local responsibilities enhances the private sector's role in water management. For domestic water users a choice should be given between a private water utility and the provision of services by a public entity, in order to ensure the best service at the lowest cost. Similarly, a farmer may be best served by a private irrigation association. Drilling and establishment and operation of water supply and sanitation systems may develop into areas where private contractors operate.

1.1.3 Documentation

During the background studies and drafting of the Water Action Plan a number of working documents have been prepared in draft, and comments to these have been obtained from various relevant parties. In concert with the developments in the Water Action Plan process, parts of these documents have become obsolete after having served their purpose of raising points for discussion and explaining status and contents of the work.

The experience and consensus obtained from those drafts have thus been carried over into a number of final documents. These are also drawing heavily on excerpts from the working papers and the draft reports from WAP Phase I. The resulting list of final documents is given in Appendix 1.1, while highlights of the documents are given in Appendix 1.2. The set of documents constituting the core of the Water Action Plan are WAP Doc. 005 to 014.

1.1.4 Water Action Plan Main Report

This document (WAP Doc.005) reviews the scope of the whole Water Action Plan. Chapter 2 describes the research and formulation process: from the initial compilation of water resources data, through the district studies which identified main water resources management functions, to the draft of a Water Resources Policy paper. Chapter 3 gives a brief introduction to the main components of the Water Action Plan: the enabling legislation and regulations, the institutional framework, capacity building programmes, and management procedures. Chapter 4 presents the action programme: 39 actions related to five main spheres: enabling environment, institutional framework, information systems, assessment capabilities, and management procedures. Chapter 5 outlines a strategy for implementation: a three stage action programme, with a commentary on monitoring and updating mechanisms.

2 THE WATER ACTION PLAN PROCESS

2.1 The main considerations

The process of formulating the Action Plan for Water Resources Management in Uganda has been flexible and dynamic, in that methodologies have been developed and refined on the basis of experience gained during the various project phases. However, the basic principles described in the Introduction have been the constant guiding factors in determining the overall objectives of the Plan.

2.1.1 Operational considerations

Without infringing the principles, the Water Action Plan formulation process has also taken into account the need to produce an action framework which is operationally realistic in the present Ugandan context - and sustainable in the future. To this end, there has been concern that the Plan should be both pragmatic and flexible.

Fitting proposals to existing realities

The functions, structures, procedures and proposed actions are pragmatic in as much as they take into account the resource constraints existing in Uganda, the existing institutional structures, and the management capacity available for implementation.

Uganda is still in the process of reconstruction after many years of civil unrest. In spite of significant progress, the economy is not yet developed enough that it can generate government revenue sufficient for financing much development activity. There are severe financial constraints at all levels of government, and this problem, despite the gains from retrenchment policies, is expected to continue in the near future. It would therefore not be appropriate to create new, large bureaucracies that would administer complicated procedures for water resources management. Such structures would not be sustainable. Procedures are prepared only in response to need.

This consideration has resulted in an attempt to create clear and uncomplicated procedures that require a minimum of staff, and which are anchored in existing institutional arrangements. Examples are the proposed procedures for the regulation of water extraction and wastewater discharges. Given the relative abundance of water resources in Uganda, the regulation of water extraction needs to be done only for relatively large users and in regard to possible dispute situations. Therefore, limits have been defined under which it will not be necessary to have a permit for water extraction, and mechanisms have been described whereby disputes about unregulated use can be settled at the local level. It is proposed that permit systems for water extraction and wastewater discharge should be self-financing, so they do not place an extra burden on recurrent budgets.

Structurally, water resources management will be anchored, as much as possible, in the existing community management structures such as the Village Resistance Councils, water user groups and water and sanitation committees. The district mechanism takes account of the decentralization process, and the proposed new committees are integrated within the recommended hierarchy of committees in district administrations. The national structure harmonises with the reconstruction that has taken place in the ministries; it relates to the newly created National Environment Management Authority (NEMA); and it brings together the relevant institutional interests. Such an approach will help to ensure acceptance and cooperation from water users, politicians and officials.

Designing structures to meet needs as they arise

Structures and procedures should be flexible enough to meet immediate needs and leave the possibility open for expansion whenever appropriate. The water extraction procedures are designed in this manner: so that they are not a burden on those districts which have little need for permits. But in the long-term the actual issuing of permits can be delegated to the district administrations when the local management capacity and volume of work increase.

Districts have different water resources management issues and problems, so not all regulations, procedures and structures need apply in all districts at any one time. Recommendations are made about district management structures, but it is for the districts themselves to decide on an appropriate structure that meets their perceived needs at a particular point in time. National regulations can also be flexible; for instance, in allowing for exemptions to procedures in certain areas with specific problems.

How these main considerations have been taken forward in creating an enabling environment, building institutional structures, and establishing planning procedures - this is also a theme of WAP Doc.006 - on Water Policy.

2.2 The Methodology

The three-phase logic of the Water Action Plan methodology has been to: identify and analyze the range of water resources problems and issues that occur across the whole of Uganda; from this analysis derive the management interventions that are needed to address these problems and issues; in the light of capacity potentials and constraints, develop both long and short term management strategies.

As a starting point for the identification of water resources problems a national overview was prepared. The Rapid Water Resources Assessment (WAP Doc. 007) provides the report on this overview. Based on existing information, it analyses the spatial and temporal occurrence of surface and groundwater and examines the present knowledge about water quality. The development trends and the corresponding water requirements are briefly described.

Water resources, from the international perspective of the Upper Nile Basin, are examined in the Report on International Aspects (WAP Doc. 008) where an analysis of the implications of Uganda's location as both a lower and upper riparian is presented. Having the international and national water resources situations as a background, specific studies in five selected districts were used to identify the range of water resources management issues.

The following diagram, Fig 2.1, is meant to show how the district studies were used to identify water resources management issues; how this led to the identification of eight basic water resources management functions; and then how the key components of a management system were created.

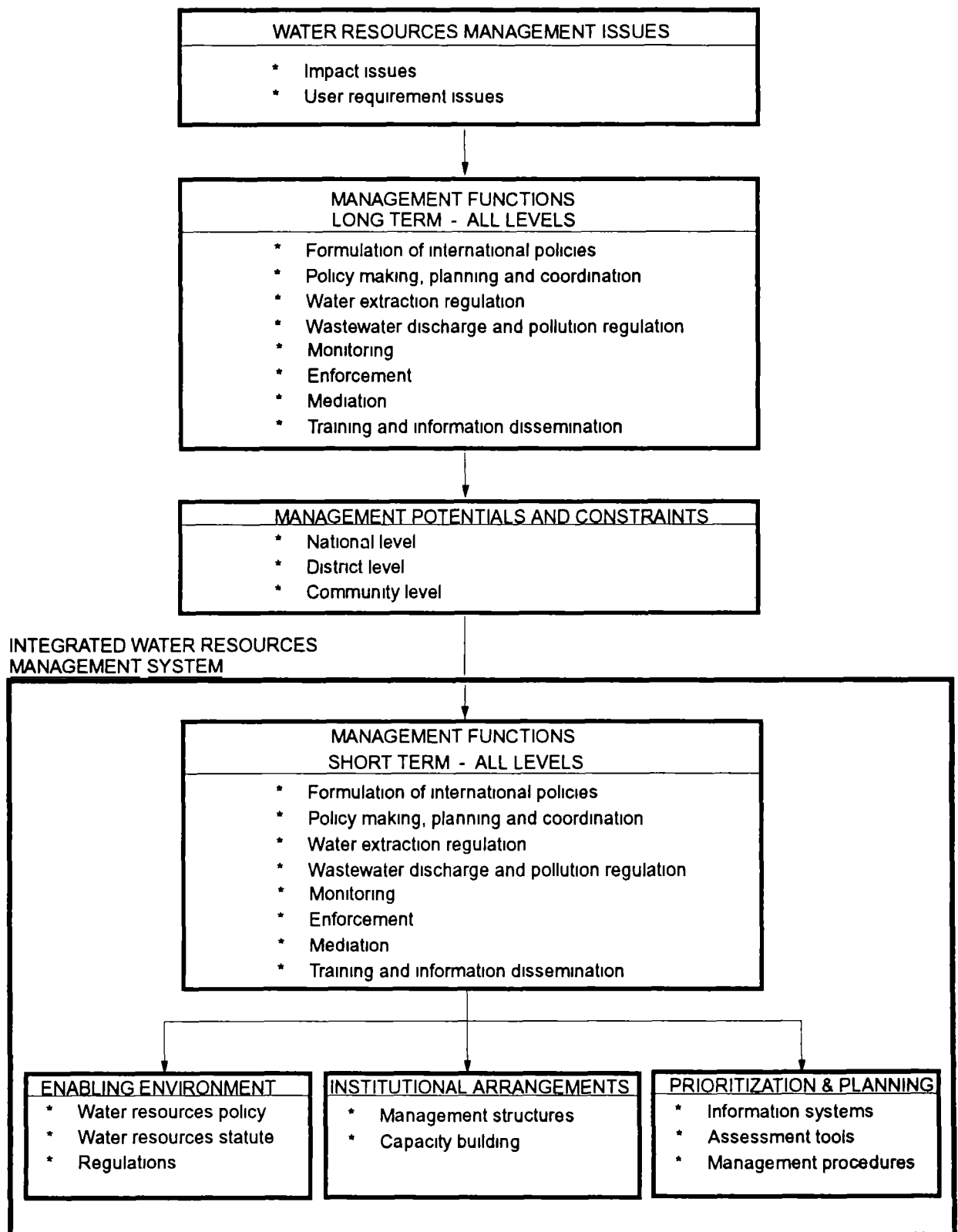


Figure 2.1 - The Water Action Plan Process

2.2.1 The District Studies

The visits to the districts revealed a number of water resources problems that needed addressing. Consideration was then given to a logical progression of how to treat the issues so that the end result would be a sustainable utilization of water resources. This involved the identification of the functions and tools necessary for handling the issues, and the appropriate management levels where rational decisions could best be expected. The process is illustrated in Fig 2.2 below.

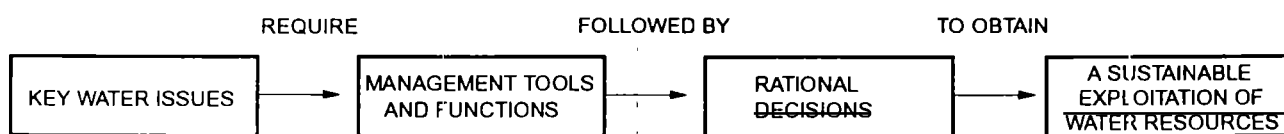


Figure 2.2 - Water resources issues management process

The issues were divided into two categories (impact issues, and user requirement issues) in order to more easily identify the relevant functions and management levels. "Impact issues" are those derived from human activities which negatively affect water resources in regard to quality and quantity. The negative impact can be on other users of the water or result in environmental degradation. "User requirement issues" are those which derive from an inadequate matching of user requirements (demand) and the available water resources (supply). These issues can be in regard to either quality or quantity of water resources. Both types of issue require an intervention from a structure or institution at a certain level and place - with powers that can resolve the issue in a manner which is as rational as possible, given the prevailing circumstances.

The issues were further grouped into four categories for easy identification. They are: surface water quantity, surface water quality, groundwater quantity, and groundwater quality. This categorization is shown in Fig 2.3

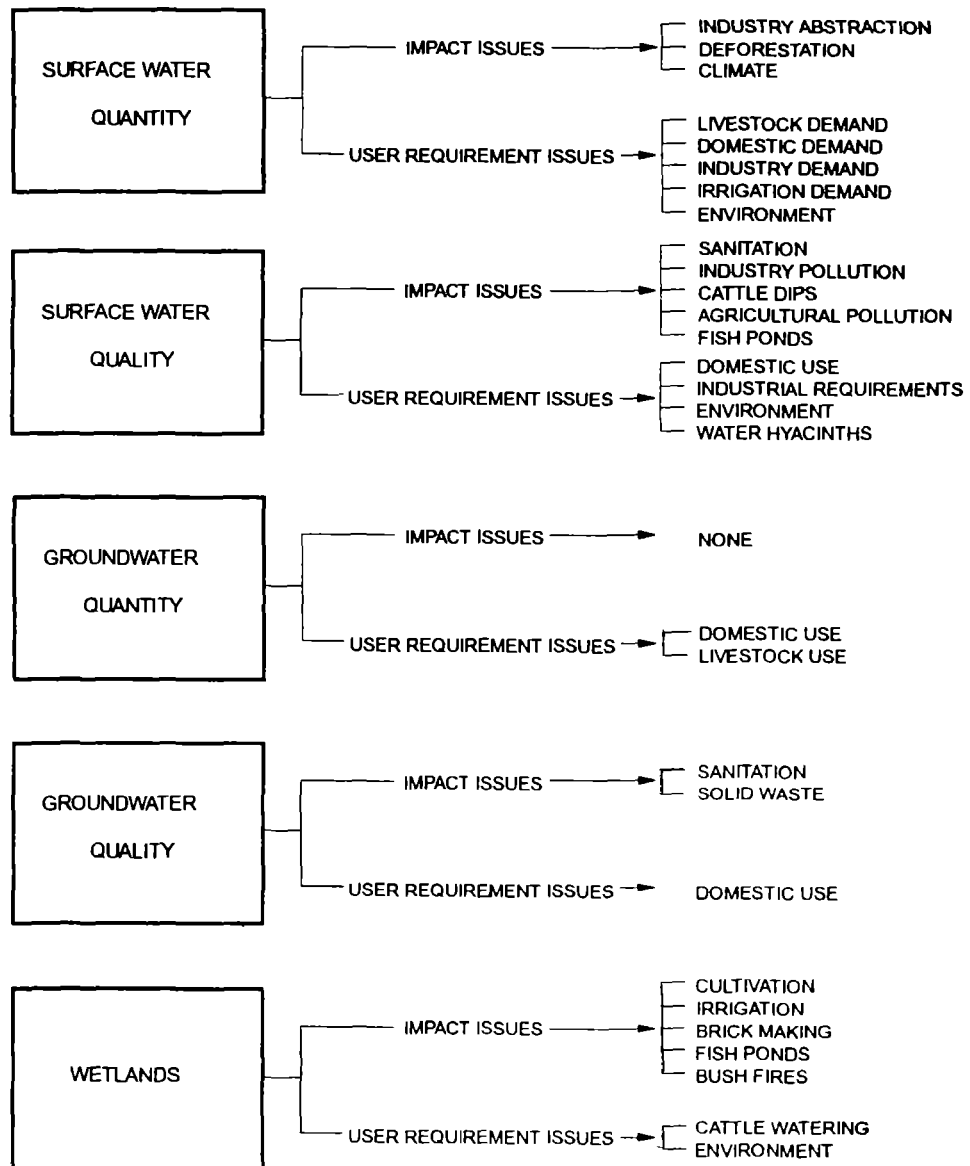


Figure 2.3 - Overview of main issues from the district studies

Not all the identified issues are those that are perceived as being critical by the local population or authorities. Some of the issues, for example, relate to water quality and the environment, and in many cases they are not possible to observe directly but require specialized investigations and equipment. They can, however, be just as damaging to socio-economic and health conditions as issues which are easily recognizable by the casual observer.

An explanation or rationale has been given for the inclusion of each issue as something requiring attention. A tentative listing of management functions necessary to deal with the issue was then derived; and, finally, the functions were distributed as responsibilities at the three management levels - national, district and community.

An illustration of the process and results is given in Table 2.1.

Table 2.1 - Some examples from Mbarara: issues identified - and the required responses:

SURFACE WATER QUALITY		
RATIONALE	MANAGEMENT TOOLS & FUNCTIONS	MANAGEMENT RESPONSIBILITIES
IMPACT ISSUE: POLLUTION		
<p>An abattoir discharges waste water into River Ruizi in Mbarara town; a milk station, a soap factory, a meat processing industry and a tannery all discharge to low-lying swamp land at Kakoba. Organic and chemical wastes are polluting both the swamp and a river, which is also used for domestic supply. Several companies are applying for registration (including Pepsi Cola) and Mbarara Town Council plans to develop an industrial area along the river.</p>	<p>Industrial effluent standards and regulations - based on trade-offs between treatment costs, capacity of the municipal treatment plant, and environmental benefits. Industrial environmental awareness building. Legal means of intervention when violations occur. Economic incentives.</p>	<p>National: Drafting of policies, standards, guidelines for EIAs, regulations. Establishing means of intervention. Providing economic incentives. District: Making EIAs. Monitoring & controlling effluents. Environmental awareness building. Community: Raising awareness of pollution. Reporting cases</p>
IMPACT ISSUE: DEFORESTATION		
<p>The intensive use of hill slopes for cattle pasture is claimed to have increased the erosion, which has caused severe silting of the rivers.</p>	<p>Regulatory control of land use. Incentives for adopting alternative farming practices. Declaration of forest reserves. Legal means of intervention.</p>	<p>National: Establishing framework for control of biomass use. Designation of forest reserves. District: Making by-laws. Promoting incentives for use of hill slopes. Community: Through Rcs, raising awareness, passing by-laws and exercising community self-control.</p>
USER REQUIREMENT ISSUE: DOMESTIC USE		
<p>Owing to the scarcity of developed groundwater sources in many parts of Mbarara District, a substantial number of households depend on surface water for consumption (mostly rivers and valley dams). There is no direct monitoring of the surface water quality, but it is obvious that this water is not suitable for drinking. Often the same source is also used for washing, wastes, and watering cattle. The high silt content also hampers the intake of water for domestic supplies.</p>	<p>Coordination of upstream/downstream use. Enforcing regulations for effluents. Managing a system of discharge permits, based on EIAs. Activating legal means of intervention.</p>	<p>National: Setting effluent standards and wastewater regulations. Establishing legal means of enforcement. Producing guidelines on construction and use of valley tanks and dams. District: Planning water intake and wastewater discharge locations. Supervising use of valley tanks and dams. Monitoring. Community: Maintaining quality of sources.</p>
USER REQUIREMENT ISSUE: ENVIRONMENT		
<p>Kagera River has become infested with the non-native water hyacinth - adding another dimension to the eutrophication phenomenon, since nutrient loadings (nitrogen and phosphorus) are rapidly converted into biomass. Navigation is impeded; oxygen depletion affects fish stocks.</p>	<p>Agreements have not been reached on most appropriate control measures.</p>	<p>National: Determine eradication strategy. Coordinate policies and controls with upstream countries. District and Community: Support and implement nationally determined actions</p>

2.2.2 Analysis of functions, potentials and constraints

The next step was to examine the existing institutions at the district and community levels in terms of their capacity to carry out the functions that had been identified. Issues were grouped into categories such as "wastewater", "solid waste", "sanitation", and "scarcity of water". The necessary management functions were listed, and then an analysis was made of the potentials and constraints of the district and community management structures that should take action.

Potentials describe the institutions, structures, regulations and staff that are in place and which are effective, or which can become effective through an infusion of resources such as finances.

The overall constraint affecting water resources management is lack of financial resources. Apart from that, constraints were identified that included, for example, "lack of water quality standards", "lack of local by-laws for wetland management", "lack of experienced staff in water monitoring", "inadequate transport", "lack of equipment", etc.

2.2.3 Defining a long term strategy

The identification of functions and management levels in the district studies led to a grouping of the functions into eight key tasks that were applicable at all three management levels. Details of activities at each level were then specified, and are summarised in Table 2.2.

This table is the synthesis of the work of the district studies as well as the analysis of appropriate national institutions. It illustrates the long term situation of how water resources management should function on the basis of the Water Action Plan principles - at a time when there is a reasonable capacity at all levels to carry out the necessary tasks.

Table 2.2 - Water resource management functions and levels

Functions	National level	District level	Community level
Formulation of international policies	Through the Water Policy Committee: Defining Uganda's position with regard to cross-border issues of water quantity and quality. Providing information for negotiations with upstream and downstream countries of the Nile Basin on these issues.		
Policy making, planning and coordination	Through the Water Policy Committee: Formulating national priorities for water and land resources. Ensuring that the plans and projects of related Ministries conform to national water resources policies, standards and guidelines. Setting water quality standards. Mediating on water resource issues.	Framing and upkeeping by-laws, standards and guidelines with regard to such matters as: - use of wetland - soil erosion - watering livestock - use of agricultural chemicals - fishponds - irrigation schemes. Establishing a database on the above matters. Coordinating extension programmes that carry water resources management information.	Through county and sub-county level Rcs: Framing by-laws on water-related issues of direct concern to local communities. Managing the use of, eg. wetlands and forests.
Water extraction regulation	Through DWD: Conducting impact assessments of cross-boundary and cross-border uses of water. Specification of water volumes for which districts can allocate extraction permits.	Through district water officers: Conducting impact assessments. Processing applications and issuing drilling and extraction permits.	
Wastewater discharge and pollution regulation	Through DWD: Processing wastewater discharge applications and issuing discharge permits.	Through district water officers: Commenting on applications in relation to district development planning. Organising public hearings. Assisting in monitoring that permitted levels are adhered to. Through public health authorities: Disseminating information on national standards.	Through water and sanitation committees and water user groups: Assisting in the monitoring of potentially harmful discharges. Framing and enforcing local rules and maintaining structures to avoid contamination of domestic water sources.

Functions	National level	District level	Community level
Monitoring	Through DWD: Monitoring water flows and water quality. Managing surface water, groundwater and water quality data banks. Disseminating water resources data to relevant users.	Through district-based staff concerned with natural resources and health: Checking that permit holders act in accordance with their permits. Assisting DWD in monitoring wastewater discharges are according to permitted levels. Checking that extraction levels do not exceed estimated recharge. Checking groundwater for possible contamination. Checking that by-laws and rules are being kept.	Through water and sanitation committees and user groups: Monitoring the condition and use of water resources and facilities. Reporting misuse and infringement of regulations.
Enforcement	Through DWD: Enforcing wastewater standards and regulations through a permit system. Initiating legal or administrative actions.	Through relevant administrative machinery, or RC and Magistrates Courts: enforcing sanctions when permits, by-laws or regulations are not being followed.	
Mediation	Through Water Policy Committee: Acting as final administrative mediation for water disputes and for settling institutional disputes.	Through Environment and Natural Resources Committee, another independent body, or Magistrates Courts: Mediating disputes that may involve individuals, institutions, and the district administration over water rights and uses.	Through Elders, Chiefs and village RC courts: Mediating water resource disputes concerning individuals. Through RC system: Mediating disputes between groups.
Training and information dissemination	Through DWD Training Unit: Developing water resource management training workshops and materials, directed to extension staff in agriculture, community development, forestry, fisheries and health. Developing materials suitable for public information on water resources management issues.	Through staff of proposed Environment and Natural Resources Department: Conducting workshops for extension workers on water resources management issues - relevant to particular districts. Conducting educational activities on water resources management, for the general public - and particularly for members of water and sanitation committees and user groups	

2.2.4 Capacity analysis

The district analysis of potentials and constraints to carry out particular water resources management functions was supplemented with an analysis of national capacities. These analyses were then combined into the table below on the basis of the eight key functions. The pervading constraints of lack of finances, transport and equipment are common to all functions.

Table 2.3 - Summary of water resources management functions, potentials and constraints

FUNCTIONS	POTENTIALS	CONSTRAINTS
Formulation of international policies	Establishment of the Water Policy Committee has been agreed	Lack of formal agreements between the countries of the Nile Basin. Lack of reliable information on the quantity and quality of shared water resources.
Policy making, planning and coordination	Legislation on water resources and supply has been drafted. Establishment of the Water Policy Committee has been agreed. NEMA has been established - opening up possibilities for cross-sectoral planning. DWD has a complement of staff with considerable experience of water resource management issues. DWD has been restructured to focus on advisory and supervisory roles. Decentralization opens up opportunities for a more rational reorganisation of cross-sectoral agencies and extension services. Sectors such as Agriculture, Community Development and, particularly Health are already involved in the development and supervision of water resources.	Low capacity at the district level for conducting environmental impact assessments. Inadequate knowledge of water resource management issues among extension officers. Economic pressures, such that environmental concerns are over-ridden. Lack of adequate structures for coordination across extension services.
Water extraction regulation	Regulations and management procedures are drafted. Capacity requirements at national level are low - easily absorbed by DWD. The local administrative system is established in all districts - with District Water Officers in place in most districts.	Shortage of staff at district level with engineering qualifications. Unclear interface between district, municipal authorities, and DWD. Lack of monitoring equipment.
Wastewater discharge and pollution regulation	Staff with necessary knowledge exist within DWD HQ. Required administrative structures and procedures at national level are relatively uncomplicated. District Water Officers can assist in monitoring activities.	Shortage of qualified staff at district level to deploy for discharge control. Lack of monitoring equipment. Very limited access to laboratory facilities.

FUNCTIONS	POTENTIALS	CONSTRAINTS
<p>Monitoring</p>	<p>"Rehabilitation of Water Resources Monitoring and Assessment Services" has been agreed. DWD HQ has staff with required qualifications. District Water Officers can assist in monitoring activities.</p>	<p>No formulated monitoring strategy, at present. No national or local standards on water resources management. Lack of staff at district level with engineering (hydrology) qualifications. No qualified staff at district level to deploy for general WQ monitoring. Lack of monitoring equipment. Very limited access to laboratory facilities.</p>
<p>Enforcement</p>	<p>Regulations are drafted. RC and Magistrates Courts are in place and functioning.</p>	<p>Possible adverse socio-economic and political priorities and pressures.</p>
<p>Mediation</p>	<p>Traditional institutions, such as the meetings of Elders, the Administrative Chiefs, as well as the RC and Magistrates Courts, all could have a role. Water Policy Committee can act as final administrative appeal.</p>	
<p>Training and information dissemination</p>	<p>Possibility that Training Section of DWD will be strengthened. The RC system ensures a high degree of community participation - in discussion of issues and decision making Extension services, in related fields such as Agriculture, Community Development and Health, reach right down to the village level - with opportunities for Water Officers collaborating in the design and delivery of environmental messages</p>	<p>Shortage of qualified staff who could carry out educational programmes concerned with the management of water resources. Lack of coordination between extension agencies, so that harmonised information on water resource management issues can be disseminated and discussed</p>

The conclusion of the capacity analysis was that it was not possible for all levels to carry out all the necessary functions noted in Table 2.3. The weakest level was found to be the district, which is not surprising considering that the districts are in a process of taking on new responsibilities as a result of decentralization, but have not yet acquired the necessary structures or experience. The existing community level structures were found to have a good potential for water resources functions; they are, in fact, already active in a number of ways. Some structural adjustments were found to be required at the national level.

2.2.5 Short term strategy

The output of the capacity analysis was a short term strategy that limited the functions at the various levels in order to fit them to the expected management capacity available. It is expected that the short term will be a period of approximately five years, but there will be differences between the districts; for example, on how soon they will be ready to take on additional responsibilities. Training and capacity building needs for the short term have also been identified.

Table 2.4 - Short term resource management functions

Main functions	National level	District and community levels
Formulation of international policies	Establish Water Policy Committee, its Secretariat, and its International Subcommittee.	
Policy making, planning and coordination	Set national priorities for water and related land resources. Revise policy, legislation and regulations. Liaise with NEMA. Ensure plans and projects conform to national policies, standards and guidelines. Advise Minister on decentralization of national functions and on appeals regarding water extraction and discharge licensing. Mediate disputes between government bodies concerning water resources issues.	Establish an Environment and Natural Resources Committee plus its administrative department - or other structure to perform the same functions. Define district priorities in the light of a problem analysis. Make relevant by-laws and regulations which address the priority problems. Integrate district extension services. Establish a database of water resources. Promote the management role of women in water resources.
Water extraction regulation	Establish a unit within DWD for processing applications and issuing permits for water extraction - as per regulations.	Identify large water users for licensing by DWD. Set up procedures within the office of the DES for commenting on applications to be passed on to DWD. Establish a database of water sources and structures in the district. RC committees to comment on water extraction applications.
Wastewater discharge and pollution regulation	Establish unit within DWD for administering wastewater discharge permits as per regulations.	Identify wastewater dischargers for licensing by DWD. Establish procedures for administering the licensing system, through the DES office, as per regulations. RC committees to report on pollution problems - and to comment on wastewater discharge applications.

Main functions	National level	District and community levels
Monitoring	Measure water flows and water quality. Monitor performance of permit holders. Process information collected at monitoring stations and manage a databank. Disseminate water resources data to relevant users.	Observe performance of permit holders and report misuse to DWD. Strengthen monitoring capacity.
Enforcement	Through the special unit set up within DWD, for administering permit system, enforce regulations for water extraction and wastewater discharge - referring to civil courts when necessary.	
Mediation	The Water Policy Committee to act as final administrative agency for mediation between government institutions regarding water resources issues.	The Environment and Natural Resources Committee to act as mediating body for disputes that cannot be resolved at lower levels. RCs, RC Courts, Chiefs and Elders to act in settling local disputes.
Training and information dissemination	Strengthen Training Section within DWD, in order for it to assist in the design of training programmes on water resources management - in guiding districts in relation to national legislation, regulations, policies and standards.	Train extension agents in the integrated extension approach to water and land management, and in disseminating integrated environmental information. Support RCs, and particularly members of water user groups, in their educational and custodial roles with regard to effective water resources management.

2.3 Outputs

The outputs of the WAP formulation process have been:

- identification of the key water resources management functions and the appropriate levels at which they should be performed
- an institutional framework for water resources management at the national, district and community levels
- long and short term strategies for establishing water resources management in Uganda
- training and capacity building needs to implement the short term strategy

In addition to the process described above, which is concerned with water resources management, the Water Action Plan process has included the necessary related activities as follows:

- formulation of a national water resources policy
- assessment of the existing situation of water resources in Uganda, both surface water and groundwater
- creation of a database of known groundwater resources
- drafting of detailed management procedures for a water extraction permit system, to be used as an input to the drafting of subsidiary Regulations to the Water Resources Statute, and as a future management tool
- drafting of detailed management procedures for a wastewater discharge permit system, for the same purpose as above
- listing of the existing water resources plans and projects and proposing guidelines of how they can be prioritized
- detailing of the actions needed in the short term to initiate the implementation and monitoring of the Water Action Plan

The policy statements, institutional structures, procedures, regulations, guidelines, databases - the tools needed in the effective management of water resources - are presented in this and the other Water Action Plan documents listed in the following table:

Table 2.6 - The main Water Action Plan Documents

WATER ACTION PLAN: MAIN REPORT

A synthesis of the key points of the Water Action Plan, comprising the water resources management framework, the main components, the action programme and a guide to the implementation and monitoring of the Plan.

WATER RESOURCES POLICY

A definition of a water resources policy, with its associated management strategies; outline of areas for further policy developments; first draft of a water supply and sanitation policy.

RAPID WATER RESOURCES ASSESSMENT

An estimate of the occurrence in space and time of both surface and groundwater resources in Uganda - and a tentative assessment of the water requirements and water resources development trends.

INSTITUTIONAL AND MANAGEMENT ASPECTS

An identification and analysis of water resources institutional structures, management functions and tools; presentation of both short and long term strategies for water resources management - and the implied capacity building programmes.

INTERNATIONAL ASPECTS

A commentary on Uganda's position in the Upper Nile Basin, in relation to water resources; a brief history of the main international issues, from Uganda's perspective; an analysis of the implications of Uganda's location as both a lower and an upper riparian.

ANNEX REPORT, VOLUME 1: DISTRICT STUDIES

Collation of studies on the water resources issues and management capacities of five districts - Arua, Mbale, Mbarara, Moroto, Mukono - and studies on particular topics for Hoima, Kabale and Tororo.

ANNEX REPORT, VOLUME 2: GROUNDWATER DATABASE

A description, specification and manual for the development of a groundwater database.

ANNEX REPORT, VOLUME 3: MANAGEMENT ASPECTS

Background for the preparation of regulations supporting the Water Resource Statute; guidelines for district water resources management; procedures for processing and issuing permits.

ANNEX REPORT, VOLUME 4: PROJECTS AND ACTIONS

Descriptions of water resources development plans and projects; guidelines for prioritization, conducting impact assessments, updating and coordination; catalogue of water resources related projects and actions.

THE WATER ACTION PLAN - EXECUTIVE SUMMARY

An overview which includes: problems that have been addressed, strategies that have established the framework for action, institutional and management structures, highlights of the rapid water resources assessment, key water resources management procedures, and the actions for implementation.

3 THE WATER ACTION PLAN COMPONENTS

3.1 Overview

Three main components are needed to achieve the goal of sustainable management of water resources:

- an enabling environment, which is a framework of national legislation, regulations and local by-laws for encouraging sound management of the water resources and constraining potentially harmful practices
- an institutional framework that allows for close interaction between national, district and community levels
- planning and prioritization capabilities that will enable decision makers to make choices between alternative actions based on agreed policies, available resources, environmental impacts and the social and economic consequences

The overall structure of the Water Action Plan is illustrated in Fig 3.1 below

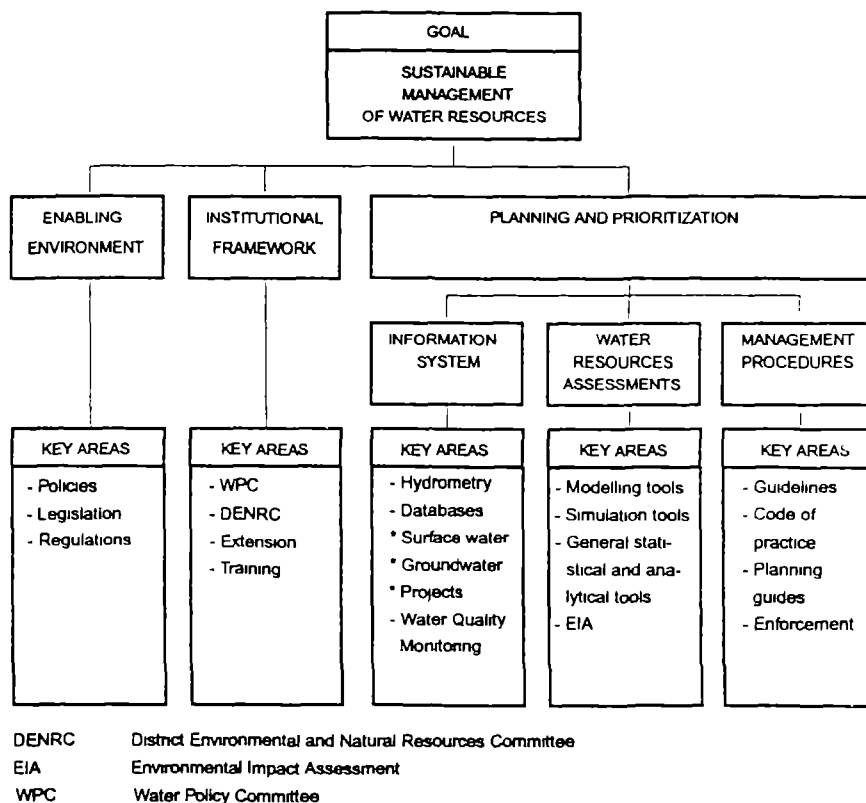


Figure 3.1 - Structure of the Water Action Plan

To prioritize and make rational planning decisions, certain tools are crucial:

- an information system, within which information on the quantity, quality, utilization and environmental condition of water resources can be collected, analyzed and disseminated
- water resources assessments, which evaluate the impact of proposed interventions on the hydrological regime and water quality, such as extractions or wastewater discharges
- management procedures for regulation of water resources.

Finally, a number of actions are required, so that the whole structure can become operational and sustainable. These actions are described in the next chapter.

3.2 Enabling Environment

In accordance with the decentralization policies of Uganda, and the principles underlying the formulation of the Water Action Plan, a structure is called for that facilitates management at the lowest appropriate levels. The national agencies should be concerned with essential functions not to be dealt with at other levels, and should act as enablers that review and revise the overall structure so that it responds to current needs and priorities.

3.2.1 Policy

Considering the central role of water in the socio-economic development of Uganda - and the extent of water resources problems - there is a clear need for a policy framework for water resources management: in order to establish priorities and plan the optimal use of the available resources.

In WAP Doc. 006, a National Water Policy is proposed. Taking note of important statements in the Draft Constitution and from the National Environment Management Policy, a set of principles are elaborated as a guide to formulating a National Water Resources Policy. Areas for further policy and strategy development are identified. The document also includes a first discussion draft of a Water Supply and Sanitation Policy.

3.2.2 Legislation

A Water Resources Statute and a Water Supply and Sanitation Statute, as already drafted and without major modifications, will have to be approved by the National Resistance Council. Regulations supporting these pieces of legislation will have to be approved and issued by the responsible minister.

3.2.3 Regulations

The two areas where regulations are most needed as a first priority are the extraction of both surface and groundwater and wastewater discharge. However, one of the guiding principles of the Water Action Plan is that management structures should be developed only in response to a perceived and expressed demand from those affected - and be balanced against administrative and enforcement capacities. Hence, small scale water extractions will be excluded from regulations if they do not significantly affect the possible use by others of the same resource. Similarly, the scope of wastewater discharge regulations is reduced by focusing on the most characteristic contaminant of the major polluting entities - BOD.

The topic of regulations is taken up later in Sub-section 3.4.3, and a detailed presentation will be found in Annexes 14, 15 and 16 of WAP Doc. 012, Annex Report - Volume 3.

3.3 Institutional framework

The recommended framework of the Water Action Plan is one which attempts to strike a balance between national and local levels in carrying out the eight key water resources management functions outlined in the previous chapter. The organizational framework which is envisaged builds on the recent reconstruction that has taken place within the Ministry of Natural Resources, anticipates the reforms happening within the decentralized district administrations, and recognises the already strong participation of village-based RC committees and user groups in securing water supplies.

The institutional framework, covering all three levels - national, district and community - is illustrated in Fig 3.2 below.

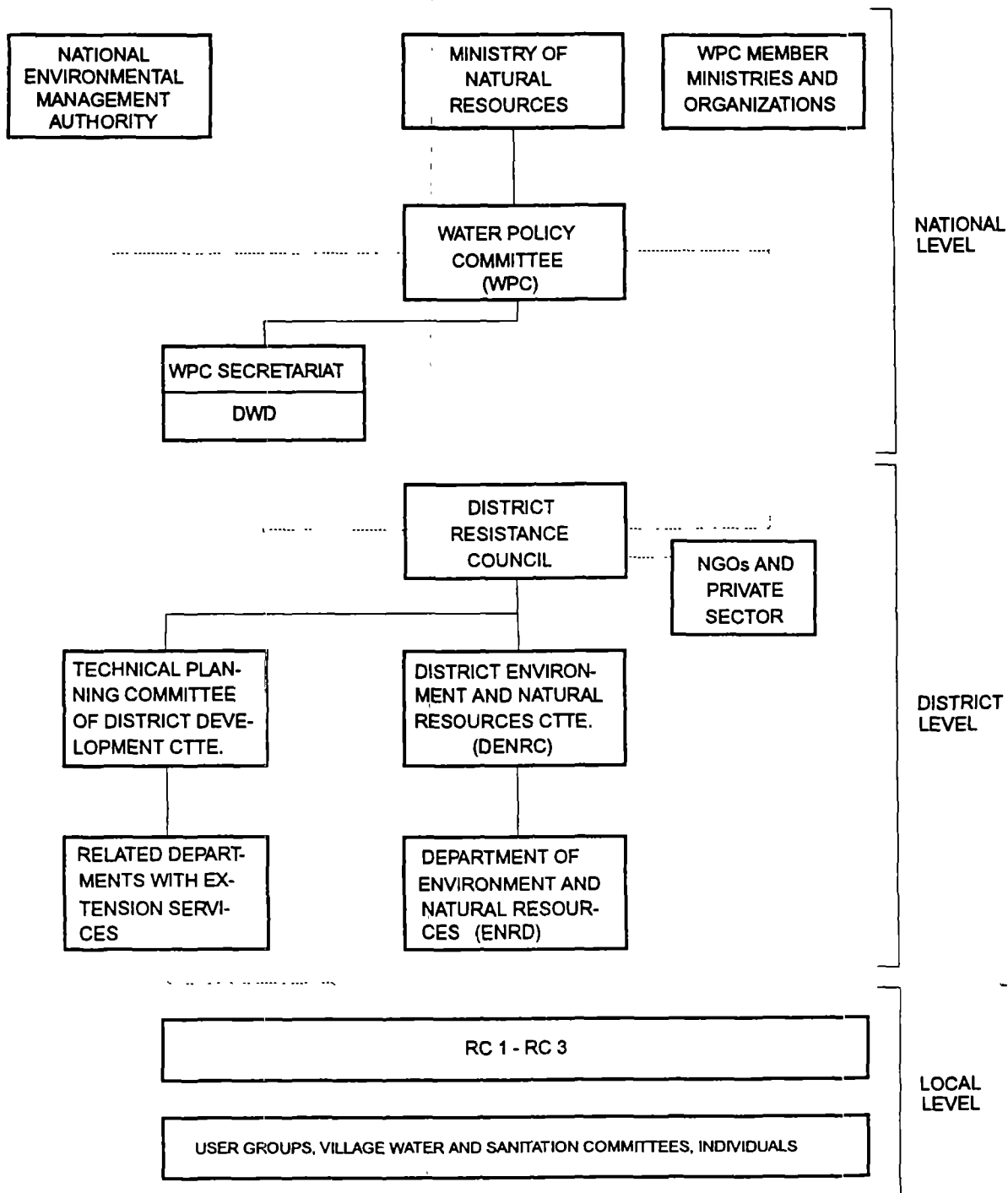


Figure 3.2 - Water resources management: the institutional framework

3.3.1 Water Policy Committee (WPC)

A Water Policy Committee will be established, according to the provisions of the Water Resources Statute. It will be placed in the Ministry of Natural Resources with the Permanent Secretary of that ministry as Chairman and the Director of Water Development as Secretary. It will relate closely to the National Environment Management Authority, with regard to the setting of environmental policies and standards relating to water resources.

There will be a Secretariat of, say, two professional staff plus support staff, placed within the Directorate of Water Development. The Secretariat will draft proposals, prepare meetings, liaise with contact persons in all member institutions, monitor follow-up of decisions taken, and prepare reports.

Liaison officers will be appointed in every member organisation, with responsibility for the daily management of the decisions of the Committee that effect their organisation. Further responsibilities will comprise an early reporting on projects under preparation or in the pipeline, so that sound water resources management considerations can be incorporated.

Except where specified in legislation, the Committee will not be able to take decisions binding on all member organisations. The member organisations will have to formally take the decisions themselves, but the agreements reached at the Committee will be at such a high level that the formal decisions and implementation should be assured.

The main functions of the Water Policy Committee are to:

- coordinate policy formulation regarding international water resources
- initiate the process of revision of the national water resources policy, legislation and regulations
- coordinate the continued Water Action Plan process
- liaise with the National Environmental Management Authority
- coordinate the formulation of national priorities for the use of water and related land resources
- set national water quality standards, and setting procedures for the administration of wastewater discharge permits
- set procedures for administration of water extraction permits

- review and coordinate the formulation of national plans and development projects of related ministries that affect the protection and utilization of water resources
- resolve conflicts between government bodies regarding water resources that cannot be resolved at the district level

Members of the WPC will come from relevant government ministries and departments, and the committee will include representatives from district administrations, research organizations and NGOs. The Chairman will be the Permanent Secretary of the Ministry of Natural Resources, and the Secretary will be the Director of Water Development. DWD will provide a Secretariat for the WPC. DWD, and its four restructured departments, will have overall responsibility for water resources management, but it will move towards supervisory and advisory roles and away from direct implementation of projects. It will continue to have a direct role in water resources monitoring, wastewater discharge permits and water extraction permits. (More details on the functions and membership of the WPC can be found in Section 6.2 of WAP Doc.008 - Institutional and Management Aspects.)

3.3.2 Directorate of Water Development

After decentralization, the Directorate of Water Development will function primarily at the national level, as a regulatory and supervisory agency rather than as an implementing one for water resources management activities. District water staff concerned with water supply services will be employed by and be responsible to the District Resistance Councils through the District Executive Secretaries. Some staff may be employed directly by DWD for water resource monitoring and will be stationed in district centres so that they can cover a number of districts.

In general, the four departments that now exist after re-structuring will function as follows:

- The Rural Water Development Department and the Urban and Institutional Water Development Department will implement donor and national-funded projects through the districts.
- The Inspection and Support Services Department will supervise and advise the districts on their own water supply activities and water resources management, and it will be the coordinating body in DWD that links all departments to the districts.
- The Water Resources Management Department will be responsible for monitoring and control of water resources, both in terms of quality and quantity.

There will be a small Secretariat for the Water Policy Committee under the Director - and a special unit will be set up within DWD for the processing of permits for water extractions and wastewater discharge.

Thus, the role of DWD after decentralization will be:

- technical adviser to government and the Water Policy Committee on international water resources management issues
- technical adviser to the Water Policy Committee on national water resources management issues, including national policies
- secretary to the Water Policy Committee and administrator of the WPC's secretariat

Its functions will be:

- collection, analysis, preservation and dissemination of hydrological, hydrogeological and water quality information
- administration of the wastewater discharge permit system
- administration of the water extraction permit system, apart from those functions delegated to district level
- technical supervision, inspection and advisory input to district management of urban and rural water supplies and sanitation
- liaison with international donors and NGOs, and implementation of national and donor funded projects

3.3.3 District committee and departmental structure

Of the five technical committees specified as compulsory in the Local Government (Resistance Councils) Statute, 1993 - Production and Marketing, Health and Environment, Education, Works and Transport, Welfare and Sports - it appears that the Health and Environment Committee, which might have been assumed to have considerable responsibility for water resources management, is likely to be concerned mainly with environmental sanitation and not overall environmental management. Overall planning and coordination will be done by the District Development Committee and its sub-committee called Technical Planning Committee.

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Water resources management needs to be closely linked to environmental management. NEMA is proposing the establishment of District Environment Committees. However, it seems appropriate to bring together all natural resources management functions in one committee. Therefore, a District Environment and Natural Resources Committee (DENRC) is proposed.

The functions of a DENRC in relation to water resources management at the district level are those described in the previous chapter. The DENRC will supervise the technical staff in the implementation of these functions, and it will recommend policies, priorities, by-laws and standards to be adopted by the District Resistance Councils.

Membership of the DENRC will be determined by the DRC, and should include both political and relevant civil servant representatives to ensure that qualified social, technical and economic considerations are taken into account. The Chairman should be the Chairman of the DRC or his representative, and the Secretary should be the District Natural Resources Officer. NGOs that are active in water and related land management activities may also be co-opted as members.

The Decentralization Secretariat has proposed to the districts that they form five departments corresponding to the five technical committees, and that all existing departments be combined into these five. However, it is not appropriate that regulatory functions, such as environmental and water management, be part of a production or public works department; nor is it appropriate that water and environment management functions be submerged in a huge department such as health. Environment and water resources are national priority sectors that attract much external funding, and therefore need a solid and recognizable structure and profile at the district level.

It is therefore proposed that another department be formed called the Environment and Natural Resources Department. It would include water, environment and forestry staff.

3.3.4 Integrated Extension Approach

In order to ensure that environmentally sound water and land management practices are spread throughout the district, and in order to make maximum use of scarce resources - staff, transport, equipment and offices - it is proposed that the districts coordinate their extension staff in various departments so that they disseminate the same environment and water resources management information and guidelines. The information and guidelines have to be integrated at the community level so that water and land management practices are coordinated in an environmentally sound manner.

The departments and units that have extension staff and would be involved are: health, community development, agriculture, veterinary services, forestry and fisheries. The concerned departments and committees would work together to create a unified extension approach regarding, for example, land use practices and soil erosion, use of wetlands, use of chemicals, wastewater control.

The integrated extension programme should be coordinated and monitored by the Technical Planning Committee.

3.3.5 Community structures

At the community level, demand-driven community management of water supplies at the lowest appropriate levels are directed by village and sub-county water and sanitation committees. These are closely linked to, and may be part of, the Resistance Councils (levels 1 and 3). They can perform useful conservation and maintenance functions in terms of water resources management - and these are described in the previous chapter.

Women already play a prominent role in the user groups and in maintenance of the water facilities and household irrigation. This participation should be built on to encourage more women to take higher profile roles in committees with overall management responsibilities.

3.3.6 Mediation structures

The existing mediation and judicial structures will continue to function as before in settling disputes about the utilization of water resources. At the community level these are the Resistance Committees and Courts (especially at the RC 1 level), the Chiefs and Elders. These structures at present settle virtually all local disputes. Some problems, however, will need to be referred to higher levels. The Environment and Natural Resources Committee can act as an administrative appeal possibility at the district level; while the District Development Committee can settle inter-departmental disputes. Also, disputes can be handled on a civil basis through Magistrates Courts. This forum would most likely be used by persons or organizations that disagree with decisions of the DENRC regarding water extraction permits, for example.

3.4 Capacity building

As well as skill-based training related to developing assessments capabilities, in order to carry out the functions described in the short term strategy (as outlined in the previous chapter) to effectively operate the management information system and execute the management procedures, there will be a need for various training, education and information activities at the national, district and community levels.

Orientation programmes

To inform about the Water Action Plan, the new water resources legislation, and structural recommendations, there should be orientation programmes for those politicians, officials and public representatives who become members of policy making and planning committees related to water resources management.

Reorientation programmes

To deepen awareness of water resources management issues, and clarify new roles and responsibilities, there will be a need for reorientation programmes for staff in DWD and in other key sector ministries, and for district-based staff, who have responsibility for carrying out water resources management functions.

Curriculum development

To integrate water resources management topics within the training of staff working in the water and related sectors, workshops and seminars should be held for members of the training section in DWD who are designing training activities and information materials - and there should be liaison with staff of relevant training institutions to advise them on how water resource management topics could be integrated in pre-service courses.

Extension training

To support the possibilities of integrating extension services, in-service programmes will be needed for those extension workers who have a responsibility for giving information and facilitating discussion about water resources problems and issues.

Information dissemination

Awareness programmes on water resources management issues should be designed and addressed to the general public - but particularly to members of RCs and members of natural resources committees operative within local communities.

3.5 Planning and prioritization

As a basis for rational planning - especially for the prioritization of water resources issues to be addressed - the three important management tools should be in place:

- an information system: for collecting, analysing and disseminating further data needed for management decisions
- water resources assessments: which provide the basic knowledge to evaluate impacts of alternative management decisions
- management procedures: the set of guidelines and codes of practice needed for consistent responses in problem solving and decision making

3.5.1 Data management system

An integrated data management system is needed that will collect, analyze, store and

3.5.1 Data management system

An integrated data management system is needed that will collect, analyze, store and disseminate information - and assist the wide variety of users in their access to and application of the information that is relevant to their specific management functions:

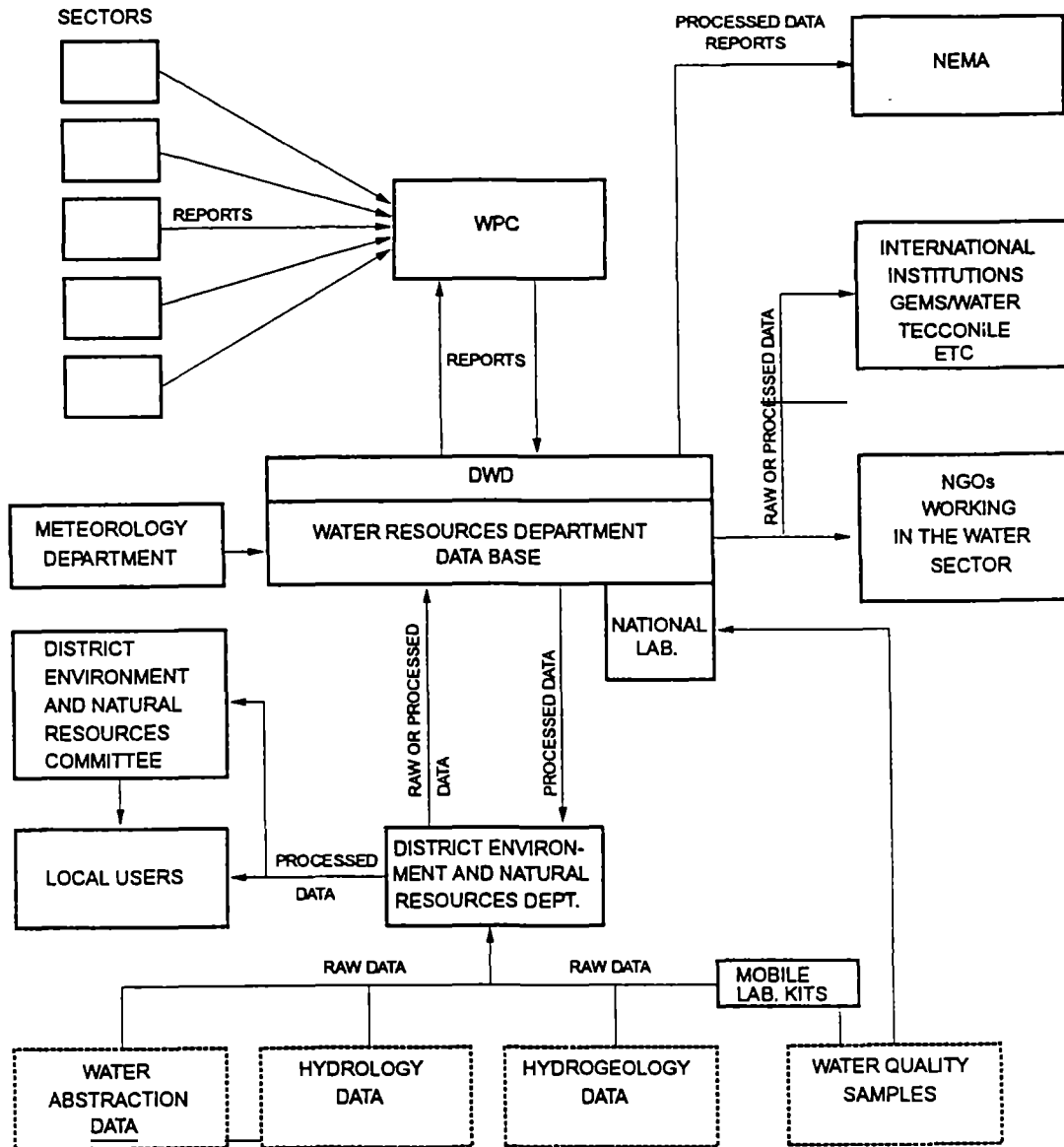


Figure 3.3 - Structure of data management system

For speed and efficiency in making and implementing decisions, it is important that, whenever possible, relevant information is abstracted, analyzed and used at the district level -instead of waiting for it to come and go out of the central databank. Also, in order to facilitate cross-sectoral management mechanisms, data will need to flow, as illustrated,

to sectors related to water resources, such as agriculture, land, fisheries and forestry.

3.5.2 Rapid Water Resources Assessment

The rapid assessment provides an approximate picture of the available water resources in the country - as a support to overall planning and as an indicator of priority areas within which more detailed investigations should be carried out. The Rapid Water Resources Assessment is found in WAP Doc. 007. Three major water resources planning units have been considered: the Upper Nile system, the Ugandan catchments, and the groundwater sources.

The Upper Nile system

The equatorial lakes and the Nile, which make up the "Upper Nile system", represent a huge water resource - and a potential for numerous development activities. Although Lake Victoria provides the water supply of the three large towns - Kampala, Entebbe and Jinja - this represents only approximately 0.2% of the lake's outflow. Furthermore, no large scale irrigation is expected within the Ugandan terrain bordering the lake. Nevertheless, one of the main concerns will be to maintain the lake as a storage reservoir which can yield the consistently high outflows needed for the generation of hydropower. More critical, however, is the issue of pollution: not from Uganda alone, but from all the upper riparian countries. The present problem caused by the rapid spread of the water hyacinth is exacerbated by the deteriorating water quality. Such deterioration could seriously affect water supplies, jeopardise fishing, and impede the development of a tourism industry.

Fishing and tourism are potentials of the other two very large lakes, Albert and Kyoga, and they too would suffer from water quality changes. Lake Kyoga might well be a sustainable source for irrigation projects. As for hydropower, only a small fraction of the vast potential of the River Nile from Lake Victoria to the Sudanese border is being tapped.

The Ugandan catchments

Whereas the dominant source of large urban water supplies is surface water, the smaller towns and rural areas are, and will continue to be, dependent on groundwater. Throughout the country, livestock are usually provided for from surface water sources. In general, though the surface water resources will be able to satisfy urban and livestock demands into the foreseeable future, the distribution pattern is such that there will be competition for water in certain cases - particularly where there are large annual variations in river flows or where streams are not perennial.

It is difficult to predict the trends of agriculture in the country - and therefore be able to estimate the demands irrigation will put on surface water sources. The economic and social feasibility of large scale irrigation compared with alternative agricultural practices is not obvious - so demands for irrigation water are not likely to be significant in the near future. Fish ponds are on the increase in Uganda, and the current estimate is that there are about 2000 working ponds. The water requirements - and the possibilities of organic pollution - may become increasingly significant issues.

In addition to Kampala, Entebbe and Jinja, only 10 towns have waterborne sewerage systems; other areas are served by combinations of septic tanks and pit latrines. In areas of low dry-season runoff, effluents are often not properly diluted; so downstream water intakes can be polluted and, without adequate and reliable treatment mechanisms, serious health hazards occur.

Groundwater resources

Though it seems - from recent surveys, calculations of recharge rates, and estimates of developments - that groundwater resources can, over most parts of Uganda, meet the demands in rural areas, in more densely populated places the deep groundwater, even when supplemented with shallow wells and springs, may not meet supply requirements, without significant cost implications.

Corrosiveness is a widespread problem, and worryingly high fluoride concentrations occur in certain locations.

There has recently been much concern over the possible drying out of water sources. A specialized climatological study was made during the WAP working period. The figure below shows long-term variations in rainfall over a central catchment in Uganda. The long term variations show a cyclical behaviour, and present departures from the norm are much less serious than those experienced in the forties, fifties and early eighties. The observations are in harmony with the general pattern of Lake Victoria level variations, and it can be assumed that the graph is representative of much larger areas of Uganda.

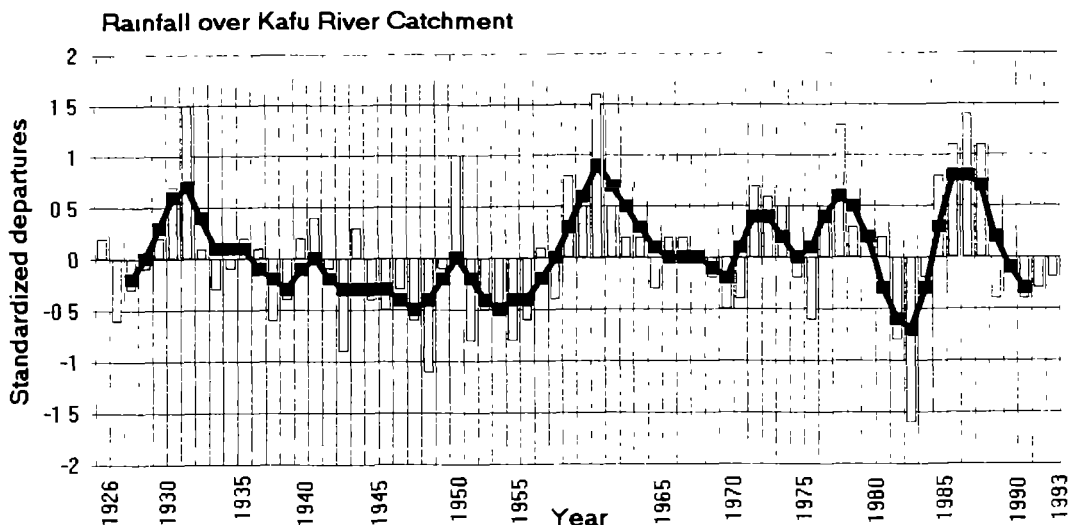


Figure 3.4 - Long-term rainfall variations over a central Ugandan catchment

3.5.3 International aspects

If there were to be a marked reduction in the flow of the Nile, then the international consequences would inevitably be significant. There would be immediate impacts on the lower riparians, Egypt and Sudan - both of whom have strong interests in continuing to receive the same volume of water as would be provided without any major abstractions by the upper riparian countries. Similarly, pollution of the lakes and rivers of the Nile Basin can have an impact of significance to five countries: Egypt, Kenya, Sudan, Tanzania and Uganda.

There is a need to examine further the present legal obligations and the current forums for cooperation - with a view to possibilities of ensuring equitable sharing arrangements. The relevant treaties are: the Nile Waters Agreement of 1929 and the Owen Falls Dam Agreement of 1949 - as well as the three agreements with Nile Basin states entered into by Uganda after independence. These old and more recent agreements should be assessed in the light of current, and generally accepted, doctrines of "equitable utilization of shared water resources" - and set against environmental declarations of the United Nations.

A most important international aspect is the question of pollution. Water quality and pollution loads in the region are not being monitored sufficiently well to make accurate assessments - or specify cause/effect relationships - but it is apparent that there has been a serious deterioration of the ecology and water quality of Lake Victoria during the last two decades - and this, in turn, affects the water quality of the Nile. With the increasing population in the catchment area and the reduced buffer capacities of the ecosystem, there could be a dramatic reduction of the fish stocks, a build up of algae blooms along lake shores adjacent to towns, and further contamination - causing major health hazards. International action is urgently required.

Uganda, alongside the other riparian nations, has particular reasons to regard water as both an economic and environmental good - and a strong interest in participating in any multi-national basin-wide organization concerned with the management of the water resources. The Water Policy Committee will have a clear mandate in helping to formulate Uganda's priorities and policies.

3.5.4 The need for regulation and management procedures

The conservation, equitable use and protection of Uganda's water resources can be achieved only by putting in place appropriate regulatory machinery - and making sure that there is capacity to operate that machinery. Among the many matters on which control can properly be exercised, there are two main activities for which regulatory mechanisms are urgently needed: extraction of both surface and groundwater - and wastewater discharge.

Administration

A small unit will be established within the Directorate of Water Development for processing applications and issuing permits for water extraction and wastewater discharge. The unit will also have responsibility for enforcing wastewater standards and regulations. And at the district level, in cases where monitoring reveals that permits, by-laws or regulations are not being followed, the district authorities will need to apply sanctions, either administratively or through the RC and Magistrates Courts.

But the drafting and implementation of regulations, permits, by-laws and procedures should all be in harmony with the principles that underlie the Water Action Plan: devised in a participatory manner and managed at the lowest appropriate level. Also, recognizing capacity constraints, the regulatory system should apply only to activities where the negative impact on the water resources are on a significant scale.

Regulating water extraction

A core element of water resources management is the rational prioritization and sustainable allocation of water among different users. Of course, the more scarce the resources, the more necessary and difficult this management becomes. But always, as a basis for making these judgements, it is vital to have adequate information about what resources are available -and what are the present and likely future demands on those resources. Such information can be obtained only if users report on their extractions to those who have the responsibility for managing the resource. Hence the first need for the regulation of water extraction.

However, it is argued that there is no case for regulating small scale water extractions if they do not adversely affect the possible use of the resource by others. Therefore, although there will be an obligation to report on all groundwater drilling, only large scale extractors will need to apply for permits - and be subjected to the consequent monitoring.

Two levels for regulation of groundwater extraction and three for surface water extraction are envisaged. As shown in the following table, the determining factor is the degree of anticipated impact on the resource. Note that, in the case of irrigation schemes and fish ponds, the recommended threshold values have not been specified - these will be determined, in due course, by the Directorate of Water Development.

Criteria for levels of water extraction regulation:

DEGREE OF CONTROL	GROUNDWATER	SURFACE WATER
No regulation	Domestic use as defined in Water Resources Statute Extraction by manual means	Domestic use as defined in Water Resources Statute Extraction by manual means
Registration required		Extraction of water by motorized pump or by gravity diversion with a capacity < 5 l/s Non-subsistence irrigation schemes < .. ha Non-subsistence fish ponds < .. ha
Permit required	Extraction by motorized pump, except for domestic use as defined in Water Resource Statute	Extraction of water by motorized pump or by gravity diversion with a capacity > 5 l/s Irrigation schemes > .. ha Fish ponds > .. ha

Charges

The recommended charges in connection with water extraction permits comprise two elements:

- a flat rate, one-time charge, to cover the costs of the administration associated with handling the permits
- an annual charge for water extraction

The annual charge could be designed to reflect any scarcity in particular areas. The revenue should be an income for administering the permit system; it would be used to cover, among other things, the costs of monitoring compliance with the given permits and impacts on water resources. DWD would design the structure and WPC decide on the size of the charges.

Decentralization

The long term strategy is that districts will receive from DWD, as the central authority, permission to allocate a specified volume of water from streams or rivers. The permission will be based on existing use, hydrological criteria, and on an assessment of possible environmental impacts. Then the districts will decide how the permitted volume of water will be divided among competing users, including what surface works can be constructed, and they will issue the extraction permits. DWD will carry out assessments to determine the uses of cross-boundary sources, taking into account any international implications.

In the short term, DWD will administer the water extraction permit system, and it is assumed that this will involve licensing only a small number of large-scale users.

Regulating Wastewater Discharge

Surveys and reports on the discharging of effluents suggest that, in the interests of environmental protection, the municipal services and industrial activities which should be regulated are:

- urban wastewater treatment plants
- sugar factories, textile industries and breweries
- tanning, oil and soap industries
- meat, fish and milk processing plants.

It seems that the second category (sugar factories, textile industries and breweries) at present account for 95% of the national industrial discharge of BOD - though the leather tanning industry produces some of the most heavily polluted wastewater in the country.

Because the processing of wastewater discharge applications involves complex technical issues, the proposal is to reduce the scope of the regulations in two ways: by concentrating on only a limited range of polluting activities (those indicated above) and by focusing on the most characteristic pollutant produced by these industries, BOD, which is also simple to both control and treat. Also, in view of the technical complexities - and of the fact that wastewater discharges affect water resources across district and even national boundaries, it is suggested that the processing and issuing of wastewater discharge permits should be a permanent national function.

Charges

It is recommended that a system of charges should be established which provides incentives to reduce the contents of pollutants in wastewater effluents - either by a more efficient use of raw materials or by treating the effluents. The cost should be determined according to the amount of pollutants discharged. This would be a signal that all polluting effluents are to be discouraged - and it meets the principle of "the polluter pays".

The cost of a wastewater discharge permit would be in the form of a fee paid annually, which comprises two elements:

- a flat rate, one-time charge to cover the costs of the administration associated with handling the permits
- a variable charge related to the type and quality of pollutants being discharged - which would, among other things - cover the costs of monitoring compliance with the permits

The scale of variable charges would be designed to impose a very severe penalty for wastewater discharges with excessive pollution. DWD would design the charges and decide on the rates.

4 ACTION PROGRAMME

During the process of formulating the Water Action Plan, the present structures and procedures for water resources management have been analyzed. The studies have comprised, among others, the actual base of water resource information, the legislative situation and the present management capacities at local and government levels. High priority issues and their related management functions have been identified, and operational procedures have been proposed - based on the principle that they should be possible to implement in the Ugandan context with a realistic amount of input of national and external resources. A number of actions have been defined, together forming a set of immediately needed measures in order to obtain an operational, integrated water resources management system in Uganda. The actions described here will need further elaboration, but they constitute a first step towards actual project proposals or documents which can be presented for financing.

4.1 Objectives of the Action Programme

The objectives of the action programme are:

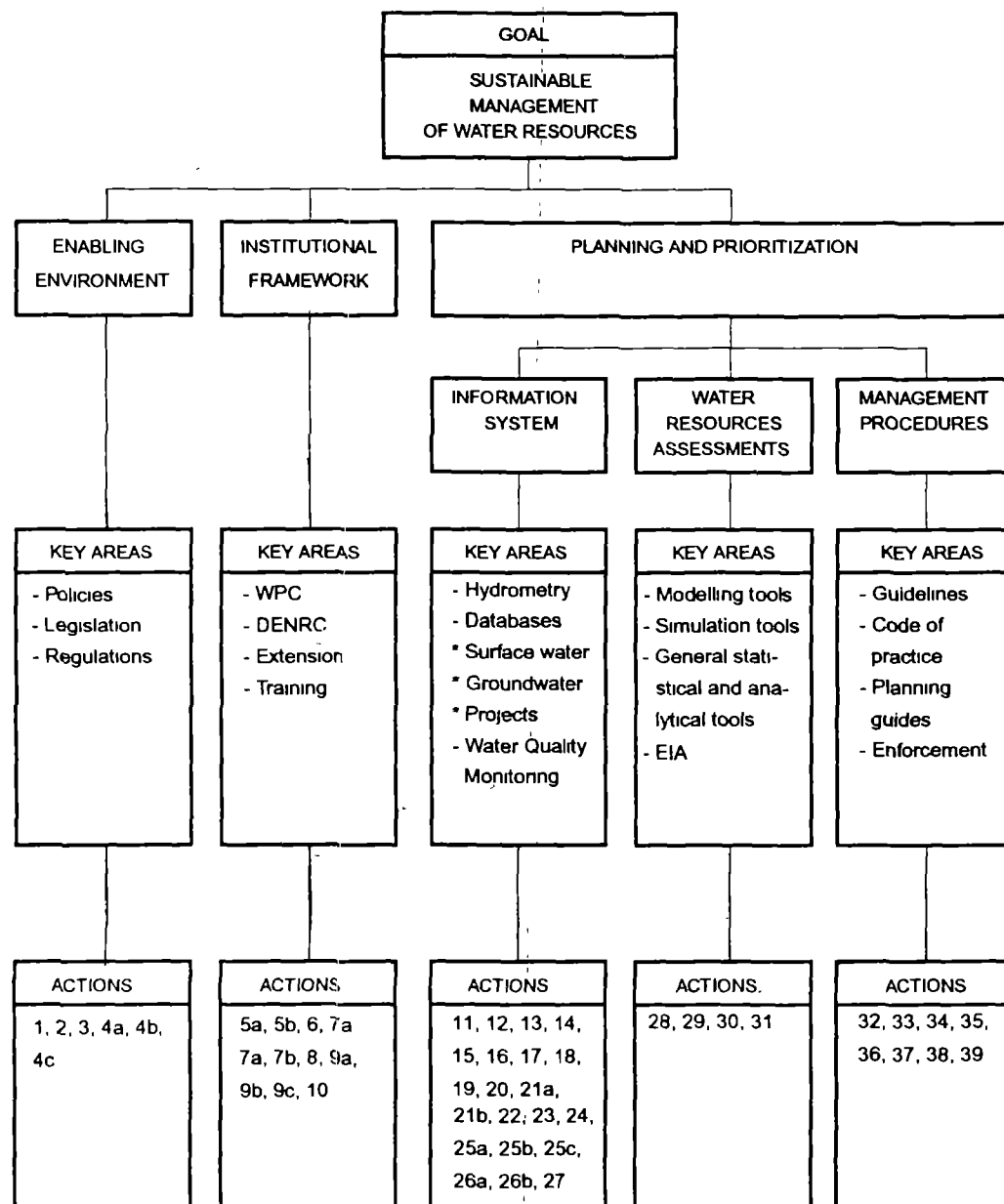
- to enhance the creation of an enabling environment for water resources management by contributing to the framework of policies and regulations within national sector development and international relations
- to improve the institutional framework for water resources management at national, district and community levels
- to improve the information base on which rational water resources decisions need to be made
- to improve the water resources assessment capabilities through the introduction of appropriate analytical tools, followed by training
- to define and make operational water resources management procedures

4.2 List of actions

The objectives of the action programme reflect the five major action groups which were identified in Fig 3.1 in the previous chapter. In the following sections, identified actions are organized according to these. The actions are described in more detail in Annex 19 in a common action profile format containing background, objectives, outputs and tasks. Actions, which are intimately related and which could advantageously be implemented together are described in a common profile sheet. In the action list they are given a common number but they are distinguished by a letter as prefix.

Actions which are already in the project preparation process have been marked with an asterisk and reference is made to the project in which they are constituents. "Monitoring" refers to the project "Rehabilitation of Water Resources Monitoring and Assessment Services in Uganda" described in the Danida project identification project format in WAP Doc.002. "Lake Victoria" refers to the project "Regional Water Quality Management in the Upper Nile Basin" also described in the Danida project identification format in WAP Doc.003. The first of these projects will be appraised by a Danida mission in the near future. No profile sheets have been included for these actions, as much more detailed information and background is found in the project identification reports.

An overview of the action groups, key areas and the actions included in each group is given in Fig 4.1 below



DENRC District Environmental and Natural Resources Committee
 EIA Environmental Impact Assessment
 WPC Water Policy Committee

Figure 4.1 - Action programme objectives and grouping of actions

4.2.1 Actions supporting the enabling environment (Group 1)

Action No.	Key areas	Description
1	Policies	<p>PREPARE INTERNATIONAL WATER RESOURCES POLICY Discussion and development of an international water resources policy securing Uganda's equitable share.</p>
2		<p>SUPPORT TO POLICY DEVELOPMENT IN WATER RESOURCES RELATED SECTORS Support to policy development in various relevant sectors including policies on wetland utilization, in order to have considerations on water resources included.</p>
3		<p>FINALIZE WATER SUPPLY AND SANITATION POLICY A first discussion draft of a water supply and sanitation policy has been prepared and a process of consultation, discussion and review needs to be implemented and standards and guidelines prepared.</p>
4	Regulations	<p>A: PREPARE FINAL WATER AND WASTEWATER PERMIT REGULATIONS Finalization of water extraction/waste water discharge regulations under the Water Resources Statute.</p> <p>B: DEVELOP WATER RESOURCES RELATED REGULATIONS Development of water resources related regulations, among others, for hydraulic works, constructions, pollution of ground water and zoning along rivers and streams.</p> <p>C: PREPARE DRILLING LICENCE REGULATIONS Detailed input to drilling licence regulations - setting the rules, for instance, for private sector drilling companies.</p>

4.2.2 Actions supporting the institutional framework (Group 2)

Action No.	Key areas	Description
5	Institutional development and capacity building	<p>A: ESTABLISH WATER POLICY COMMITTEE AND SECRETARIAT Establishing the Water Policy Committee including its Secretariat with the additional role of acting as the Water Action Plan Implementation Unit. Provide with staff, offices and equipment. Furthermore, include establishment of links (i.e. contact persons) to relevant sector ministries.</p> <p>B: PROVIDE ORIENTATION WORKSHOPS AT NATIONAL LEVEL Providing orientation workshops for the Water Policy Committee and DWD, regarding roles and responsibilities.</p>
6		<p>ESTABLISH DWD PERMIT PROCESSING UNIT Establishing the system within DWD that will administer the processing of applications and issuing of permits for water extraction and wastewater discharge.</p>
7		<p>A: INTEGRATE WATER RESOURCES MANAGEMENT TRAINING WITHIN THE ACTIVITIES OF THE HUMAN RESOURCES DEVELOPMENT UNIT Support to the staff of the Human Resource Development Support Unit within DWD in their design of training programmes and information material related to water resources management.</p> <p>B: INTEGRATE WATER RESOURCES MANAGEMENT TOPICS WITHIN THE CURRICULUM AT TRAINING INSTITUTIONS Assisting appropriate sector training institutions in curriculum development in relation to water resources management including the relation between land and water management.</p>
8		<p>PREPARE GUIDELINES FOR INTERACTION BETWEEN DWD AND DISTRICT ADMINISTRATIONS Defining the operational roles (in the form of guidelines) between DWD and the district administrations, in accordance with regulations and the provisions of the Water Action Plan.</p>
9		<p>A: SUPPORT THE ESTABLISHMENT OF ENVIRONMENT AND NATURAL RESOURCES COMMITTEES Support to the Environment and Natural Resources Committees in the districts - and the departments concerned with water resources management</p> <p>B: CONDUCT ORIENTATION TRAINING IN DISTRICTS Designing and providing orientation training in selected districts for policy makers, administrators, extension staff and RC committee members - about roles and responsibilities in relation to water resources management.</p> <p>C: PREPARE GUIDELINES FOR INTEGRATED EXTENSION SERVICES Preparation of guidelines to the districts on procedures for integrating existing extension services to facilitate water resources management functions.</p>
10		<p>CONDUCT A STUDY ON WOMEN'S POTENTIAL ROLE IN THE MANAGEMENT OF WATER RESOURCES Provision of factual information on women's role, analysis of factors enhancing or constraining women's participation and recommending facilitating strategies.</p>

4.2.3 Actions supporting information systems (Group 3)

Action No.	Key areas	Description
11*	Acquisition and management of surface water quantity information	REHABILITATE HYDROMETRIC NETWORK ("Monitoring") Review and rehabilitation of the hydrometric network and resumption of comprehensive flow measurements programmes to calibrate rating curves.
12		COLLECT HYDROMETEOROLOGICAL DATA FROM TECCONILE Transfer of hydrometeorological data from TECCONILE to Uganda Meteorological Department, preferably in computerized form.
13		INVESTIGATE WATER BALANCES Undertaking detailed water balance studies including evaporation and groundwater recharge processes, also evaluating the effects of land use on the water resources.
14		INVESTIGATE THE HYDROLOGY OF WETLANDS Investigation of the detailed hydrological effects of wetlands and their possible exploitation for irrigated agriculture.
15		PREPARE HYDROLOGICAL YEARBOOK Preparation of data availability summaries and surface water resource assessments and publicising the information in the form of a yearbook.
16	Acquisition of surface water quality information	DESCRIBE MAJOR WATER POLLUTION SOURCES Identification, characterization and quantification of major pollution sources at sensitive water bodies.
17		PREPARE EIA FOR SECTOR ACTIVITIES Environmental impact assessments of sector activities.
18*		MONITOR MAJOR WASTEWATER DISCHARGES ("Monitoring") Monitoring of significant polluting discharges.
19*		MONITOR WATER QUALITY TRENDS ("Monitoring") Establishing of surface water quality monitoring programmes to detect long term trends or shifts in essential parameters (early warning).
20*		ESTABLISH WATER QUALITY INFORMATION SYSTEM (Monitoring") Establishing of databases, processing, reporting and dissemination routines for water quality information.
21	Acquisition and management of groundwater quantity information	A: INVESTIGATE RECHARGE Investigations of recharge in order to establish the role of groundwater in Uganda's future water supply.
22		B: MONITOR GROUNDWATER LEVELS Introduction of groundwater level monitoring. Results become part of the groundwater database. INVESTIGATE SHALLOW WELL POTENTIAL Studies of shallow well potential to establish the significance for rural water supply.
23*	Acquisition and management of groundwater quality information	TRAIN IN GROUNDWATER QUALITY ANALYSES ("Monitoring") Training of DWD staff in standard practices for groundwater sampling, transport, storage and analysis with particular focus on testing for aggressiveness and fluoride.
24*	Acquisition and management of land and water information	IMPLEMENT SEDIMENT TRANSPORT MEASUREMENTS ("Monitoring") Establishing of measurements of sediment load in connection with the rehabilitation of the hydrometric network.

Action No.	Key areas	Description
25	Data management	<p>A: TRAIN IN USE AND FURTHER DEVELOPMENT OF GROUNDWATER DATABASE Training of DWD data base manager(s) in advanced use and development of the DWD data bases creating new report types and new combinations with GIS.</p> <p>B: UPDATE GROUNDWATER DATABASE Continuation of present action of updating of groundwater database until it is fully operational</p> <p>C: PROMOTE USE OF GROUNDWATER DATABASE Introduction/promotion and coordination of groundwater database/hydrogeological information to producers of data (e.g. water supply projects) and possible users including standardization of groundwater quality data generation and storage to be enforced through requirements to all implementing organizations</p>
26		<p>A: IMPLEMENT PROJECT INFORMATION SYSTEM Implementation of project information system, linkage to RDP, information flow, information generation from contact persons in sector ministries, etc.</p> <p>B: TRAIN IN USE OF PROJECT DATABASE Training in the use of project profile data base.</p>
27		<p>ESTABLISH PERMIT DATABASE AND TRAIN STAFF Specification/implementation of, and training in the use of permit/registration data bases.</p>

4.2.4 Actions supporting assessment capabilities (Group 4)

Action No.	Key areas	Description
28	Water quantity	<p>ESTABLISH WATER RESOURCES ASSESSMENT PROCEDURES Establishment of water resources assessment procedures in DWD and strengthening capabilities for such assessments.</p>
29		<p>TRAIN IN USE OF HYDROLOGICAL AND HYDROGEOLOGICAL ASSESSMENT TOOLS Implementation of, and training in the use of statistical, modelling and simulation tools in hydrologic and hydrogeologic assessments.</p>
30		<p>TRAIN IN WATER BALANCE COMPUTATIONS Strengthening DWD's capabilities for undertaking water balance studies through supply of technical assistance, training and the necessary hydrological and hydrogeological tools.</p>
31*	Water quality	<p>ESTABLISH WATER QUALITY MODELLING TOOLS ("Lake Victoria") Establishment of water quality modelling tools for Lake Victoria in order to identify the reasons for the rapid development in the eutrophication and to devise the proper interventions. The model should also be capable of simulating effects in local water bodies such as Murchison Bay.</p>

4.2.5 Actions supporting management procedures (Group 5)

Action No.	Key areas	Description
32	Guidelines and procedures	PREPARE GUIDELINES FOR DESIGN OF DAMS AND VALLEY TANKS Development of guidelines for improved design of dams and valley tanks.
33		PREPARE PROCEDURES FOR BULK WATER ALLOCATION TO DISTRICTS Development of procedures for allocation of water extractions to district and municipalities.
34		PREPARE GUIDELINES FOR DISTRICT WATER RESOURCES PLANNING Development of guidelines for local water resources planning (district level) and management including definition of quantity/quality objectives for water resources.
35		ESTABLISH ENFORCEMENT PROCEDURES Development of enforcement procedures including control and criteria for penalties.
36		PREPARE DETAILED DEFINITION OF REGULATION LIMITS AND CHARGES Detailed definition of extraction/waste water discharge limits, fees, charges and penalties.
37		PREPARE MANAGEMENT PROCEDURES FOR WATER RESOURCES RELATED REGULATIONS Development of management procedures for other water related regulations (hydraulic works, construction, pollution of ground water etc.)
38		DEVELOP CODE OF PRACTICE Development of code of practice for issuing permits including detailed waste water quality standards/guidelines, procedures for impact assessment and coordination with NEAP/NEMA etc.
39		PROMOTE PERMIT SYSTEMS Introduction and promotion of permit systems

4.3 Schedule of actions

For the purpose of scheduling, the actions are clustered in three stages, as show in the tables which follow. The numbers of the actions refers to the action profiles in Annex 19. Those actions within Stage One are expected to be completed by the end of two years; Stage Two actions should be completed by the end of 4 years; Stage Three by the end of 6 years. However, it should be pointed out that there could well be overlap between the stages, in as much as some of the Stage Two actions, for example, could begin before the completion of Stage One - for a number of the actions, their implementation will depend on how soon the planning, agreements and resource allocations can be processed within the normal cycle of project identification, appraisal and approval.

The criteria used to determine the three-stage schedule were a considered balancing of:

- cohesion: some actions necessarily cluster together; for example, those actions concerned with establishing a water quality information system
- conditionality: the pattern of actions largely follows the overall pattern of the plan: creating the legislative framework which establishes the enabling environment; building the appropriate institutional structures; producing the required water resources management procedures and tools
- dependency: some actions cannot be started until others are completed; for example, training related to developing an integrated extension service cannot happen until agreement has been reached to establish such a service
- urgency: some actions are started in Stage One because they have a high priority ranking; for example, the establishment of the Water Policy Committee - on which depends so much of the strategy formulation that should emerge from the Water Action Plan.

1st STAGE ACTION PROGRAMME	
Action No.	Description
3	POLICY DEVELOPMENT - Finalize water supply and sanitation policy
4A 36 28 35	REGULATIONS AND MANAGEMENT PROCEDURES - Prepare final water and wastewater regulations - Prepare detailed definition of regulation limits and charges - Establish water resources assessment procedures - Establish enforcement procedures
5A 5B 9A 9C 8	NATIONAL AND DISTRICT INSTITUTIONAL STRUCTURE - Establish Water Policy Committee and Water Action Plan Implementation Unit - Provide orientation workshops at national level - Support the establishment of Environment and Natural Resources Committees - Prepare guidelines for integrated extension service - Prepare guidelines for interaction between DWD and district administrations
11* 15 24* 18* 19* 20* 23*	WATER RESOURCES MONITORING - Rehabilitate hydrometric network - Prepare hydrological yearbook - Implement sediment transport measurements - Monitor major wastewater discharges - Monitor water quality trends - Establish water quality information system - Train in groundwater quality analyses
21A 21B	GROUNDWATER POTENTIAL - Investigate recharge - Monitor groundwater levels
25A 25B 25C	GROUNDWATER DATABASE - Train in use and further development of groundwater database - Update groundwater database - Promote use of groundwater database
26A 26B	PROJECT INFORMATION SYSTEM - Implement project information system - Train in use of project database

2nd STAGE ACTION PROGRAMME	
Action No.	Description
1 2	POLICY DEVELOPMENT - Prepare international water resources policy - Support to policy development in water resources related sectors
4B 37 38 4C	REGULATIONS AND MANAGEMENT PROCEDURES - Develop water resources related regulations - Prepare management procedures for water resources related regulations - Develop Code of Practice - Prepare drilling licence regulations
9B	DISTRICT INSTITUTIONAL STRUCTURE - Conduct orientation training in selected districts
16 31*	WATER QUALITY MANAGEMENT TOOLS - Describe major water pollution sources - Establish water quality modelling tools
22	GROUNDWATER POTENTIAL - Investigate shallow well potential
6 27 39	INSTITUTIONAL STRUCTURE AND CAPACITY BUILDING - Establish DWD permit processing unit - Establish permit database and train staff - Promote permit systems
29	WATER RESOURCES ASSESSMENTS - Train in use of hydrological and hydrogeological assessment tools
10	WOMENS ROLE - Conduct a study on womens potential role in the management of water resources
7A 7B	HUMAN RESOURCES DEVELOPMENT - Integrate water resources management training within the activities of the human resources support unit (HRDSU) - Integrate water resources management topics within the curriculum at training institutions

3rd STAGE ACTION PROGRAMME	
Action No.	Description
12 13 30 14	WATER RESOURCES ASSESSMENTS - Collect hydrometeorological data from TECCONILE - Investigate water balances - Train in water balance computations - Investigate the hydrology of wetlands
17	WATER QUALITY MANAGEMENT TOOLS - Prepare EIA for sector activities
34 33 32	MANAGEMENT PROCEDURES - Prepare guidelines for district water resources planning - Prepare procedure for bulk water allocation to districts - Prepare guidelines for design of dams and valley tanks

5 IMPLEMENTATION

The three-phase sequencing of actions presented in the previous chapter constitutes the core element of the Water Action Plan implementation programme:

- First stage: in which key operational structures are established at both the national and district levels; drafting of crucial regulations and procedures is completed; activities of the "Rehabilitation of the Water Resources Monitoring and Assessment Services in Uganda" project gets under way; a groundwater database is fully updated; capacity building programmes are designed.
- Second stage: in which training is given towards developing recommended institutional structures at the district level; capacity building activities are undertaken in support of the integrated extension services; regulations are refined after the passing of water sector legislation; a permit processing unit is established within DWD; an international policy on water resources is drafted; HRDSU is encouraged to develop water resources management materials, and curriculum components are included in relevant training institutions; monitoring of water resources is continued; a special study is conducted on women's role in water resources management.
- Third stage: in which a number of special water resources assessments are carried out; further water resources assessment tools and water quality management tools are refined - especially EIAs for sector activities; the final set of management procedures for water resources management are completed.

5.1 First stage programme

The preparation of the Water Action Plan has been undertaken by a unit in the DWD, supported by Danish technical assistance. During the first stage in Water Action Plan implementation, this unit will be transformed into a permanent Water Action Plan Implementation Unit within the Directorate of Water Development.

With the enactment of the Water Resources Statute and the creation of the Water Policy Committee (WPC), this unit will include the Water Policy Committee Secretariat.

The Implementation Unit will have the following functions with respect to the implementing the Water Action Plan during this first phase:

- giving general support to the implementation of the WAP Action Programme, by carrying out itself those actions within its own scope
- formulating project proposals for the WAP Action Programme, and supporting DWD and the Ministry of Natural Resources in arranging funding for their implementation (whether directly by the GoU or by means of donor support)
- liaising with other projects within the water sector, so that they can carry out some of the monitoring functions
- assisting DWD in developing a permit system for water extractions and waste water discharges (until a permanent operational set-up can take over)
- establishing procedures for monitoring the progress of the preparation and implementation of the WAP Action Programme
- reporting to the Water Policy Committee (in first instance, to the WAP Inter-ministerial Committee chaired by the PS of the Ministry of Natural Resources) on progress and constraints in the implementation of the WAP Action Programme

Steps have already been taken to continue the Water Action Plan preparation process in a Follow-up Phase, which will maintain the present WAP Implementation Unit in DWD, and provide for some support from Danida. This Follow-up Phase is scheduled to last until the start of the first project in the WAP Action Programme: the "Rehabilitation of the Water Resources Monitoring and Assessment Services in Uganda", also envisaged for Danida funding. Continued support to the WAP Implementation Unit is envisaged as part of the water resources monitoring project. Being the first WAP Action Project, the WAP Implementation Unit is expected to play an important role in its management.

5.2 Second stage programme

As the WAP Action Programme gets under way, the planning and implementation of water resources development and management in Uganda will gradually shift from the present centralized and sectorially fragmented approach to the decentralized and integrated approach under the WAP framework. The Implementation Unit will play a key role in this process by assisting the Government of Uganda through the Water Policy Committee in the planning and implementation of water resources related projects and programmes.

In doing so, the WAP Implementation Unit, now including the Water Policy Committee Secretariat, will take up other identified actions, in order to:

- maintain and continuously update the DWD data-base for water resources related projects (project catalogue data-base), while ensuring its linkage to the water resource data-bases of DWD and the general project data-base (RDP) in the Ministry of Finance and Economic Planning
- maintain regular and frequent dialogue with the WPC appointed liaison officers in key water related ministries, who will provide the required input to project catalogue data-base
- maintain regular and frequent contacts with district water resources administrations, and provide required guidance and support for their water resources development and management activities
- make inputs to the Human Resource Development Unit within the Training section of DWD in order to develop professional training and public information materials on water resources issues
- advise training institutions in the water and related sectors about integrating water resources management topics in their professional training programmes
- assist the WPC in cross-sectoral assessments of proposed new water resources development initiatives
- report to the WPC on progress and constraints in water resources development and management programmes

5.3 Third stage programme

By this stage, the structures for water resources management at both the national and district levels should be well established, the main management procedures functioning - and the long term strategy outlined in Sub-section 2.2.3 should be operative. But continued support to the district administrations in taking over functions such as running a permit system for water extractions will be necessary.

The Water Policy Committee will continue to exercise the responsibilities accumulated through the first two stages - but the balance, in terms of initiating actions and preparing policy papers and reports - will have shifted from the consultants of the WAP Implementation Unit to the DWD staff members of the WPC Secretariat.

5.6 Monitoring reports

A regular system for reporting on the progress of the Water Action Plan needs to be instituted. It is proposed that the Implementation Unit should submit quarterly reports to the Director of Water Development - and that half yearly reports should be presented to the Water Policy Committee.

5.7 Updating the Water Action Plan

The Water Action Plan as a continuous process calls for frequent updating and the addition of new actions as contexts change, requirements develop - or progress falls below expectations or schedules. Modifications of earlier proposed actions may also be relevant. Such updating will be the responsibility of the WAP Implementation Unit.

An important tool for the updating will be the project information system and the project database. (See Action 26A and 26B) The use of this tool will facilitate the updating as new profiles can easily be entered in addition to the review of existing profiles. New lists of projects/actions can then be produced.

It is important that the quarterly and half-yearly monitoring reports will be accompanied by updated project/action lists.

APPENDIX 1.1

WATER ACTION PLAN DOCUMENTS

UGANDA WATER ACTION PLAN (WAP)		
DOCUMENT	TITLE	DATE
001	WATER ACTION PLAN PHASE I - PROJECT DOCUMENT Description of the background and requirements to the work in WAP Phase I including budget.	Jan 1993
002	REHABILITATION OF WATER RESOURCES MONITORING AND ASSESSMENT SERVICES IN UGANDA - PROJECT IDENTIFICATION REPORT Background and proposal for a water resources monitoring project including budget.	Feb 1994
003	REGIONAL WATER QUALITY MANAGEMENT IN THE UPPER NILE BASIN - PROJECT IDENTIFICATION REPORT Background and proposal for a water quality management project including budget.	Feb 1994
004	WATER ACTION PLAN PHASE II - PROJECT DOCUMENT Description of the background and requirements to the work in WAP Phase II including budget	Oct 1993
005	WATER ACTION PLAN - MAIN REPORT Synthesis of the key points of the Water Action Plan comprising the water resources management framework, the action programme and guidance for the implementation and monitoring of the plan	Jul 1994
006	WATER RESOURCES POLICY Policy document defining a water resources policy with associated management strategies Outline of areas for further policy development and actions Preliminary discussion draft of a water supply and sanitation policy	Jul 1994
007	RAPID WATER RESOURCES ASSESSMENT An assessment of the surface water and groundwater resources occurrence in time and place and a tentative estimate of the water requirements and water resources development trends	Jul 1994
008	INSTITUTIONAL AND MANAGEMENT ASPECTS An assessment of water resources management functions, structures and tools Proposals for a future management strategy and corresponding capacity building	Jul 1994
009	INTERNATIONAL ASPECTS An assessment of the international aspects and implications of Uganda's position in the Upper Nile Basin in relation to water resources	Jul 1994
010	ANNEX REPORT - VOLUME 1 - DISTRICT STUDIES Collation of district studies for Arua, Mbale, Mbarara, Moroto, Mukono and special studies for Hoima, Kabale and Tororo	Jul 1994
011	ANNEX REPORT - VOLUME 2 - GROUNDWATER DATABASE Groundwater database development description, specification and manual	Jul 1994
012	ANNEX REPORT - VOLUME 3 - MANAGEMENT ASPECTS Background for preparation of regulations supporting the Water Resource Statute, guidelines for district water resources management and management procedures for issuing of permits	Jul 1994
013	ANNEX REPORT - VOLUME 4 - PROJECTS AND ACTIONS Description of water resources development plans and projects giving guidelines for prioritization, impact assessments, updating and coordination Catalogue of water resources related projects and actions	Jul 1994
014	WATER ACTION PLAN - EXECUTIVE SUMMARY A concise short version of the set of strategies, actions and guidelines constituting the Water Action Plan also giving a key to the documentation	Jul 1994



APPENDIX 1.2

HIGHLIGHT OF WAP DOCUMENTS

1 GENERAL

The final issue of the Water Action Plan documents comprise WAP Doc.005 to 014. The titles and a few key words describing the content are given in Appendix 1.1.

Although these documents are termed final they still have to be considered as milestones in the rolling process of developing and maintaining a water resources management system. The documents are organized in a three level hierarchy. An executive summary (WAP Doc.014), the main body of reports (WAP Doc.005 to 009) and the annexes collated in four volumes (WAP Doc.010 to 013). The objective of this chapter is to give highlights volume by volume and thus supplement the Executive Summary.

2 WATER RESOURCES POLICY (WAP Doc.006)

The guiding principles for the Water Action Plan are given and briefly explained in Subsection 1.1.2. The overall Ugandan water policy objective has been proposed as "to manage and develop the water resources of Uganda in an integrated and sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs". The water resources management strategies have then been developed based on the policy objective and the guiding principles.

The strategies are grouped within those supporting an enabling environment, those guiding institutional development and those supporting the upgrading of planning and prioritization capacity.

The key strategies within the support for an enabling environment are in brief:

- the Government as an enabler
- legislation to support the policy
- regulatory control only in response to need and at enforceable levels
- regulatory controls combined with economic incentives
- management decisions based on monitoring and information systems' output
- Water Action Plan process to provide dynamic management framework

The key strategies within institutional development comprise in brief:

- cross-sectoral coordination mechanism (Water Policy Committee)
- integrated approaches to project development
- management functions delegated to lowest appropriate level
- private sector involvement
- womens' participation
- water resources management capacities developed at all levels

The key strategies within planning and prioritization comprise in brief:

- domestic demands have first priority

- allocation to other purposes than domestic demand to be based on socio-economic and environmental criteria
- sustainable use
- water quality and landuse links recognized
- Environmental Impact Assessment as a planning tool
- polluter pays
- economic incentives to avoid water wastage
- regional cooperation
- wetlands - an integral part of the water resources system

Annex 3.1 gives a first draft of a Water Supply and Sanitation Sector Policy harmonized with the basic principles of the Water Resources Policy. The headings of this policy are:

- general policy statements
- technology - water supply
- technology - sanitation, sewerage and drainage
- health and hygiene
- economic and financial aspects
- management and institution building
- operation and maintenance
- sustainability
- water resources and environmental aspects

3 RAPID WATER RESOURCES ASSESSMENT (WAP Doc.007)

The Rapid Water Resources Assessment provides an approximate picture of the available water resources in Uganda. These are assessed in the context of the present and future requirements and both quantity and quality are considered. Three water resources planning units were considered: the Upper Nile system, the Ugandan catchments, and the groundwater sources.

3.1 The Upper Nile system

The equatorial lakes and the Nile, which make up the "Upper Nile system", represent a huge water resource - and a potential for numerous development activities. Although Lake Victoria provides the water supply of the three large towns - Kampala, Entebbe and Jinja - this represents only approximately 0.2% of the lake's outflow. Furthermore, no large scale irrigation is expected within the Ugandan terrain bordering the lake in the near future. Nevertheless, one of the main concerns will be to maintain the lake as a storage reservoir which can yield the consistently high outflows needed for the generation of hydropower. More critical, however, is the issue of pollution: not from Uganda alone, but from all the upper riparian countries. The present problem caused by the rapid spread of the water hyacinth is exacerbated by the deteriorating water quality. Such deterioration could seriously affect water supplies, jeopardise fishing, and impede the development of a tourism industry.

Fishing and tourism are potentials of the other two very large lakes, Albert and Kyoga, and they too would suffer from water quality changes. Lake Kyoga might well be a sustainable source for irrigation projects. As for hydropower, only a small fraction of the vast potential of the River Nile from Lake Victoria to the Sudanese border is being tapped.

3.2 The Ugandan catchments

Whereas the dominant source of large urban water supplies is surface water, the smaller towns and rural areas are, and will continue to be, dependent on groundwater. Throughout the country, livestock are usually provided for from surface water sources. In general, though the surface water resources will be able to satisfy urban and livestock demands into the foreseeable future, the distribution pattern is such that there will be competition for water in certain cases - particularly where there are large annual variations in river flows or where streams are not perennial.

It is difficult to predict the trends of irrigated agriculture in the country - and therefore be able to estimate the demands irrigation will put on surface water sources. The economic and social feasibility of large scale irrigation compared with alternative agricultural practices is not obvious - so demands for irrigation water are not likely to be significant in the near future. Fish ponds are on the increase in Uganda, and the current estimate is that there are about 2000 working ponds. The water requirements - and the possibilities of organic pollution - may become increasingly significant issues.

In addition to Kampala, Entebbe and Jinja, only 10 towns have waterborne sewerage systems; other areas are served by combinations of septic tanks and pit latrines. In areas of low dry-season runoff, effluents are often not properly diluted; so downstream water intakes can be polluted and, without adequate and reliable treatment mechanisms, serious health hazards occur.

3.3 Groundwater resources

Though it seems - from recent surveys, calculations of recharge rates, and estimates of developments - that groundwater resources can, over most parts of Uganda, meet the demands in rural areas, in more densely populated places the deep groundwater, even when supplemented with shallow wells and springs, may not meet supply requirements, without significant cost implications.

Corrosiveness is a widespread problem, and high fluoride concentrations occur in certain locations.

3.4 Dynamics of water resources

The dynamics of rainfall is governing the variations in water resources availability. A special study of River Kafu catchment rainfall made under WAP revealed that the long term variations have a cyclical behaviour, and present departures from the norm are much less serious than those experienced in the forties, fifties and early eighties. The observations are in harmony with the general pattern of Lake Victoria level variations, and it can be assumed that these conditions are representative of much larger areas of Uganda.

4 INSTITUTIONAL AND MANAGEMENT ASPECTS (WAP Doc.008)

The WAP Doc.008 reviews the existing water resources management context and mechanisms, and identifies the water resources management functions that are considered to be necessary in Uganda in the future. It looks at the present management capacity and concludes that it is not possible to undertake all the necessary functions in the immediate future. Therefore, a short term

strategy is proposed that places some functions at the national level that later can be moved to district management.

4.1 Water resources management functions

The water resources management key functions are as follows:

- **International policy making**

Uganda needs a coordinated policy and strategy regarding international water resources issues: in particular, the utilization of the Nile Basin waters and the water quality of Lake Victoria. This is a national level function.

- **Policy making, planning and coordination**

The integrated management of water resources and land-related issues requires policies and plans to be made particularly at the national and district levels. At the national level, policies will be formulated, standards set and project activities in the sector coordinated. The districts will set local priorities, by-laws and annual action plans regarding the use of water resources such as wetlands, fish ponds, irrigated areas, livestock watering, and rural and urban domestic water supplies.

The existing extension staff in the districts - who work in several sectors - will be coordinated in order to promote integrated and uniform information regarding the sustainable use of water and land resources.

Local level groups, within the framework of national and district policies, can manage the use of resources such as wetlands, and they will plan their use through local decision making bodies such as the Village and Sub-county Resistance Committees.

- **Water extraction regulation**

The administration of permits for water extraction will be determined by regulations that specify the types of uses that need to be regulated. In the long term, when the districts have the capacity to make assessments of the impact of extraction and surface works within their district boundaries, they will administer the application and permit procedures. The central level (DWD) will carry out assessments of cross-boundary sources and then distribute block allocations of water rights to the districts concerned - who will then administer a permit system for the allocated amounts.

- **Wastewater discharge regulation**

The management of a wastewater discharge permit system will be a permanent national function because of the detailed technical expertise required, and because of the need to ensure adherence to international and national standards. The districts will comment on applications from their areas, organize public hearings and assist in monitoring that the rules governing permits are being followed.

- **Monitoring**

DWD will retain a national level role in: baseline monitoring of water flows and water quality; managing surface water, groundwater and water quality databanks; and disseminating data on water resources to relevant agencies and users. A proposed project on the rehabilitation of assessment and monitoring services will build capacity in this regard. The districts will check that by-laws, regulations and permits are being followed, monitor groundwater quality for domestic uses, and monitor groundwater extractions in relation to recharge. Community groups and the local Resistance

Committees will monitor activities having impact on water resources, such as wetlands, forests and dumping of wastes - and they will report to the districts through the RC system.

- **Enforcement**

Enforcement of standards, regulations and by-laws will be undertaken by DWD and the district administrations through the imposition of stipulated penalties and use of the judicial system.

- **Mediation**

The RC system, including the RC Courts, will be the first structures used for mediating disputes between individuals and groups regarding access to water resources and extractions that do not require permits. Village elders and the local government Chief system will also be used when appropriate. All of these structures already function as mediators. Appeals can be handled administratively by the district committee responsible for water and judicially by Magistrates Courts. At the national level, the Water Policy Committee will be the final administrative appeal possibility; while the judicial system will also have an appeal channel.

- **Training and information**

Continuous public information activities will have to take place in order to ensure sustainable management of water resources. DWD has a role to play through its Training Unit, and at the district level the integrated extension services will be trained and will spread information to the various users of water resources.

- **Rural and urban water supply**

The districts, under the new Local Government (Resistance Councils) Statute 1993, will have responsibility for water supply services, but with supervision from DWD. User group management of point sources will be promoted in rural areas, and town councils or other institutions will manage urban supplies so that they will not be a burden on the district administration. DWD will supervise to the extent of ensuring that national standards and policies are kept, and in facilitating the implementation of government and donor financed projects.

4.2 Management capacity

At the national level, DWD has sufficient numbers of qualified engineers for the present level of activities and for management of water extraction and wastewater discharge permit systems. However, there are major constraints in terms of finances, equipment, transport and management procedures. Staff needs for the permit systems are not large in terms of numbers, as the systems are expected to deal with a limited number of permits in the short term. Projects have already been identified to strengthen monitoring and training activities in DWD.

There are many water staff at the district level, but the numbers vary widely from district to district. Most are employed on town waterworks. Most District Water Officers are diploma engineers, and although posts have been sanctioned for graduate engineers at district level it is doubtful that they can be recruited. The district staff have been almost exclusively concerned with water supply services, and have no recent experience of other water resources management functions. Like other parts of government, the districts suffer from severe financial constraints, and it is doubtful whether decentralization will result in significant increases in the overall funds available.

4.3 Management structures

National level

A Water Policy Committee (WPC), placed under the Ministry of Natural Resources, will have overall responsibility for setting national policies, standards and priorities, including coordinating revisions to legislation and regulations, and coordinating sector ministries' plans and projects affecting water resources. In addition, it will coordinate the formulation of an international water resources policy. It will have a close link to the National Environment Management Authority with regard to policies and standards, especially concerning wastewater discharge. NEMA will have liaison officers in related ministries, who will also function as liaison officers to the WPC.

Members of the WPC will come from relevant government ministries and departments, and the committee will include representatives from district administrations, research organizations and NGOs. The Chairman will be the Permanent Secretary of the Ministry of Natural Resources, and the Secretary will be the Director of Water Development. DWD will provide a Secretariat for the WPC. DWD, and its four restructured departments, will have overall responsibility for water resources management, but it will move towards supervisory and advisory roles and away from direct implementation of projects. It will continue to have a direct role in water resources monitoring, wastewater discharge permits and water extraction permits.

District level

The District Resistance Councils are recommended to form a District Environment and Natural Resources Committee and a department with the same name comprising water, environment and forestry officers. This structure should ensure coordinated environmental management. There will be no need to establish water resources extension staff if the districts coordinate existing extension staff in other departments such as community development, health, agriculture, fisheries and livestock - to ensure that water resources and environmental aspects form part of an integrated extension strategy.

Community level

Village water user groups will manage, operate and maintain point water sources. Community groups can also be formed for the purpose of managing resources such as a wetland, fish ponds or an irrigation scheme. The existing Resistance Councils will play a role in setting local priorities, monitoring and mediating.

River/lake basin level

In the present Ugandan context, it has not been found necessary to create river or lake basin management authorities.

4.4 Capacity building needs

In order to carry out the functions there will be a need for various training, education and information activities at the national, district and community levels. These will be in addition to various projects and actions that will provide management and financial support to specific activities, such as monitoring. The activities have been identified as follows:

orientation programmes for those politicians, officials and public representatives who become members of policy making and planning committees related to water resources management

- re-orientation programmes for staff in DWD and in other key sector ministries, and for district-based staff, who have responsibility for carrying out water resources management functions
- in-service programmes on water resources management issues for members of the training section in DWD who are designing training activities and information materials for staff within the water and sanitation sector and for the general public
- in-service programmes for those extension workers who have a responsibility for giving information and facilitating discussion about water resources problems and issues
- awareness programmes on water resources management issues addressed to the general public, but particularly to members of RCs and members of water and sanitation committees operative within local communities.

5 INTERNATIONAL ASPECTS (WAP Doc.009)

5.1 Surface water resources and demands

Approximately 78% of the total flow of the Nile at the Uganda/Sudanese border is comprised of direct rainfall over the equatorial lakes, while the remaining flow comes from surface runoff from the land catchments. Uganda contributes 39% of the flow from land catchments, while other riparian countries contribute 61%. The average outflow of Lake Victoria (1948-1970) is 914 m³/s, while the outflow to Sudan is 1251 m³/s. The Ugandan catchments contribute some 18% of the total outflow to Sudan.

It is not possible to make an accurate estimate of potential demands of all the upper riparians, including Uganda, due to the inconsistency of available figures. However, if maximum potential demands are utilised the flow of the Nile at Jinja and the Sudanese border is likely to be significantly reduced.

The prospect of a significant reduction of the Nile flow will create international consequences in the form of protests from the lower riparians Egypt and Sudan.

5.2 International water quality aspects

In general, water quality and existing pollution loads in the region are not being monitored sufficiently to make adequate assessments of existing water quality or cause/effect relationships. However, it is apparent that the most striking international issue at present is the dramatic deterioration of the water quality and ecology of Lake Victoria during the last two decades, which in turn has affected water quality in the Victoria Nile.

The content of nutrients and organic matter in the rivers entering the lake from Kenya and Tanzania contribute a major pollution load to the lake, while urban and industrial wastewater discharges from towns surrounding the lake are also a significant contamination factor. The Nile perch may also be a significant factor in the changing ecological balance. However, the exact causes of the observed deterioration of the lake have not yet been identified.

Extrapolation of present trends predicts an even more dramatic future change when taking into account the increasing population in the catchment area and the reduced buffer capacities of the ecosystem caused by the already observed structural changes.

5.3 International legal aspects

5.3.1 Significant international treaties

The Nile Waters Agreement of 1929 between Great Britain and Egypt contained a clause which required that no Nile Basin countries under British administration could take any measures or construct any works that would affect the flow of the Nile without the prior agreement from Egypt.

The Owen Falls Dam Agreement of 1949 between Great Britain and Egypt provided for the construction of the dam for the purposes of hydro-electricity generation for Uganda and for increasing the role of Lake Victoria as a storage reservoir for Egypt. The project and agreement were to be reviewed 20 years after commencement (1961), but this has not taken place. Uganda, however, repudiated all colonial agreements at independence although she has continued to act within the provisions of the Owen Falls Dam agreement.

After gaining independence, Uganda entered into three agreements with Nile Basin states regarding technical cooperation. The HYDROMET Agreement was signed in 1967, and after termination it was succeeded by the TECCONILE Agreement of 1992. The long term programme of TECCONILE includes increasing technical cooperation and preparation of regional projects. The organization comprises a technical committee and a council of ministers. Secondly, The Kagera Basin Agreement is composed solely of Upper Nile Basin states, excluding Egypt and Sudan. This agreement covers all aspects of the development of the Kagera River Basin, which involves Burundi, Rwanda, Tanzania and Uganda. Thirdly, The Permanent Joint Technical Committee was formed in 1959 by Egypt and Sudan. This committee apportioned the utilization of the flow of the Nile between the two countries and committed them to have a common position in regards to other Nile Basin states.

The present international treaties to which Uganda is a party are all quite vague on water quality issues and the prevention of transboundary pollution. The treaties do not specify duties, responsibilities and obligations in relation to known/identified water quality issues nor do they specify means of conflict resolutions.

5.3.2 Uganda's actions regarding international agreements

In 1963, shortly after independence, the Prime Minister of Uganda wrote to the Secretary-General of the United Nations repudiating all treaties concluded during colonial times. This was followed by a declaration of Parliament in Sessional Paper No.3 of 1963. The declaration was not followed-up by any specific actions regarding each treaty and what they might have been replaced with.

In regards to the Owen Falls Agreement, Uganda has continued to honour its terms. In general, Uganda has continued to consult with basin states in regards to international water resources, and has conducted itself within the requirements of customary international law.

5.3.3 Relevant current international water law

Customarily accepted international water law accepts the doctrine of "Equitable Utilization of Shared Water Resources". This doctrine recognizes the sovereignty of states in regard to water resources, but also imparts an obligation on the part of a state using the resource not to injure the interests and rights of other states sharing the same resource. This doctrine is expressed in The Helsinki Rules on the Uses of the Waters of International Rivers, and in environmental declarations of the United Nations.

Customary international law consistently states that a nation does not have the right to pollute shared water to the detriment of co-riparians. Further, it is stated that a nation should bear the cost of the pollution caused by its activities ("polluter pays").

5.3.4 Ugandan interests

Uganda is an upper riparian in relation to Egypt and Sudan, and has an interest in the utilization of the water resources within its territory for the benefit of social and economic development. In relation to Kenya, Tanzania, Rwanda, Burundi and Zaire, however, Uganda is a lower riparian and has an interest in the uninterrupted flow of water and conservation of water quality before it enters the Nile system at Jinja. Therefore, in regards to negotiating positions, Uganda's interests will lie with lower or upper riparians depending on the issue at hand.

A multinational basin-wide organization concerned with management of the water resource would be contributed to by each state in accordance with the benefits derived from the water resource.

5.3.5 National institutional framework

Presently, Uganda does not have a national coordinating mechanism for the formulation of policy regarding international water resources. The Ministry of Foreign Affairs supported by the Ministry of Natural Resources handles international water issues. DWD staff normally act as representatives to the relevant international institutions.

The proposed Water Policy Committee, as the national coordinating mechanism for the Water Action Plan, could also cover international issues, perhaps with a specialized sub-committee. This sub-committee would be responsible for coordinating the technical inputs and formulating and revising international water resources policies.

In terms of immediate tasks to be done, there is an urgent need for a coordinated policy from Uganda's side regarding the water quality problems in Lake Victoria. It is also necessary to develop a policy regarding which international institution should be promoted to deal with the general water resources management aspects of the Nile Basin, including the question of water rights. The potential high level of demand for the water resources of the Nile Basin makes it imperative that a mechanism soon be established for equitably resolving those demands.

6 DISTRICT STUDIES (WAP Doc.010)

6.1 Objectives of district level studies

Eight district level studies have been carried out during the Water Action Plan Phase II work. These studies had different emphasis as given below:

- district level studies in Arua, Mbale, Mbarara, Moroto and Mukono Districts focusing on identifying appropriate local water resources management levels and giving a background for outlining management procedures
- district level study in Hoima District focusing on issues regarding detailed institutional capacities for water resources management
- district level study in Kabale District focusing on the interaction between land management and water resources management

- district level study in Tororo District focusing on wetland irrigation management.

The district level studies concentrated on the identification of present and future problems and issues for which a water resources management framework was required. A further objective was to gain knowledge adequate to recommend which aspects of local water resources management can be generalized throughout the country, and which aspects are area specific.

6.2 District issues and problems

Aspects, which are emerging from the five district studies of Arua, Mbale, Mbarara, Moroto, Mukono and the Hoima study, and which are of general significance for the water resources management framework are summarized below under headings of water resources, consumers and water use, agencies involved in water resources management, issues, management functions and responsibilities and assessment of present management.

6.2.1 Water resources

The following general aspects are characterizing the water resources situation at district level in the management context:

- surface water occurs as both perennial and non-perennial streams
- the Nile and the large lakes are only economically accessible as water sources for riparian users and for large scale developers
- wetlands and their use are of special significance for the water resources
- surface water quality is generally not known, and several potential sources of pollution exist
- erosion and sedimentation are significant factors but quantitative information is lacking
- groundwater development potential is generally low but adequate for rural and small urban supplies
- groundwater quality is generally good but corrosiveness and localized high fluoride contents occurs

6.2.2 Consumers and water use

The common features related to consumers and their water use are summarized below seen in the district level perspective:

- rural domestic water use is dominant in most districts
- urban domestic water use is considerably less than rural domestic water use
- livestock use is significant and in some districts (for instance Moroto) dominant
- industrial consumers often have high consumption and high water pollution potential, but are localized only in a few districts outside Kampala
- irrigation water use can dominate, but scheme development depends on economics
- aquaculture in the south presents a potential risk to surface water quality
- environment and conservation set requirements to the ecosystems and the national policies may influence water use.

- lack of awareness among officers and extension workers about the interactions between landuse practice and water resources
- lack of awareness among farmers about the importance of soil conservation measures and the negative effects of soil erosion on the water resources
- severe logistic constraints within most of the relevant departments.

6.4 Water resources management framework requirements

The district studies have clearly indicated the need for improvements in water resources management structures and frameworks at district and lower level as a basis for decentralized management. The management in the Ugandan context requires:

- completion of the enabling environment comprising policies, legislation and regulations
- strengthening and streamlining of the institutional framework including a Water Policy Committee (WPC), a District Environmental and Natural Resource Committee (DENRC) and extension and training services
- planning and prioritization capabilities based on adequate information systems, water resources assessment skills and a full set of management procedures.

The total set of conditions forming the full framework for the water resources management will have to be suitably arranged at national, district and community levels according to the principle of management at the lowest appropriate level.

7 GROUNDWATER DATABASE (WAP Doc.011)

7.1 Objectives of the national groundwater database

During the Water Action Plan work a national groundwater database has been established. The objectives are to organize and systematize all relevant available groundwater data in order to prepare an overview of the groundwater resources in terms of quantity, quality and availability.

7.2 Functional requirements

The database includes static as well as dynamic data. Static data are geology, drilling dimensions and location, whereas dynamic data, which may change with time, are e.g. water level, chemistry and pump installation data. The database is designed to include, at all times, the latest available information on dynamic data. When updating such data the format will automatically indicate that other (earlier) data are available and that these are stored in related databases.

The basic record identification will be the national I.D. number which is unique for each waterpoint. The national I.D. includes a district and waterpoint type identification code and is given automatically upon data entry.

All waterpoints are registered with indication of district, county, sub-county, parish, village and waterpoint name as well as with grid coordinates. The grid references and map drawing facilities have been given particular attention in order to ensure an easy integration of the database with possible future Geographical Information Systems (GIS).

7.3 System description

The database has been designed to include basically two different types of data, i.e. waterpoint information and groundwater information. The waterpoint information includes (1) identification and location data, (2) construction data and (3) pump installation data. The groundwater information is given under another three headings; (4) geological and hydrogeological data, (5) hydrochemical data and (6) yield test, flow and water level data. Further to these six headings, a category (7) other information, has been included, which may include e.g. information on ownership and users, etc.

It is envisaged that the groundwater database will be operated and maintained by professional staff at DWD head office and that a relatively uniform level of quality control and data reliability thus can be ensured prior to entry in the database.

7.4 Database operation and maintenance

The database should eventually be established within the Water Resources Department in Entebbe and thus share facilities with the already developed surface water database. The office should be staffed with permanent staff qualified in database management and hydrogeology as well as data entry operators.

Quality control should be established at two levels; i) control of data transformation from various original documents to new standard formats, including data quality assessment, and ii) check of data entry errors and omissions. This quality control could be carried out by a qualified senior hydrogeologist.

Database maintenance should be a continuous process based on mandatory reports submitted by the individual implementors in the DWD prescribed database format.

7.5 Use of the groundwater database

The database is intended to accommodate the groundwater information needs of internal DWD staff, as well as requests from external bodies. It is furthermore intended as a corner-stone in a future groundwater management and monitoring system.

Database users will be able to receive data in print-out as well as diskette formats, and all data are linked to specific grid coordinates in order for the users to combine such data with other area characteristics and thereby develop a fully integrated geographical information system.

The database must be operated and up-dated by DWD staff only, thereby ensuring a consistent and correct database management. DWD must ensure that information is readily obtainable upon request and within a reasonable time. A fee to cover the direct costs involved in such data submission could be charged.

7.6 Relations between the groundwater database and external databases

The DWD groundwater database is intended to be the first step in a phase which eventually will constitute a DWD management information system. The present uncoordinated and inhomogeneous designs of individual project databases prevent DWD from computerized exchange of uniform and standardised data for water resources management purposes with most project databases.

Three external databases have been identified as having data which may be of interest in a groundwater resources management context. Therefore, the possibilities for data exchange with these databases have been assessed. The three databases are:

- the climate (CLICOM) database at the Meteorological Department in Kampala
- the surface water database (HYDATA) operated by the Water Resources Department in Entebbe
- the project database operated by Ministry of Finance and Economic Planning

The groundwater database is designed with exchange of data with these databases in mind.

8 MANAGEMENT ASPECTS (WAP Doc.012)

8.1 General

The identified management functions, their levels of administration and the need for regulatory measures have resulted in the preparation of more detailed guidelines and outline regulations. Some highlights from these are briefly described in the following sections.

8.2 Guidelines for district management of water resources

A number of water resource issues may well be dealt with at the district level. Such issues comprise, among others:

- competition between various users for the right to use the same water source
- excessive use of a water resource causing environmental problems
- soil erosion caused by overgrazing or cultivation at steep slopes, in turn creating water quality problems
- wastewater discharges and water quality problems
- groundwater pollution
- management, operation and maintenance of rural and urban water supplies

The district administrations will need to be involved in the following functions together with DWD in order to deal with the above issues:

- planning and coordination
- regulation of water extraction
- regulation of wastewater discharge
- monitoring
- mediation
- training and information
- rural and urban water supply

The management structure is proposed to comprise an Environment and Natural Resources Committee, a subcommittee under the District Resistance Council.

The committee needs to be supported by a department including for instance units for environmental planning, water resources and water supply and forestry.

Extension services should be integrated as far as possible in order to save staff and reduce logistic needs. A further advantage would be that uniform messages were delivered.

The liaison between DWD and the district administration will have to be determined in accordance with national efforts towards devolution of powers.

8.3 Regulation of water extraction

8.3.1 Regulation needs

An essential aspect of water resources management is allocation, at a sustainable level, of available water resources for different uses and, especially, prioritization between different uses in case of scarce resources. In order to execute rational management it is necessary to possess knowledge on available resources and the extent of present and possible future exploitation of these resources. This can only be obtained if extractors of water provide information on their extraction to the authorities responsible for management of the resources, hence the need for regulation of water extraction.

For reasons of administrative and enforcement capacity constraints, it is clear that a requirement for all water users, irrespective of the quantity of water extracted, to apply for and obtain a water extraction permit is not feasible, nor is it necessary from a point of view of water resources management.

One of the guiding principles behind the WAP is that management structures should only be developed in response to a perceived and expressed demand from those affected. Hence, if small scale water extraction does not affect other users' possible use of the same resource, there is no need for regulation of water extraction.

8.3.2 Criteria and thresholds

The proposed threshold levels for rendering a water extraction permit mandatory to a water user, before water can legally be extracted, are determined in order to cope only with the big extractors. The threshold levels are shown in Table 8.1. In some cases threshold levels still needs further discussion and decision by DWD.

Table 8.1 - Criteria for levels of water extraction regulation

DEGREE OF CONTROL	GROUNDWATER	SURFACE WATER
No regulation	Domestic use as defined in Water Resource Statute Extraction by manual means	Domestic use as defined in Water Resource Statute Extraction by manual means
Registration required		Extraction of water by motorized pump or by gravity diversion with a capacity < 5 l/s Non-subsistence irrigation schemes < .. ha Non-subsistence fish ponds < .. ha
Permit required	Extraction by mechanical, electrical or other equipment, except for domestic use	Extraction of water by motorized pump or by gravity diversion with a capacity > 5 l/s Irrigation schemes > .. ha Fish ponds > .. ha

8.3.3 Charges

The recommended charges in connection with water extraction permits comprise two elements:

- a flat rate, one-time charge, to cover the costs of the administration associated with handling the permits
- an annual charge for water extraction

The annual charge could be designed to reflect any scarcity in particular areas. The revenue should be an income for DWD administering the permit system; it would be used to cover, among other things, the costs of monitoring compliance with the given permits and impacts on water resources. DWD would decide on the structure and size of the charges.

8.3.4 Decentralization

The long term strategy is that districts will receive from DWD, as the central authority, permission to allocate a specified volume of water from streams or rivers. The permission will be based on existing use, hydrological criteria, and on an assessment of possible environmental impacts. Then the districts will decide how the permitted volume of water will be divided among competing users, including what surface works can be constructed, and they will issue the extraction permits. DWD will carry out assessments to determine the uses of cross-boundary sources, taking into account any international implications.

In the short term, DWD will administer the water extraction permit system, and it is assumed that this will involve licensing only a small number of large-scale users.

8.4 Regulation of Wastewater Discharges

Surveys and reports on the discharging of effluents suggest that, in the interests of environmental protection, the municipal services and industrial activities which should be regulated are:

- urban wastewater treatment plants
- sugar factories, textile industries and breweries
- tanning, oil and soap industries
- meat, fish and milk processing plants.

The second category (sugar factories, textile industries and breweries) at present account for approximately 95% of the national industrial discharge of BOD - though the leather tanning industry produces some of the most heavily polluted wastewater in the country.

Because the processing of wastewater discharge applications involves complex technical issues, the proposal is to reduce the scope of the regulations in two ways: by concentrating on only a limited range of polluting activities (those indicated above) and by focusing on the most characteristic pollutant produced by these industries, BOD, which is also simple to both control and treat. Also, in view of the technical complexities - and of the fact that wastewater discharges affect water resources across district and even national boundaries, it is suggested that the processing and issuing of wastewater discharge permits should be a permanent national function.

8.4.1 Charges

It is recommended that a system of charges should be established which provides incentives to reduce the contents of pollutants in wastewater effluents - either by a more efficient use of raw

materials or by treating the effluents. The cost should be determined according to the amount of pollutants discharged. This would be a signal that all polluting effluents are to be discouraged - and it meets the principle of "the polluter pays".

The cost of a wastewater discharge permit would be in the form of a fee paid annually, which comprises two elements:

- a flat rate, one-time charge, to cover the costs of the administration associated with handling the permits
- a variable charge related to the type and quality of pollutants being discharged - which would, among other things - cover the costs of monitoring compliance with the permits

The scale of variable charges would be designed to impose a very severe penalty for wastewater discharges with excessive pollution. DWD would design the charges and decide on the rates.

8.5 Outline regulations

The proposed principles for management of water extraction and wastewater discharge has been followed up by outlining regulations and administrative procedures. These are briefly summarized below.

8.5.1 Water extraction

The outline comprises:

- criteria for levels of water extraction regulation (permit required, registration required, no regulation)
- proposed responsibilities for a licensed driller
- standard conditions to be included with all water extraction permits
- procedures for registration of water extraction
- procedure for applying for a permit
- register of applications
- processing of permit, including public hearing
- arrangements for charges
- appeals procedure
- failure to apply or comply with conditions

8.5.2 Wastewater discharge

The outline comprises:

- general limitations of requirement for permit
- activities for which permit is required
- establishment of wastewater discharge standards and "Code of Practice"
- procedure for applying for a permit register of applications
- processing of applications for permits
- appeals procedure
- failure to apply or comply with conditions

9 PROJECTS AND ACTIONS (WAP Doc.013)

9.1 General

The integrated water resources management approach implies that the sectoral developments are evaluated for possible impacts on - or requirements to the water resources and that such evaluations are considered when designing as well as prioritising development projects. For this reason, the water resources management system must include cross sectorial information exchange and coordination procedures, techniques for evaluation of individual project with respect to their implications for the water resources and procedures ensuring that the water resources aspects are included in the final design and prioritization of projects.

In general the process should be as follows:

- Rapid screening of the project for possible water resources implications

and if the project is found to imply water issues it should be subject to:

- Impact assessment (possibly EIA)
- Evaluation of possible specific requirements to the involved water resource and recommendations to project design on fulfilling such requirements
- Identification of possible interaction/competition from other planned or ongoing projects regarding the use of the water resource
- Recommendations on possible improvements on project design regarding optimal exploitation of a given water resource

Finally, the evaluations and recommendations should be included in the prioritization process of the projects emphasising both environmental and economical implications of the involved water resources issues.

The national development priorities and programmes constitute the context for the assessment of project priority and relevance.

9.2 Water resources related projects

Ongoing or planned water resources related projects within a wide range of sectors have been listed as part of a project database. The list is intended to provide an overview of activities that may have a bearing on, or be of significance in management of, the water resources of Uganda and therefore should be known by those administering the water resources. Projects from two sources have been considered:

- Ministry of Finance and Economic Planning: Rehabilitation and Development Plan 1993/94-1995/96 (RDP)
- NEAP: Investment Programme, January 1994.

The following criteria have been applied for inclusion:

- is execution of the project/programme likely to have any impact on the water resources (quantity or quality)

- does execution of the project/programme imply any requirements as to water resources (quantity or quality)
- is execution of the project/programme likely to provide any information relevant for management of water resources

The water resources related projects are broadly classified under

- agriculture
- environment protection
- manufacturing industry
- mining and energy
- health
- water infrastructure
- tourism and wildlife

9.3 Environmental Impact Assessment

In the process of providing information on water resources implications of development programmes and projects the impact assessment plays a central role. However, in addition to impacts on the physical environment, impacts on the water resources often also implies impacts on the biological and the socio-economic environment, and the assessments of impacts on the water resources should therefore often be seen as an integral part of Environmental Impact Assessment (EIA).

The National Environment Action Plan (NEAP) has identified the need of introducing Environmental Impact Assessments in Uganda, and in May 1993 "A Draft Framework for Environmental Impact Assessment in Uganda" was issued. This paper contains, in general terms, the recommendations from NEAP on EIA. The objectives are to integrate environmental concerns into development policies, plans and projects in order to minimize adverse environmental impacts where feasible; and to involve the public in development planning at the national, district and local levels.

9.4 Updating and coordination

The integration of water resources issues in the prioritization process, makes it necessary that tools and procedures exist for securing adequate exchange of information between the project preparing bodies, the water resource authorities and the final decision makers.

In short the requirements are that:

- information about new proposals for projects which may impact or imply specific requirements to the water resources should reach Water Policy Committee (WPC) or Directorate of Water Development (DWD) in due time for elaboration of impact assessments and recommendations before final decisions are taken including considerations of potential alternative exploitation of the involved water resource.
- WPC/DWD should possess rapid access to relevant information about registered planned and ongoing water related projects through adequate database tools.

New Government projects will normally be defined continuously within the various line ministries and after technical preparation there, they are forwarded to the Ministry of Finance and Planning

(MFP) where they are subject to a screening in the Development Committee to assure that scarce investment funds are allocated to the highest priority use. As of now, one of the most important criteria employed is the economic viability of projects.

It is proposed that each project proposal in the future, at an early stage, will be subject to an initial screening identifying if the project is likely to have water resources related implications. It is further proposed that WPC/DWD receive information about any project proposals which the line ministries consider relevant even at the stage before they reach the MFP. This would ensure that any potential exploitation of a given water resource can be included in evaluations of new projects. Finally, it is proposed that the process of detailed evaluation/impact assessments, which may be relatively costly, is not initiated before MFP has considered the particular project viable for other reasons.

9.5 Action programme structure

The programme of action that emerges from the analysis of significant issues, and the identification of the responses that are necessary, does not call for a radical restructuring of institutions nor a massive input of resources. The Water Action Plan is a pragmatic one: which fits proposals to existing economic, political and social realities. The structures, functions, procedures and actions that are proposed will need some external assistance - some materials and expertise in support of capacity building - but the action programme is achievable and sustainable because it is moulded within the existing institutional structures and it recognises the general resource constraints.

Fig 9.1 reflects the formulation process of the Water Action Plan and identifies the key areas to be addressed in its implementation

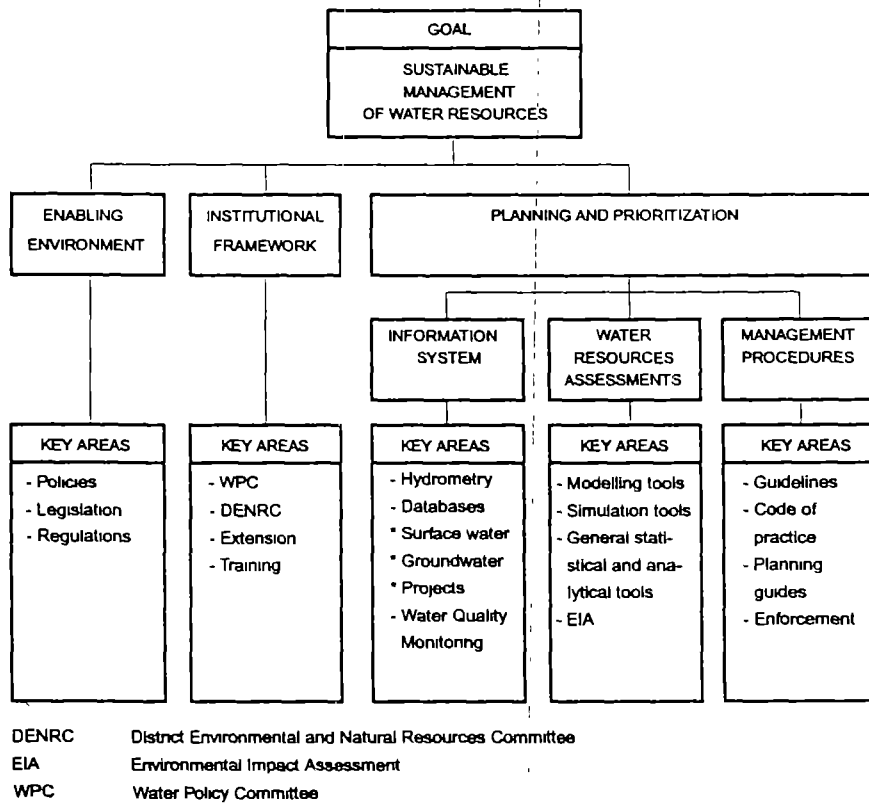


Figure 9.1 - Key areas for actions and interventions

9.6 Implementation of actions

The following tables show the developed action programme: a three stage strategy in which 39 actions will be undertaken. Stage One is expected to be complete within two years; Stage Two within four; and Stage Three within six years. The criteria used in determining the schedule has been a balancing of considerations such as clustering actions that are best dealt with together, and following the logic of the overall Water Action Plan: first creating the enabling environment, then building the institutional structures, and, finally, producing and using the needed management procedures and tools. Profiles of each action are prepared.

1st STAGE ACTION PROGRAMME	
POLICY DEVELOPMENT	- Finalize water supply and sanitation policy
REGULATIONS AND MANAGEMENT PROCEDURES	- Prepare final water and wastewater regulations - Prepare detailed definition of regulation limits and charges - Establish water resources assessment procedures - Establish enforcement procedures
NATIONAL AND DISTRICT INSTITUTIONAL STRUCTURE	- Establish Water Policy Committee and Water Action Plan Secretariat - Provide orientation workshops at national level - Support the establishment of Environment and Natural Resources Committees - Prepare guidelines for integrated extension service - Prepare guidelines for interaction between DWD and district administrations
WATER RESOURCES MONITORING	- Rehabilitate hydrometric network - Prepare hydrological yearbook - Implement sediment transport measurements - Monitor major wastewater discharges - Monitor water quality trends - Establish water quality information system - Train in groundwater quality analyses
GROUNDWATER POTENTIAL	- Investigate recharge - Monitor groundwater levels
GROUNDWATER DATABASE	- Train in use and further development of groundwater database - Update groundwater database - Promote use of groundwater database
PROJECT INFORMATION SYSTEM	- Implement project information system - Train in use of project database

2nd STAGE ACTION PROGRAMME	
POLICY DEVELOPMENT	<ul style="list-style-type: none"> - Prepare international water resources policy - Support to policy development in water resources related sectors
REGULATIONS AND MANAGEMENT PROCEDURES	<ul style="list-style-type: none"> - Develop water resources related regulations - Prepare management procedures for water resources related regulations - Develop Code of Practice - Prepare drilling licence regulations
DISTRICT INSTITUTIONAL STRUCTURE	<ul style="list-style-type: none"> - Conduct orientation training in districts
WATER QUALITY MANAGEMENT TOOLS	<ul style="list-style-type: none"> - Describe major water pollution sources - Establish water quality modelling tools
GROUNDWATER POTENTIAL	<ul style="list-style-type: none"> - Investigate shallow well potential
INSTITUTIONAL STRUCTURE AND CAPACITY BUILDING	<ul style="list-style-type: none"> - Establish DWD permit processing unit - Establish permit database and train staff - Promote permit systems
WATER RESOURCES ASSESSMENTS	<ul style="list-style-type: none"> - Train in use of hydrological assessment tools
WOMENS ROLE	<ul style="list-style-type: none"> - Conduct a study on womens potential role in the management of water resources
HUMAN RESOURCES DEVELOPMENT	<ul style="list-style-type: none"> - Integrate water resources management training within the activities of the human resources support unit (HRDSU) - Integrate water resources management topics within the curriculum at training institutions

3rd STAGE ACTION PROGRAMME	
WATER RESOURCES ASSESSMENTS	<ul style="list-style-type: none"> - Collect hydrometeorological data from TECCONILE - Investigate water balances - Train in water balance computations - Investigate the hydrology of wetlands
WATER QUALITY MANAGEMENT TOOLS	<ul style="list-style-type: none"> - Prepare EIA for sector activities
MANAGEMENT PROCEDURES	<ul style="list-style-type: none"> - Prepare guidelines for district water resources planning - Prepare procedure for bulk water allocation to districts - Prepare guidelines for design of dams and valley tanks

6.2.3 Agencies involved in water resources management

Throughout the districts the well established RC system with specialized sub-committees provides an important vehicle for water resources management functions. Other institutions comprise parastatals, private enterprises and development projects. In general the following institutions are found functioning:

- users committee, a sub-committee of RC 1 with responsibilities relating to the particular village water supply
- water and sanitation committee, a sub-committee of RC 3 with coordinating functions
- district water and sanitation committee, a sub-committee of RC 5 dealing with policy matters and coordination of for instance NGO implemented projects
- the district administration comprising the District Water Officer, District Medical Officer of Health, District Health Inspector, District Agriculture Officer, District Fisheries Officer, District Forest Officer and the Chiefs
- the judicial institutions engaged in conflict resolution, the RC Courts, the Magistrates Court, the Chiefs and the Elders
- donor funded water development projects which are found in all districts, playing a significant role through their major resource input
- private sector, including privately owned or operated supplies, water vendors and major consumers like breweries and sugar factories.

6.2.4 Issues, management functions and responsibilities

The water related key issues which are decisive for the design of the water resources management framework are either impact issues or user requirement issues. Impact issues are related to human activities affecting the water resources negatively with regard to quantity or quality. User requirement issues are appearing as a result of inadequate matching of user requirements and available water resources (quantity or quality).

The district studies revealed that in general, management functions should be available to regulate both the consumptive and non-consumptive use of surface water and groundwater. In more specific terms the following major items need to be covered by management controls:

- abstractions for domestic, industrial and livestock use and requirements from environmental protection
- impacts from sanitation, industrial discharges, cattle dips, use of fertilizers and pesticides, fish ponds and solid waste.

Wetlands, which presents unique and complex processes need controls related to cultivation, irrigation, brickmaking, fish ponds, bush fires, cattle watering and requirements from environmental protection.

It is also appearing from the district studies that regulatory controls or interventions will have to be used according to needs or the significance of the impacts or conflicts. A lean water administration is required in the present Ugandan context and decentralized decisions and actions are desirable for many reasons.

The required management functions as derived from the district studies comprise the following:

- policy making, planning and coordination
- water extraction regulation
- waste water discharge and pollution regulation
- monitoring
- enforcement
- mediation
- training and information dissemination

These functions will have to be carried out by the agencies and institutions at nation, district and community level according to the issues concerned and the capacity and capability of the particular level.

6.2.5 Present management

An assessment of the present water resources management in the five pilot districts supplemented by special studies in Hoima led to the following observations:

- management tools such as policies, guidelines, standards and regulations are not available
- interfaces between authorities and division of responsibilities are unclear
- shortage of qualified staff
- severe lack of resources such as finance, transport, equipment and facilities.

6.3 Land and water management issues

The appraisal of the interaction between land and water management is based on studies of wetland irrigation in Tororo District and landuse, soils, erosion and water use in Kabale District.

6.3.1 Interactions

Poor agricultural practices such as cultivation on steep slopes which are not suitable for crop production and overgrazing may lead to increased surface runoff and soil erosion and thus have a negative effect on the water resources in terms of quantity and quality, e.g.:

- transport of soil/sediment to reservoirs, intakes and pipes, causing siltation, increased turbidity and technical difficulties
- transport of nutrients and chemicals, resulting in pollution and eutrophication of surface water
- poor soil structure and decreasing infiltration rates resulting in reduced groundwater recharge and reduced flow during dry seasons
- increased peak flow during months with heavy rains

It was found that erosion hazards varied considerably geographically also within Kabale District itself. In the districts visited, where soil erosion was found to be severe, e.g. Kabale, only few soil conservation measures are practised, no comprehensive extension on soil and water conservation issues is undertaken and there is no linking of the land and water management plans and practices. The general findings are that this is, among others, due to:

- limited cross-sectoral collaboration (landuse, agriculture, soil conservation, livestock grazing, water use)

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