THE REPUBLIC OF UGANDA

MINISTRY OF WATER AND ENVIRONMENT

WATER RESOURCES DEVELOPMENT AND MANAGEMENT STRATEGY AND ACTION PLAN FOR THE UPPER NILE WATER MANAGEMENT ZONE

POPULAR VERSION

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01 INTRODUCTION

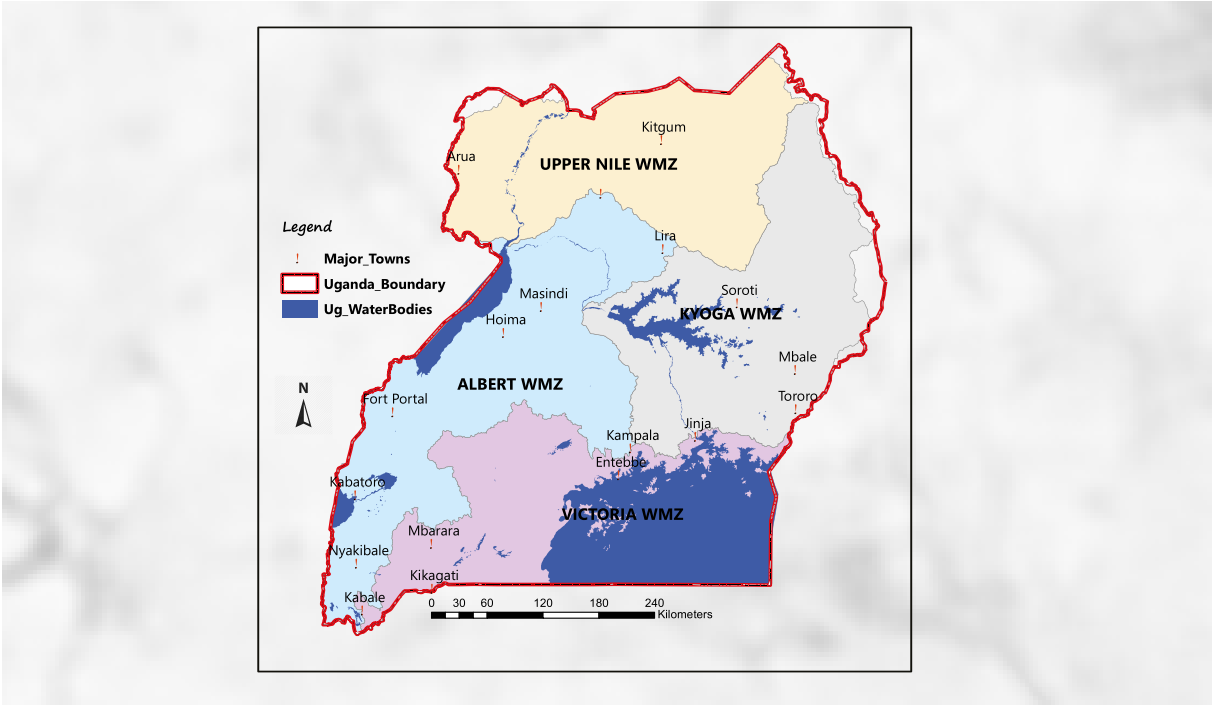

Figure 1: Water Management Zones

1.1 Background

In order to enact the Water Sector Reform that was started in 2006, the Ministry of Water and Environment (MWE), through the Directorate of Water Resources Management (DWRM) established a new institutional setup to implement Integrated Water resources Management (IWRM) that is aimed at de-concentration of water resources management. Under this approach; Catchment based Water Resources Management (CBWRM), Uganda was divided into four Water Management Zones (WMZs): Upper Nile, Albert, Victoria and Kyoga, Figure 1.

The national institutional framework for integrated and de-concentrated management of water resources entails management at four levels, namely: (i) national level (centre), (ii) water management zone level, (iii) catchment level, and (iv) community level.

The Upper Nile Water Management Zone is the platform for de-concentration of IWRM and catchment based water resources development and management planning in northern Uganda, within the policy and planning framework provided by the National Water Resources Strategy and relevant Water and Environment sub-sector strategies. As such, planning for water resources development and management is a key ingredient to sustainability of the resource.

1.2 Objectives of the WRDM Strategy and Action Plan

The Water Resources and Management Strategy and Action Plan for the Upper Nile WMZ is aimed at:

- Formulating a shared Upper Nile WMZ vision in 2040;
- Identifying the strategic objectives of water resources management and development in the Upper Nile WMZ up to year 2040;
- Identifying coherent sets of strategic actions as associated activities, their outputs and the output indicators;
- Defining a framework of prioritized and sequenced strategic actions and activities for water resources management and development in the Upper Nile WMZ, including evaluation of financing and institutional options for implementation.

1.3 Approach to Undertaking the WRDM Strategy and Action Plan

The strategic planning of water resources development and management in the Upper Nile WMZ has been framed on three guiding principles: (i) Equity, (ii) Sustainability and (iii) Efficiency. The Strategy is structured in a suite of five sub-strategies that provide the framework for setting specific objectives and related strategic actions at the WMZ, catchment and primary sub-catchment levels. Strategic Action Plan and the implementation framework are based on these sub-strategies.
These are:

Within each sub-strategy, long term comprehensive measures to be undertaken to achieve the desired water balance and water resources protection objectives within the Upper Nile WMZ are outlined. They take into account the water situation assessment, the current and future water requirements and the strategic objectives. Each sub-strategy is built on the following five structural components:

- Monitoring Systems and Information Management
- Water Allocation and Water Demand Management
- Water Infrastructure Development
- Water Resource Management and Environmental Protection
- Public engagement and capacity development

Table 1 presents the function and purpose of each structural component. For each sub-strategy, the structural components have proper functions and their relative importance might be substantially different across the sub-strategies: for example, the infrastructural component is a major element of the Water for People and Water for Production sub-strategies, while it is of less importance in the Water Governance sub-strategy. Furthermore, the structural components might support different elements/phases of the sub-strategies: planning, regulation, Implementation, and Operation.

Table 1 Functions and purpose of Structural Component of WRDM Sub-Strategies

SUB-STRATEGIES	FUNCTIONS AND PURPOSE
Monitoring Systems and Information Management	This component guides collecting, accessing, analysing and sharing a wide range of information for the purposes of monitoring and evaluating water resources and operational management. It aims at providing institutions and stakeholders the water resources information required to enable them to meet their responsibilities towards effective water resources management as well as their reporting requirements regarding water resources and environment.
Water Resources Allocation and Water Demand Management	This component aims at defining the criteria, limits and constraints, incentives and disincentives that shall be imposed on the uses of water resources in order to achieve the desired vision and achieve water resources management goals and objectives for the Upper Nile WMZ
Water Infrastructure Development	This component sets out a comprehensive needs evaluation and financial arrangements for infrastructure development for the WMZ. Reference shall be made to the responsibilities and costs associated with planning, design, implementation, operation and maintenance of the infrastructure
Water Resource Management and Environmental Protection	This component addresses water resource sustainability for the WMZ through incremental protection (including rehabilitation) of water resources and water related ecosystems.
Public engagement and capacity development	This component provides the basis for public engagement in the various aspects of the WRMD Strategy (through co-operation, collaboration and agreement). It shall address appropriate capacity building, the provision of opportunities for collaborative action, and communication and access to information, so that all role-players in the WMZ are adequately represented and that they participate in the formulation, implementation and review of the actions on a sustained basis

OVERVIEW OF THE UPPER NILE WMZ 02

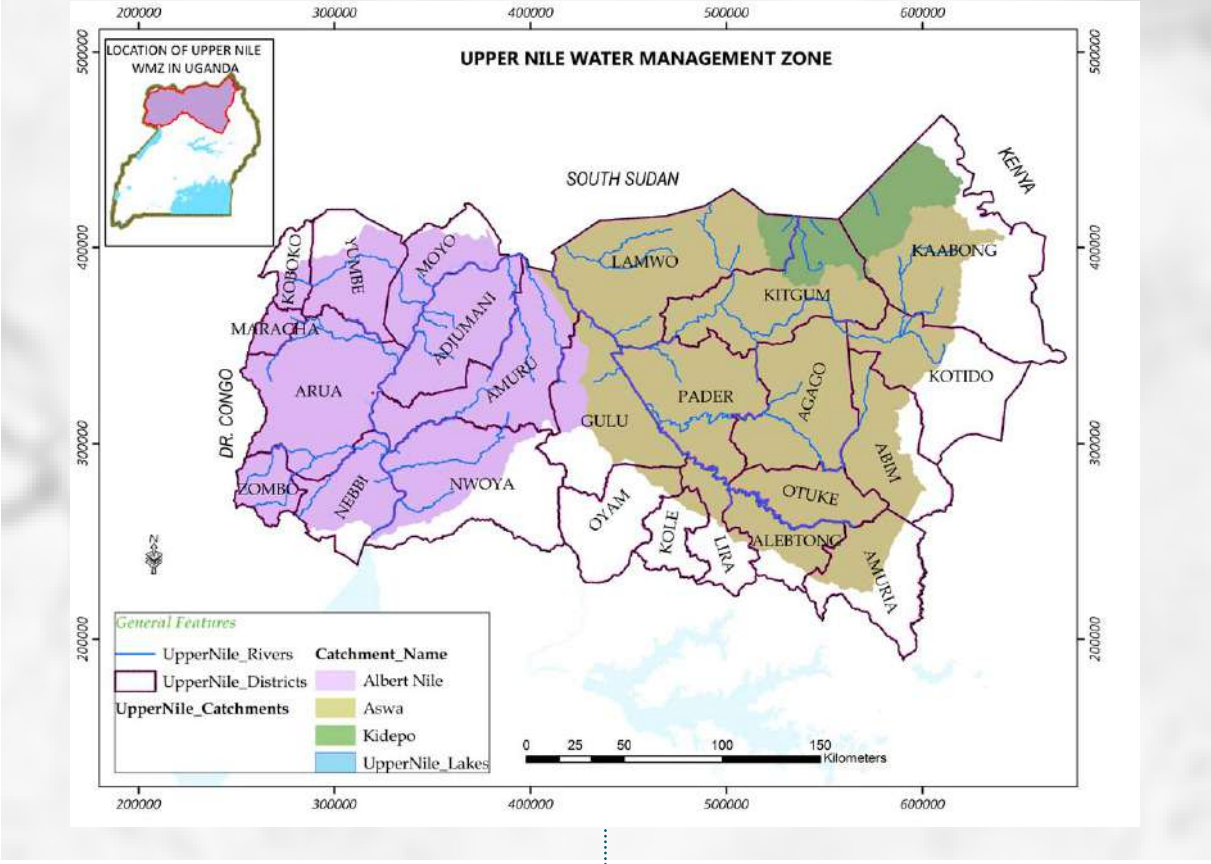

Figure 2: Upper Nile Water Management Zone

The Upper Nile Water Management Zone encompasses almost entirely the Northern Region of Uganda. It has an extension of about 50,000 km2 and includes the Ugandan part of three river catchments that form the Upper Nile Water Management Zone: Albert Nile, Aswa and Kidepo; Figure 2. According to the results of the 2014 National Population and Housing Census (NPHC), Uganda's population was estimated at about 34 million. The total population of the districts that are entirely or partially encompassed in the Upper Nile WMZ is approximately 6.3 million. Of the 24 districts encompassed in the Upper Nile WMZ, 10 are entirely included and the remaining 14 are only partially included in the WMZ.

The Albert Nile River stems from Lake Albert and flows to the north through northern Uganda, then at the South Sudanese border it becomes the Bahr al Abyad, or the White Nile. The Aswa River is a major river in north-eastern Uganda which flows northwest into South Sudan where it joins the White Nile. The Kidepo River is a tributary of the Pibor River that runs in eastern South Sudan along the border between South Sudan and Ethiopia.

The average annual rainfall ranges from below 600 mm in the eastern portion of the Karamoja region, it increase up to 1000 – 1200 mm along the course of Albert Nile and it reaches the highest value (1400 – 1600 mm) in the central part Upper Nile WMZ. Monthly values of minimum daily temperature vary from 16 to 20 °C, while to maximum daily temperature range between 28 and 34 °C during the year. Potential evaporation rates almost linearly decrease from 1800 to 1300 mm/year from East to West of Upper Nile WMZ.

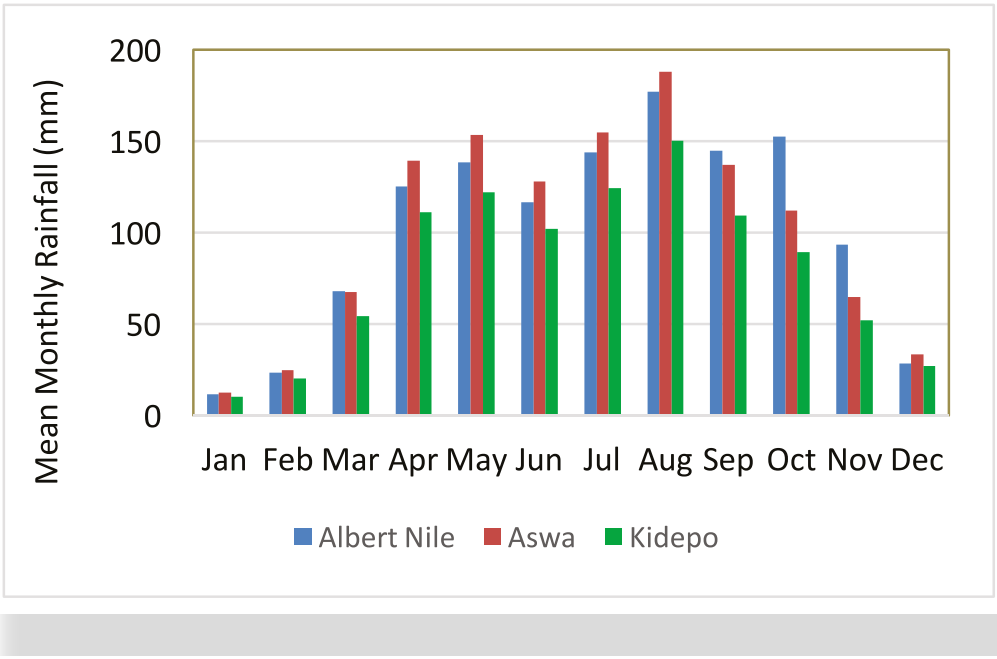

Figure 3: Mean monthly rainfall in Upper Nile basins

2.1 Water Resources Assessment (Surface and Groundwater)

The water resources assessment conducted provides the water resources availability under the current hydrological conditions, and that under climate change projections for the year 2040. The current annual average overall surface water available is 6.9 BMC/year while groundwater recharge is estimated to be 3.66 BMC/year, as shown in Figure 4.

Overall, there is general reduction in water resources available in 2040 (climate change projections) when compared with the current average hydrological conditions.

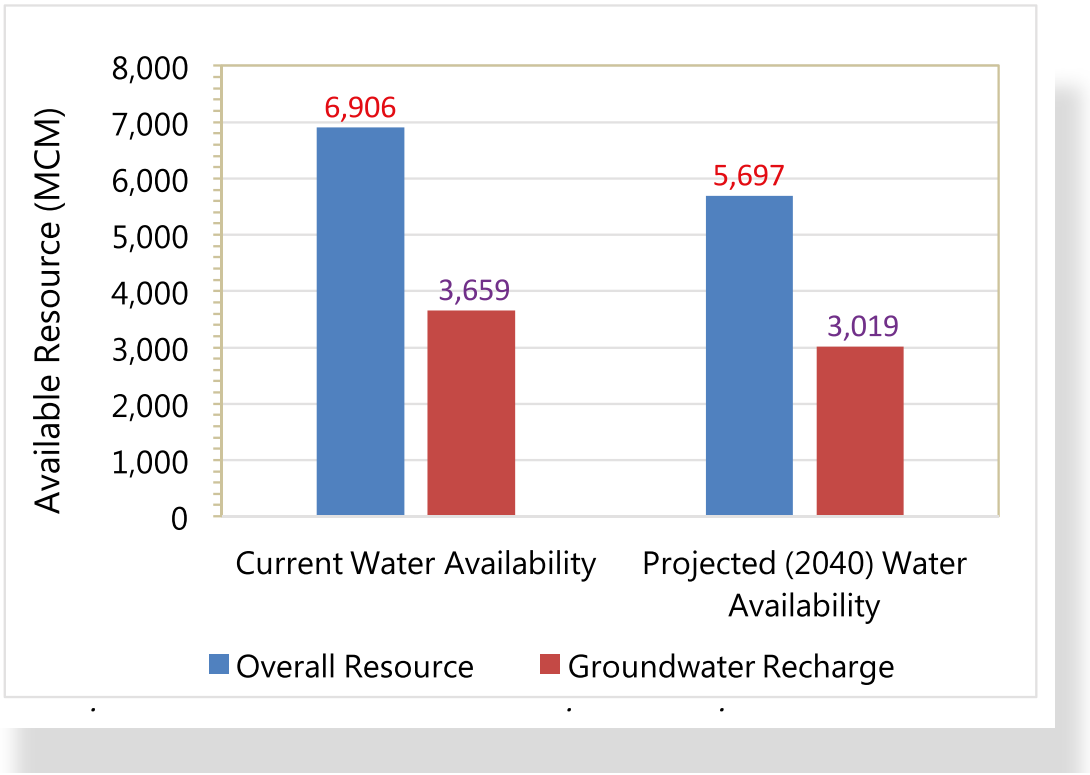

Figure 4: Overall water resources in Upper Nile WMZ

The overall water resources within the individual catchments in the UN WMZ is as shown in Figure 5, which indicates a general decline in the resource for the 2040 projection when compared to the current situation.

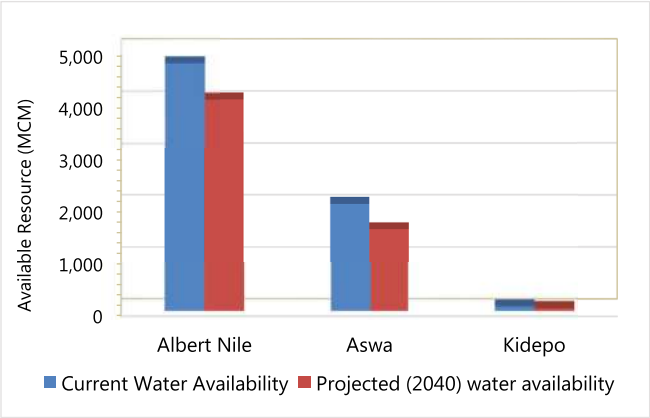

Figure 5: Overall water resources for basins in Upper Nile WMZ

2.2 Water Demand and Balance

The current and projected water demand within the UN WMZ was categorised based on the use, with the main categories considered being;

a) Water for people/Domestic water, and
b) Water for production, includes Water for Crops, Livestock, Industry, and Energy

The gross water demand was computed for the catchments and aggregated for the whole UN WMZ. Figure 6 shows a comparison of the gross water demand and the available (overall) water resources which generally shows that there is sufficient water in both the current and projected situation. However, there are spatial variations in the distribution of the available resource and the demand across the UN WMZ, and as such, during the dry period, the gross water demand for Aswa and Kidepo basins doubles the available water, while it is not the case for the Albert Nile.

2.3 Stakeholders

The purpose of stakeholder analysis is to identify and analyze key stakeholders who presently are or in the future may be involved in planning, developing, managing, regulating or using water resources. Identifying, understanding, consulting, engaging and organizing stakeholders is a condition for the successful preparation and implementation of a strategy. For this reason, stakeholders shown in Figure 7 had the opportunity to participate in all phases of the planning process and subsequently will be involved in the management and implementation of the strategy.

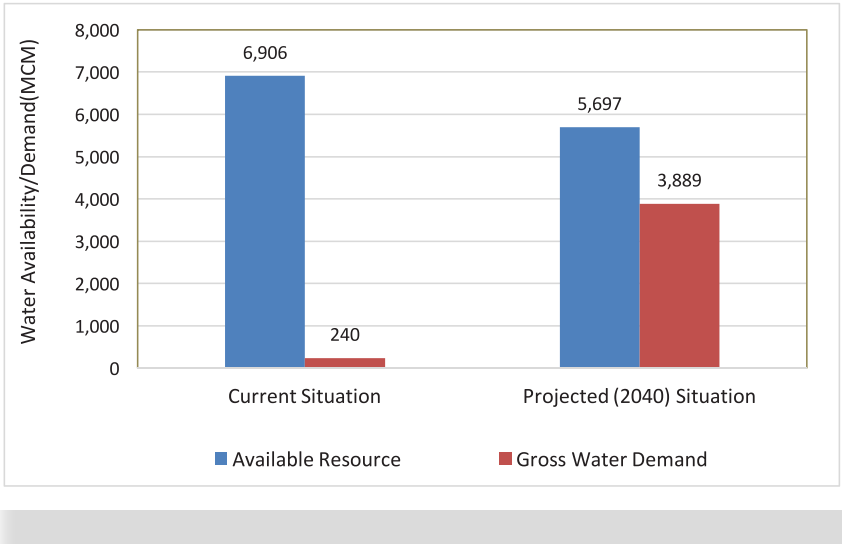

Figure 6: A comparison of the available water resources and grosswater demand for all scenarios

Figure 7: Stakeholders in the Upper Nile WMZ

2.4 Key Strategic Issues

Strategic issues emerging from the technical and institutional diagnostic assessments conducted and stakeholder engagement are presented in Table 2. The detailed list of issues is presented in the main report and these issues form the background for identification of the strategic actions for implementation within the UN WMZ.

Table 2: Key Strategic Issues within Upper Nile WMZ

INSTITUTIONAL AND GOVERNANCE ISSUES	WATER RESOURCES ISSUES
• Limited enforcement of WRM regulation and lack of compliance with existing standards • Weak operationalization of IWRM at WMZ and catchment levels • Limited integration of IWRM into sectoral and local planning frameworks • Inadequate hydro-meteorological monitoring network • Inadequate water quality monitoring network and laboratory facilities • Inadequate groundwater monitoring network • Inefficient Water Regulation / Water Quality information management system • Limited harmonization of institutional mandates between national and local government bodies and agencies • Limited inter-agency cooperation and collaboration • Weak stakeholder engagement • Inadequate institutional capacity • Inadequate technical capacity and lack of tools for water resources allocation • Low level of awareness • Insufficient funding for CBWRM • Limited effective criteria for water resources allocation (high value water use)	**WATER FOR PEOPLE** **Water Supply and Sanitation** Water insecurity, Insufficient water availability, Insufficient Storage, Inadequate water supply and irrigation infrastructure, Inadequate wastewater and sludge management, Lack of sewerage and WWTP (urban areas). **WATER FOR PRODUCTION** **Agriculture and Industry** Insufficient water availability, Insufficient water storage, Inadequate irrigation infrastructure, Water Insecurity. **WATER FOR ENERGY** Insufficient water availability, Insufficient Storage. **WATER FOR ENVIRONMENT** Pollution loads , Risk of contamination of water resources, Land degradation, Vulnerability to Floods, Vulnerability to Droughts, Pressure on water dependent ecosystems.

03 VISION, OBJECTIVES, AND STRATEGIC ANALYSIS

3.1 Vision and Objectives

The aim of the vision is to present a collective, medium-to-long term vision for the desired future state of the WMZ and its sub-catchments that can be used to derive strategies that are realistic and locally attainable. The agreed vision for water resources development and management in the Upper Nile WMZ is:

> **A sustainable, equitable and effective water resources management and development for socio-economic transformation of Upper Nile Water Management Zone by 2040**

The Water Resources Development and Management Strategy for the Upper Nile WMZ is structured on five sub-strategies and nine strategic objectives, as listed in Table 3

Table 3: Upper Nile WRDM Strategic Objectives

SUB-STRATEGY	STRATEGIC OBJECTIVE
Water Governance	1. Equitable, participatory and accountable water governance for sustainable and inclusive growth and development.
Water for People	2. Universal and sustainable access to safe water supply 3. Universal and sustainable access to improved sanitation and hygiene.
Water for Production	4. Sustainable use, development and management of water resources in Agriculture, Livestock production, Fishery and Aquaculture, Forestry 5. Sustainable use, development and management of water resources for Agro-industry, Industrial production, Oil and Gas 6. Sustainable use, development and management of water resources for Other Sectors (tourism, transportation, security).
Water for Energy	7. Sustainable use, development and management of water resources for renewable energy production.
Water for Environment	8. Conservation of ecosystem services and functions 9. Mitigation of effects of extreme climatic events.

3.2 Strategic Framework of Actions

In the WRDM Strategic Framework of Actions, each of the nine strategic objectives were structured in five Structural Components (refer to section 1.3) and for each component a set of Strategic Actions has been defined with related activities, outputs and indicators. This strategic framework of action stems from the comprehensive analysis of identified critical issues and opportunities in the three catchments of the Upper Nile WMZ. In order to prioritize the strategic actions, as a result of the reconciliation analysis the strategic issues were evaluated according to the following criteria: (i) Population growth, (ii) Economic development in the basin, (iii) Water availability and resource development, (iv) Environmental conservation, (v) Social concerns, (vi) Institutional issues. Table 4 shows the strategic actions with the highest priority.

Table 4: High Priority Strategic Actions

Strategic Objective	Strategic actions with highest priority in UN WMZ	Year range
1. Water Governance	Promote integrated land and water management in the UN WMZ	5
	Establish and operationalise the Catchment Management Organizations in the UN WMZ	
	Develop Water Sector funding mechanisms for de-concentrated IWRM implementation at WMZ and catchment levels	
	Establish and maintain a Web-GIS database of areas with integrated land and water management measures.	
2. Water Supply	Awareness raising on wise use of water resources.	
3. Sanitation	Awareness raising on waste management.	
4. Water for Production	Promote integrated land and water management in the UN WMZ	
9. Extreme Events	Awareness raising on water efficiency in agriculture.	
	Awareness raising on water, environment and management of natural resources.	
2. Water Supply	Increased water storage capacity for domestic water supply in areas with seasonal deficits in the UN WMZ	10
	Develop bulk diversion schemes for water supply in areas with water deficit within the UN WMZ.	
4. Water for Production	Rehabilitate and improve functionality of existing water for production storage facilities.	
8. Ecosystems	Adequate water quantity allocated for wetlands and aquatic ecosystems	
	Promote integrated land and water management in the UN WMZ.	25
2. Water Supply	Expand the water supply infrastructures for full coverage of urban and rural population in the UN WMZ.	
3. Sanitation	Improve management of sludge from sewage and sanitation facilities Improve sanitation and hygiene facilities in public buildings.	
4. Water for Production	Improve water for production facilities	
	Increase water for production storage capacity in the UN WMZ in areas with seasonal deficits of UN WMZ	
	Develop bulk diversion schemes for water for production in areas with water deficit of UN WMZ	
	Expand irrigation schemes in the UN WMZ.	
9. Extreme Events	Promote integrated land and water management in the UN WMZ.	

IMPLEMENTATION ARRANGEMENTS 04

4.1 Programs and Sub-Programs

In order to ensure coordinated implementation of the Strategy and avoid duplication or overlapping of planned interventions, the strategic actions were grouped in ten (10) homogeneous Programmes and sixteen (16) Sub-Programmes, Table 5. A Programme being defined as **"a group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually. Programmes may include elements of related work outside of the scope of the discrete projects in the Programme"**. A sub-Programme is a coherent subset of projects within a complex Programme. The full matrix of Programmes, Sub-Programmes and related Actions and Responsibility for implementation is reported in the main strategy document. The 10 programs are;

Programme 1: Geo-database and GIS Atlas: Create a GIS infrastructure to support data storage, exchange, and information management of Aswa Catchment. Develop technical guidelines, protocols and specifications for GIS-database population and management of spatial information.

Programme 2: Information Management System: Collect, access, analyse and share a wide range of information for the purposes of evaluating water resources and operational management.

Programme 3: Water Resource Monitoring: Collect, access, analyse and share a wide range of information for the purposes of monitoring water resources and operational management. Expand and upgrade the hydro-meteorological monitoring network, hydrogeological monitoring system and WQ monitoring system. Develop an Environmental Monitoring Program on water bodies (SW and GW) to determine their ecological state.

Programme 4: Water Resource Knowledge Base: Implement and maintain a comprehensive knowledge base on Water Resources and Water Resources management through the archival of reference documents and information (paper and digital document).

Programme 5: Water Resource Planning and Regulation System: Establish and maintain the Upper Nile WMZ Modelling Unit, improve and expand the water permit management system in the WMZ/Aswa Catchment. Develop water source protection plans and promote integrated pollution prevention and control in the Upper Nile WMZ.

Programme 6: Water Sector Infrastructure & Facilities: Expand the water supply infrastructures for full coverage of urban and rural population and increase water storage capacity for domestic water supply in areas with seasonal deficits. Rehabilitate and improve functionality of existing water for production storage facilities and develop underground water storage for production in areas with water deficit. Expand irrigation schemes. Improve sanitation and hygiene facilities and implement WWTP or alternative wastewater treatment method. Develop water supply facilities using groundwater sources in areas with good potentialities for groundwater resources exploitation.

Programme 7: Multipurpose Water Storage Facilities: Define and operationalize a Technical Standard for design, implementation and management of multipurpose water for production storage facilities, storage facilities including recreational functions and including hydropower.

Programme 8: Integrated Water and Land Management: Promote water efficiency practices (water conservation, reuse, recycling), promote irrigation water efficiency and water conservation agricultural practices, and promote optimization of water for production uses and reuse of treated wastewater for landscaping, green areas and other uses. Ensure appropriate environmental flows in water bodies, establish and maintain a water demand management system, promote integrated land and water management and enforce riverbanks protection zones. Increase preparedness to severe climate events (flood / drought).

Programme 9: Stakeholder engagement and participatory IWRM: Stakeholder engagement mechanism developed and established at the WMZ/Catchment level. Awareness raising on wise use of water resource and on waste management.

Programme 10: Technical Capacity Building: Training activities of Catchment/WMZ technical staff, organizations and stakeholder engagement at local/community.

Table 5: Programmes and Sub-programmes

PROGRAMME		Programme Leader	SUB-PROGRAMME		Sub-Programme Leader	Support Institutions
1	Upper Nile WMZ geo-database (GIS Atlas of Upper Nile WMZ)	DWRM				UN WMZ, UBOS, NPA, Districts
2	Upper Nile WMZ Information Management System on WR	UN WMZ	1	Upper Nile WMZ Information Management System on Water Bodies	UN WMZ	DWRM, DWD, DEA, NEMA, NFA, Districts
			2	Upper Nile WMZ Information Management System on Water Supply and Sanitation facilities	UN WMZ	DWD, NWSC, Districts
			3	Upper Nile WMZ Information Management System on Water for Production Facilities	DWD	MAAIF, MEMD, MTIC, Districts
3	Upper Nile WMZ Water Resources Monitoring	UN WMZ				DWRM, Districts, NEMA, DEA, UNMA
4	Upper Nile WMZ Water Resources Knowledge base	UN WMZ	1	Improve and expand the knowledge base on Water Resources	UN WMZ	DWRM, DWD, Districts, NEMA, DEA, UNMA
			2	Improve and expand the knowledge base on Water Infrastructure and Facilities	UN WMZ	DWD, NWSC, Districts
			3	Integrated Knowledge for Management of Water Resources	UN WMZ	DWRM, DWD, DEA, NEMA, NFA, MAAIF, MEMD, MTIC, Districts
			4	Knowledge management and exchange	UN WMZ	DWRM, DWD, Districts, CMO, MSE, MLG
5	Water Resources Planning and Regulation System	UN WMZ				DWRM, DWD, DEA,WESWG, CMO
6	Water Sector Infrastructure & Facilities	DWD	1	Water Supply infrastructure and service	DWO	DWRM, WSDF, TSU, UO, Districts
			2	Sanitation infrastructure and service	DWD	NWSC, Districts
			3	Water for Production facilities	DWD	DWRM, MAAIF, MEMD,MTIC, OPM
7	Multipurpose Water Storage Facilities	Multipurpose Programme Unit (*)				DWRM, DWD, DEA, OPM, WESWG, MEMD, MTIC, MAAIF, NFA
8	Integrated Water and Land Management	UN WMZ	1	Water Efficiency	UN WMZ	DWD, DEA, NEMA, NFA
			2	Environmental flows and reserve management system	UN WMZ	DWRM, DEA, CMO
			3	Integrated Water and Land Management	DEA	NEMA, NFA
			4	Resilience to climate variability and change	UN WMZ	DWRM, DEA, NEMA, UCC, UNMA
9		UN WMZ	1	Stakeholder engagement and participatory IWRM	UN WMZ	CMO, Districts
	Stakeholder engagement and participatory IWRM		2	Awareness Raising	UN WMZ	DWRM, DWD, DEA, CMO
10	Technical Capacity Building	DWRM				WESWG, DWD, DEA, Upper Nile WMZ
* MPU to be established under the MWE						

4.2 Funding Requirements

A summary budget for implementation of the Aswa CMP is presented in Table 6 below, and the details of costs regarding the sub-programs and actions are contained in the main document

Table 6: Funding Requirements for Programmes

PROGRAMMES		COST ('000 €)			
ID	NAME	2017 - 2019	2020 - 2025	2025 - 2040	Overall
1	Upper Nile WMZ geo-database (GIS Atlas of Upper Nile WMZ)	490	30	90	**610**
2	Upper Nile WMZ Information Management System on WR	830	50	160	**1,040**
3	Upper Nile WMZ Water Resources Monitoring	9,150	570	1,720	**11,440**
4	Upper Nile WMZ Water Resources Knowledge base	6,710	420	1,260	**8,390**
5	Water Resources Planning and Regulation System	2,030	130	380	**2,540**
6	Water Sector Infrastructure & Facilities	100,020	806,830	2,420,500	**3,327,350**
7	Multipurpose Water Storage Facilities	10,000	54,660	163,980	**228,640**
8	Integrated Water and Land Management	3,000	21,350	64,040	**88,390**
9	Stakeholder engagement and participatory IWRM	1,350	80	250	**1,680**
10	Technical Capacity Building	2,140	130	400	**2,670**
TOTAL		**135,720**	**884,250**	**2,652,780**	**3,672,750**

4.3 Institutional Arrangements

Overall coordination, planning and supervision of implementation will be ensured by the Upper Nile WMZ. The Upper Nile WMZ will function as the Strategic Action Plan Coordinator to ensure operationalization of the Water Resources Development and Management Strategy and Action Plan – including overall programme coordination, planning, reporting and monitoring responsibilities, the supervision of sub-programmes planning and implementation, and the organizations of periodic review and meetings.

Within the MWE, the DWRM will have the overall responsibility for mobilizing and managing the human and financial resources required to implement the WRDM Strategy and Action Plan, for harmonization of the Programmes and Sub-Programmes with the Water and Environment Sector governance, for the coordination of capacity development and technical assistance and for full alignment of Upper Nile WMZ WRDM programmes and sub-programmes with cross-cutting national and sectoral strategies, objectives and plans.

The other Water and Environment Directorates – DWD and DEA – and their Departments will be responsible for the implementation and management of specific Sub-Programmes as Programme Leaders.

The Directorates of line Ministries and Agencies, the Water and Environment Sector's semi-autonomous agencies of MWE – NWSC, NEMA and NFA – as well as the deconcentrated regional structures – WSDFs, TSUs, UOs - and District Local Government will be closely involved in the implementation of specific Sub-Programmes as Supporting Institutions.

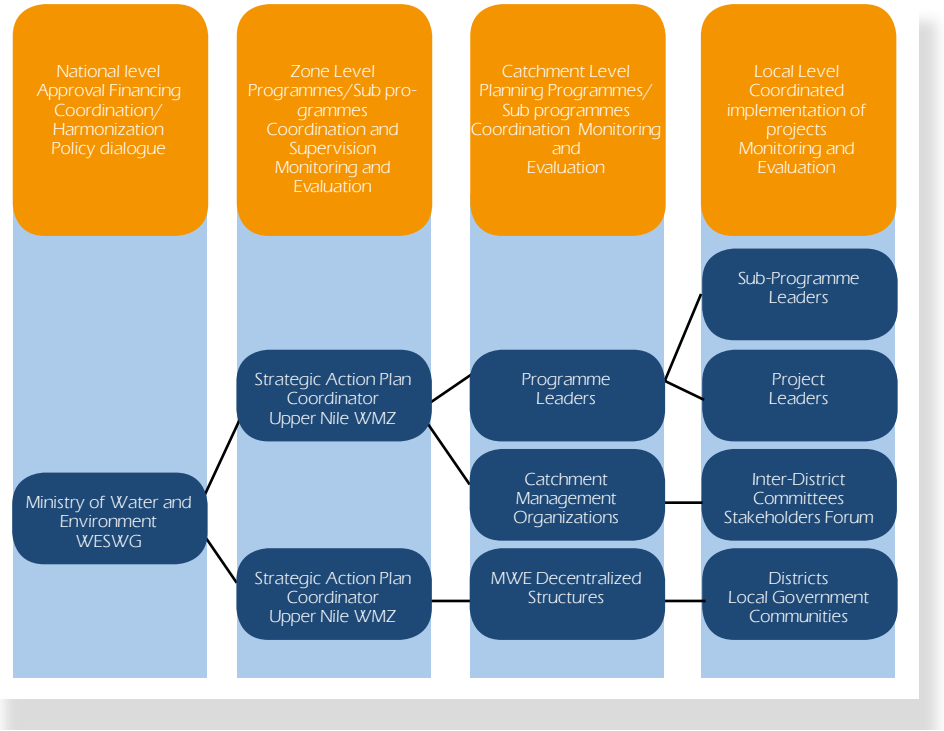

Figure 8: Institutional framework for WRDM strategy implementation

05 ACKNOWLEDGEMENT AND CONTACT INFORMATION

ACKNOWLEDGEMENT

This popular version of the Upper Nile Water Resources Development Strategy and Action Plan summarizes the main findings and the key messages. For more details on the approach, the results of the assessments, the interventions to be implemented, where and when how that implementation will take place, please refer to the main report for the Upper Nile Water Resources Development Strategy and Action Plan.

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