MINISTRY OF WATER AND ENVIRONMENT

DIRECTORATE OF WATER RESOURCES MANAGEMENT

WATER RESOURCES MANAGEMENT INFORMATION AND KNOWLEDGE MANAGEMENT GUIDELINES FOR UGANDA

March 2025

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FOREWORD

Hon. Sam Cheptoris
Minister of Water and Environment
The Republic of Uganda

The effective management of Uganda's water resources is vital for ensuring sustainable development, socio-economic growth, and environmental conservation. Recognizing the importance of knowledge and information in guiding sound decision-making, the Ministry of Water and Environment under the Directorate of Water Resources Management (DWRM) has developed these Water Resources Management Information and Knowledge Management Guidelines.

These guidelines aim to provide a structured framework for collecting, managing, sharing, and applying water resources data and knowledge to support evidence-based planning, policy development, and resource allocation. They reflect our commitment to fostering a culture of transparency, collaboration, and innovation across stakeholders, including government institutions, development partners, academia, civil society, and the local communities.

I invite all stakeholders to adopt and implement these guidelines as we work together to safeguard Uganda's water resources for current and future generations.

For God and My Country

ACKNOWLEDGEMENT

Alfred Okot Okidi

Permanent Secretary
Ministry of Water and Environment

The development of the Water Resources Management Information and Knowledge Management Guidelines marks a critical step in Uganda's journey toward improved water governance, data-driven decision-making, and sustainable resource management. This milestone would not have been possible without the dedication, expertise, and collaboration of multiple stakeholders.

I extend my deepest appreciation to the Director Directorate of Water Resources Management (DWRM), Dr. Callist Tindimugaya for his leadership and commitment in spearheading this initiative. Special recognition goes to Dr. Tusiime Felly Mugizi (PhD), the SACRiAC National Project Coordinator, for her invaluable contributions in guiding and supporting this process. I also acknowledge the technical team, including Ms. Nakalyango Caroline, Principal Hydrologist, and Mr. Anywar Anthony, M&E Expert SACRiAC, for their oversight and technical input in ensuring the successful formulation of these guidelines.

Additionally, I wish to express my gratitude to the technical staff within the DWRM, whose expertise and hard work played a crucial role in shaping the content and direction of this document. The contributions of our development partners, including the Global Environment Facility (GEF) and African Development Bank, for their financial and technical contributions to strengthening Uganda's water sector.

I also recognize the valuable input of academia, civil society, and knowledge management experts Mr. Karumuna Rollanda and Mr. Joseph Obaa, whose efforts have set a strong foundation for enhanced data collection, dissemination, and decision-making in Uganda's water sector.

Lastly, I encourage all stakeholders to adopt and implement these guidelines to strengthen collaboration and improve the management of Uganda's water resources for present and future generations.

FOREWORD BY THE DIRECTOR, DIRECTORATE OF WATER RESOURCES MANAGEMENT

Dr. Tindimugaya Callist

Ag. Director, Directorate of Water Resources Management/Commissioner Water Resources Regulation and Planning Department

Ministry of Water and Environment

Uganda's water resources are central to socio-economic development, environmental sustainability, and climate resilience. They support agriculture, energy, health, industry, and ecosystems. However, growing pressures from rapid population growth, land-use change, pollution, and climate change demand a more coordinated and knowledge-driven approach to their management.

The Water Resources Management Information and Knowledge Management Guidelines provide a structured framework for strengthening how water related data is generated, validated, and stored. By standardizing processes and enhancing accessibility, the guidelines ensure that decisions on water resources and associated sectors are evidence-based, transparent, and accountable.

A key pillar of these guidelines is the Water and Environment Information System (WEIS), which serves as the central hub for hydrological, hydrogeological, meteorological, and water quality data. This system enables regulators, policymakers, researchers, and practitioners to access information for planning, monitoring, and risk management, thus improving resilience and ensuring equitable utilization of Uganda's water resources.

I extend appreciation to the SACRiAC project, the technical staff under the project and from within DWRM, and our development partners for their vital contributions to this process. Their work has ensured that these guidelines meet both national priorities and international best practice.

I encourage all stakeholders to utilize these guidelines to manage their water resources information and knowledge. By doing so, we will strengthen Uganda's capacity to safeguard its water resources and secure a more sustainable and resilient future.

Table of Contents

List of Figures

List of Table

ACRONYMS

ADCPs	Acoustic Doppler Current Profilers
AVCP	Agricultural Value Chain Development Program
BGS	British Geological Survey
DEA	Directorate of Environmental Affairs
DWD	Directorate of Water Development
DWRM	Directorate of Water Resources Management
GEF	Global Environment Facility
HR	Human Resources
ICT	Information Communication Technology
ISO	International Organization for Standardization
IT	Information Technology
KM	Knowledge Management
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MDAs	Ministries, Departments and Agencies
MEL	Monitoring, Evaluation and Learning
MEMD	Ministry of Energy and Mineral Development
MoES	Ministry of Education and Sports
MoH	Ministry of Health
MTTI	Ministry of Tourism, Trade and Industry
MWE	Ministry of Water and Environment
NEMA	National Environment Management Authority
NFA	National Forestry Authority
NWSC	National Water and Sewerage Corporation
RER	Rapid evidence reviews
RUWAS	Rural Water and Sanitation
RWSSD	Rural Water Supply and Sanitation Department
SACRiAC	"Strengthening the Adaptive Capacity and Resilience of Communities in Uganda's watersheds – Awoja Catchment"
SWOT	Strength, Weaknesses, Opportunities and Threats
WEIS	Water and Environment Information System
WQ	Water Quality
WRM	Water Resources Management
WRM	Water Resources Management.

KNOWLEDGE MANAGEMENT GUIDELINES

1.0 KNOWLEDGE MANAGEMENT GUIDELINES

1.1 Purpose of the Guidelines

The knowledge management guidelines for the Ministry of Water and Environment (MWE) were developed in consultation with the MWE staff, which is comprised of representatives from the all the departments in the Directorate of Water Resources Management (DWRM). This document sets clear guidance for all MWE staff and managers on how to:

a. Institutionalize effective learning processes to facilitate improvement of policies, strategies, and structures;

b. Run an effective knowledge management system and associated processes.

MWE considers knowledge as a strategic organizational resource and values its contribution to operational efficiency and effectiveness. The implementation of the guidelines will ensure knowledge retention and effective access to knowledge products, policies and regulations. It will also support processes that contribute to effective learning and knowledge management across the Ministry.

1.2 Introduction and Mandate of the MWE

1.2.1 Scope

The Ministry of Water and Environment (MWE) has the responsibility for setting national policies and standards, managing and regulating water resources and determining priorities for water development and management. It also monitors and evaluates sector development programs to keep track of their performance, efficiency and effectiveness in service delivery. MWE has three directorates: Directorate of Water Resources Management (DWRM), Directorate of Water Development (DWD) and the Directorate of Environmental Affairs (DEA). The Ministry is headed by a Cabinet Minister and two State Ministers.

1.2.2 Stakeholder Management and Mapping

MWE interacts with a range of other ministries, departments and agencies (MDAs) for the delivery of its vision and mission. It also works closely with bi-lateral and multi-lateral donor agencies, academic institutions, utilities and non-governmental organizations.

The mandate of the MWE regarding sanitation and hygiene activities is stipulated in the Memorandum of Understanding that was signed by the Ministry of Health **(MoH),** Ministry of Education and Sports **(MoES),** and MWE. The role of MWE is limited to development of public sanitary facilities and promotion of good practices of hygiene and sanitation in small towns and rural growth centers. With respect to water for production, MWE is the lead agency for water for production and development off-farm. The Ministry of Agriculture, Animal Industry and Fisheries **(MAAIF)** is the lead agency for water use and management for agricultural development on-farm. The mandate of the Ministry of Tourism, Trade and Industry **(MTTI)** covers water use and management of industries, commerce, wildlife and tourism. The mandate of the Ministry of Energy and Mineral Development **(MEMD)** is water use and management for hydropower generation.

The following parastatal institutions and authorities are under the Ministry of Water and Environment:

The National Water and Sewerage Corporation (NWSC) is a parastatal that operates and provides water and sewerage services for 23 large urban centers across the country including Kampala. NWSC's activities are aimed at expanding service coverage, improving efficiency in service delivery and increasing labour.

The National Environment Management Authority (NEMA): NEMA responsible for the regulatory functions and activities that focus on compliance and enforcement of the existing legal and institutional frameworks on environmental management in Uganda. NEMA's mandate covers both green and brown issues of environmental management. It oversees the implementation of all environment conservation programs and activities of the relevant agencies both at the national and local Government level.

The **National Forestry Authority (NFA)** is responsible for sustainable management of Central Forest Reserves (CFRs), supply of seed and seedlings, and provision of technical support to stakeholders in the forestry sub-sector on contract. NFA is a semi-autonomous business entity and generates most of its own revenues and finances its activities, i.e. NFA's support is contingent upon payment for its services.

The figure below presents an overview of the Ministry with Directorates, Departments, and linkages to committees and parastatal agencies under the MWE.

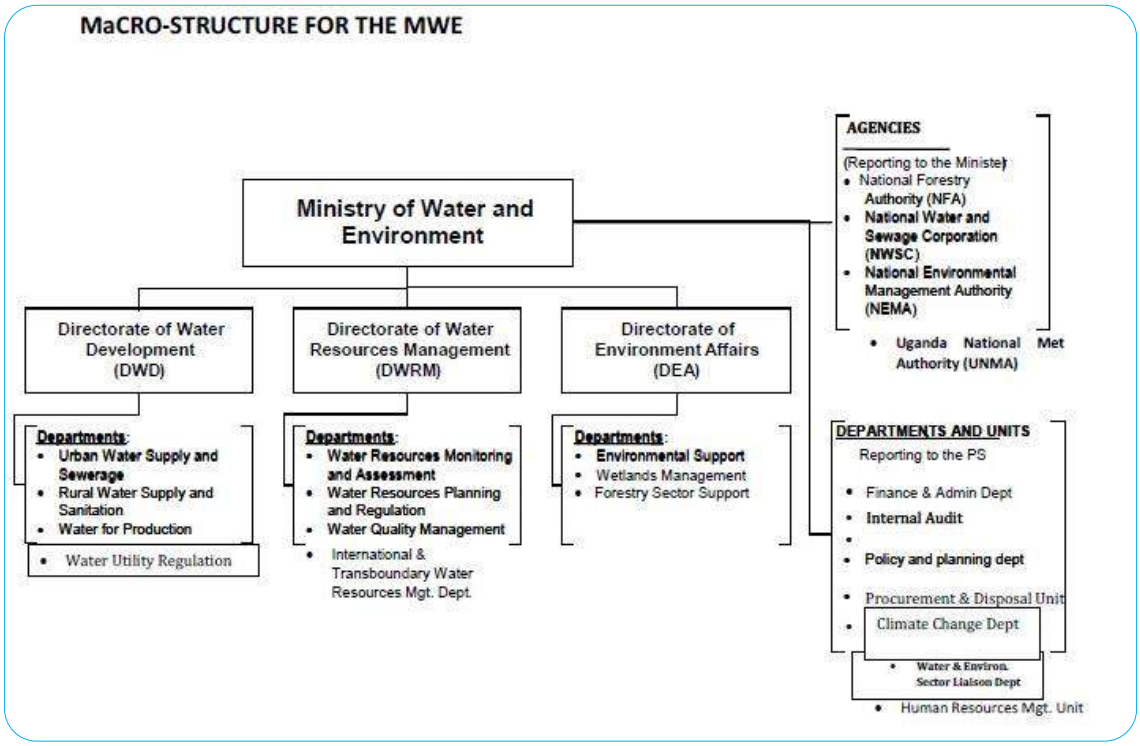


Figure 1: *Ministry of Water and Environment Organizational Structure (Source: MWE Website)*

The **Mandate** of the Ministry is derived from the Constitution and the Local Government Act and includes initiating *legislation, policy formulation, setting standards, inspections, monitoring, and coordination and back up technical support in relation to water and environment sub sectors*.

Broadly, the Ministry performs the following roles and responsibilities:

- Developing legislations, policies and standards for management of water and environment resources.
- Providing sustainable safe water supply and sanitation facilities in rural areas.
- Providing viable water supply and sewerage/sanitation systems for domestic, industrial and commercial use in urban areas.
- Provision of water for production for use in agriculture, rural industries, tourism and other uses.
- Coordinating the national development for Water for Production (agriculture, industry, aquaculture, tourism, trade).
- Promotion of integrated and sustainable water resource management.

- Providing effective planning, coordination and management mechanisms for water and sanitation sector.
- Providing sound and sustainable management of environment for optimum and social and economic benefits for the present and future generations.
- Promotion of effective management of forests and trees to yield increases in economic, social and environment benefits for the current and future generation, especially the poor and vulnerable.
- Receiving, transmitting and processing all weather data from stations nationwide and to international centers.

1.2.3 Vision

The Vision of the Water and Environment Sector is "*Sound management and sustainable utilization of Water and Environment resources for the betterment of the population of Uganda."*

1.2.4 Mission

MWE's Mission *is* "*To promote and ensure the rational and sustainable utilization, development and effective management of water and environment resources for socio-economic development of the country"*.

1.3 Knowledge Management

1.3.1 What is Knowledge Management?

Knowledge management is the process of generating/creating, sharing, using and managing the knowledge and information of an organization. It refers to a multidisciplinary approach taken to achieve organizational objectives by making the best use of knowledge. It is about making the right knowledge available to the right people and making sure that an organization can learn, and that it will be able to retrieve and use its knowledge assets in current applications, as needed.

Two major types of knowledge are identified in MWE:

i. **Explicit Knowledge:** codified knowledge found in documents and databases. Some of the examples of explicit knowledge existing in the Ministry are policies, by-laws, guidelines, regulations, maps and strategic plans;

ii. **Tacit Knowledge:** know-how rooted in experience, practice or in the mind of an expert transferred through socialization, mentoring and coaching.

1.3.2 Knowledge Management Process and System

Knowledge management is a critical process that enables MWE to achieve its mandate and vision. There are many benefits to establishing and enforcing a knowledge management process and system, such as:

i. Improving access to key documents issued by the Ministry. Knowledge management processes will help in the use of existing knowledge assets by enabling sharing between different directorates and between ministries, departments and agencies (MDAs).

ii. Assisting in capturing institutional knowledge and ensuring that knowledge is beneficial for the Ministry and the sector and is not lost with staff/organizational changes.

iii. Assisting MWE in learning from successes and failures with regards to implementing the best strategies and projects, ensuring that failures are not repeated.

iv. Encouraging innovation, as knowledge will be used and adapted regularly.

v. Motivating staff, improving work relations and reducing time and effort spent on "re-inventing the wheel".

In order to rollout and implement these guidelines, there are 3 key prerequisites that must be first established at MWE:

1. Guidelines must be endorsed and promoted by high level management.
2. Key point people (Knowledge Management Product and Project owners) from each directorate must be assigned to, and fully on-boarded in, regularly updating information from each directorate.
3. A knowledge management portal must be established and both regularly updated and widely advertised in the organization and among key stakeholders.

1.3.3 Principles of Knowledge Management

In an organization, knowledge is everywhere. It is the by-product of most work and guides future strategies, work and approaches. Organizational strategies, programs, projects, processes and communications depend on knowledge. To succeed, the knowledge management processes need the support of senior management (the Minister, State Ministers and Commissioners) of MWE and staff to take responsibility.

This section presents the knowledge management principles of MWE (listed below), which are a set of guidelines for effective knowledge management. These principles were defined based on discussions with different stakeholders[1]. The process of establishing principles is one of the most effective actions the senior management in MWE can take to support the knowledge management system.

i. **Knowledge is a valuable asset:** Knowledge is an asset that should be managed just as capital assets are managed. Explicitly stating that knowledge is a valued asset makes it clear that teams are expected to manage and protect knowledge.

ii. **Knowledge is decentralized:** All knowledge creation should be decentralized, meaning that teams closest to knowledge generation are made responsible for learning and documentation. Knowledge Management is employed to ensure that this decentralized knowledge is not lost, but instead is identified, captured and communicated using the processes and methods set out in these guidelines.

iii. **Knowledge is stored in a central repository:** Teams and individuals should not save knowledge in their own temporary repositories. Rather, all knowledge should be stored in one central repository.

iv. **Knowledge is maintained and easily accessible:** Knowledge is more valuable when it is accessible to a wide audience. MWE will apply privacy and confidentiality to limited areas as specified in Section 4.12 of the KM Guidelines (Sign off procedures and confidentiality clause). Any other restrictions to knowledge access should have a valid and strong justification.

v. **Knowledge is searchable:** "Search" functionality is a critical tool for knowledge discovery. Both the online KM portal and MWE's physical library will prioritize search functionality.

vi. **Work produces knowledge:** Every program, project and process should generate knowledge. This could be translated into policy documents, learning documents, by-laws and/or the documentation of processes such as meetings or field visits conducted by MWE. Directors should monitor how many knowledge products are generated and their quality on a quarterly basis.

vii. **Continually refresh knowledge:** Knowledge is not static, it goes out-of-date. Therefore, it needs to be continually refreshed with new knowledge being developed, captured and shared on an ongoing basis.

viii. **Knowledge is accessible:** Captured knowledge should be easily accessible to a wide audience. While the Knowledge Management processes and system set out in these guidelines will increase access to knowledge, some information may be confidential. MWE should develop its privacy and

1 A series of interviews were conducted with representatives from different departments in the DWRM. These interviews have allowed to identify what the key principles should be.

confidentiality policy to address this. Systems to make knowledge products easily available to users must be developed and strengthened.

ix. **Knowledge is measured:** Knowledge quantity and quality is measured and can be regularly evaluated as detailed in Section 4.10 of these guidelines. MWE should monitor and measure the number of knowledge products created, the number of active users and improvement of knowledge management processes.

x. **Knowledge drives improvement:** Knowledge Management and understanding what we know and don't know enables us to make evidence-based decisions, address shortcomings, adapt and improve our work.

xi. **Knowledge is sustained:** Knowledge processes must be sustained and improved over time. To ensure sustainability, knowledge processes need to be integrated with planning and reporting processes.

1.4 Approaches to Knowledge Management

MWE will be applying a knowledge management program that integrates both knowledge codification and person-to-person interactive techniques to encourage knowledge capture and sharing. The organization is thus prioritizing:

i. The production of best practice/learning documents that include processes of critical reflection, communication, application and adaptation.

ii. The establishment of internal learning and sharing platforms (meetings, webinars, trainings): including learning, research, in-depth analysis and sharing between a network of people.

iii. The development and maintenance of a knowledge portal as a key point of access for retrieving organized knowledge.

iv. Human resources (HR) management support, which will develop the right HR processes to manage tacit knowledge in the organization.

v. Investment in and maintenance of Information Management (ICT) based tools aimed at catalyzing the presentation of accurate knowledge for knowledge sharing.

This approach can be translated into action through the learning process depicted in Figure 3 below. This incorporates key, integrated processes to capture, share, store and disseminate knowledge.

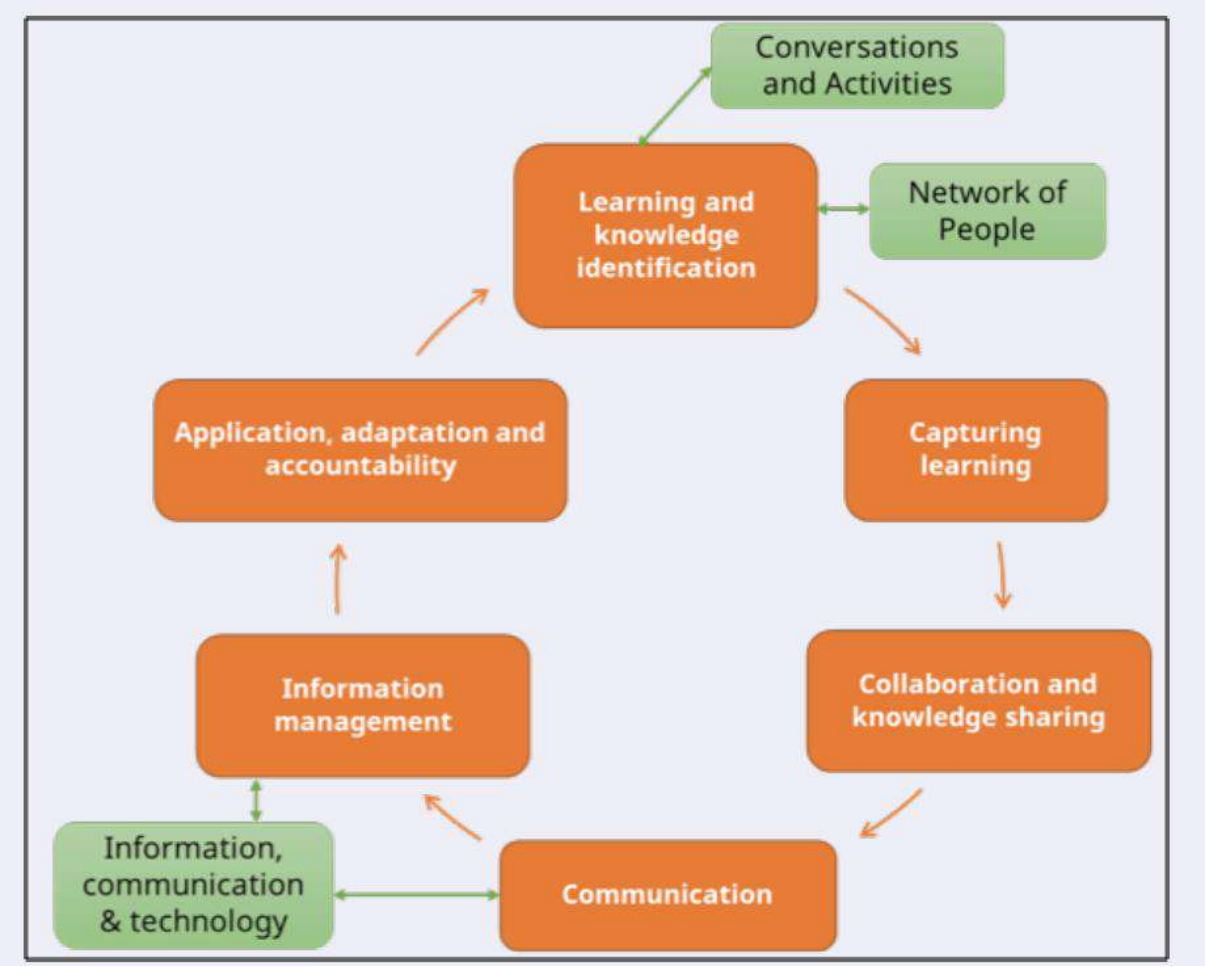


Figure 2: *Learning Process*

1.5 Importance of Knowledge Management

Knowledge Management in MWE is deployed through an executive framework which includes authority, strategy development, organizational culture, risk management and evaluation and measurement.

Knowledge Management will enable the MWE to learn from past mistakes and successes, protect its key knowledge and competencies from being lost or copied, develop the right competencies and skills, use knowledge from one department to another and enhance ability to innovate.

1.6 Roles and Responsibilities

To introduce and sustain knowledge management practice at MWE, it is essential that staff take responsibility for knowledge management as part of day-to-day work. To address this, the Knowledge Management Guidelines drafting team undertook a mapping exercise which identified specific knowledge management responsibilities for existing staff roles; and where appropriate, the creation of a new staff role. To make knowledge management a reality at MWE, the taskforce recommended the adoption of the following new responsibilities:

Table 1: Knowledge Management Roles and Responsibilities at MWE

CATEGORY	ROLES AND RESPONSIBILITIES
All staff	➲ Undertake the Knowledge Management training and ensuring the staff they supervise have taken the training and are implementing the knowledge management guidelines.
Senior Management (Minister, State Ministers and Commissioners)	Senior Management has the roles and responsibilities of ensuring that: ➲ Knowledge management (KM) is owned and guided by Senior Management. ➲ Responsibilities for KM are implemented via reporting processes. ➲ A Knowledge Management Manager is appointed to the KM committee to coordinate and facilitate KM approaches (This is not the creation of a new role; these responsibilities are to be embedded within a suitable existing role). ➲ Budget is allocated to implement and resource the knowledge management activities set out in these guidelines. ➲ KM is integrated into annual budgeting cycles and processes. ➲ A cross-functional steering or advisory committee for KM is established, chartered and operational. ➲ The number and quality of knowledge products generated by each Directorate on a quarterly basis is monitored.
Directors	Directors have the roles and responsibilities of ensuring that: ➲ Their team members are properly inducted on their knowledge management responsibility. ➲ Their Directorate regularly captures knowledge and reports progress on a quarterly basis. ➲ A point of contact (also called the KM Product & Project owner) in their directorate to upload and share new knowledge is assigned. ➲ Monthly team internal meetings are conducted (meetings will focus on lessons learned, successes, challenges and what can be done differently and will be documented). ➲ The Directorate produces at least three best practice/learning products per year.

CATEGORY	ROLES AND RESPONSIBILITIES
There will be a Knowledge Management Product & Project owner assigned by each directorate. *This is not the creation of a new role,* *these responsibilities are to be embedded within a suitable existing role.*	A Knowledge Management Product & Project owner has the following roles and responsibilities: ➲ Being an active champion of KM in each directorate. ➲ Representing Directorates to receive/communicate knowledge products, thereby enabling knowledge flow. ➲ Compiling knowledge outputs in the directorate. ➲ Providing induction to new team members on the KM guidelines. ➲ Uploading new knowledge products, research and reports on the knowledge portal. ➲ Editing/deleting/removing outdated knowledge products from the knowledge portal. ➲ Defining access levels of documents: high (confidential Directors and State Ministers only), medium (all MWE staff), public (accessible to water and environment sector partners). ➲ Providing updates on knowledge management status of the Directorate in quarterly and annual reports and providing updates to the Director.
System Administrator of Knowledge Management Portal: This is not the creation of a new role, these responsibilities are to be embedded within a suitable existing role.	➲ Providing login access for internal staff and deleting access when staff leave the organization. ➲ Backing up information according to the IT policy. ➲ Monitoring performance of the KM portal. ➲ Providing KM portal maintenance support to ensure it is properly functioning.
Human Resources Management Unit	➲ Ensuring that KM competencies are embedded across the Ministry. ➲ Ensuring that KM resource requirements are determined collaboratively between the KM committee and directorates. ➲ Ensuring that resigned or retired staff no longer have password access. ➲ Ensuring that new staff have received a proper induction on the Knowledge Management guidelines. ➲ Organizing knowledge management trainings, in collaboration with the Knowledge Management Manager, at least twice a year for all MWE staff. ➲ Developing annual succession, phased retirement and mentoring plans on an annual basis for review and approval by the senior management and each Directorate Director.

1.7 Knowledge audit

Knowledge assessment review involves assessing existing knowledge resources in the organization. This process enables an organization to understand the knowledge resources it possesses and the knowledge it lacks to fulfill its policy and strategic goals (e.g. National Water Policy, MWE guidelines and Regulations). Any knowledge assessment should aim at enhancing organizational capabilities and related competencies to improve efficiency and effectiveness.

MWE will maintain a database/record of key documents produced such as policies, guidelines, strategic plans, annual plans/report, etc. This will enable a knowledge assessment as it stores regular records and documentation in one place, making it easier to access within the Ministry.

MWE commits to conducting annual knowledge audits to identify gaps in knowledge management processes and make the adequate changes. The audit will be led by the Directorate of Water Resources Management (DWRM) with full support from the senior management of MWE. The knowledge audit will include, but is not limited to:

i. **Knowledge Management (KM) strategy and leadership:** Does the organization use the Knowledge Management Guidelines? Does it have and use a knowledge vision and strategy, actively promoted by the Minister, that clearly articulates how knowledge management contributes to achieving organizational goals?

ii. **Roles and responsibilities for KM:** Have specific staff been identified as key point people (Knowledge Management Product & Project owners)? Are roles and responsibilities for Knowledge Management clear?

iii. **KM awareness and capacity:** Have all staff been briefed on the knowledge management guidelines of the organization, including new staff, when they join? Have senior managers and professionals been trained to enable knowledge management? Does the organization have adequate knowledge management and information management staff that coordinate knowledge repositories (library and knowledge management portal) and act as point people for the provision of information to support key decision-making?

iv. **KM systems:** Does the organization have systematic processes for gathering, organizing, using and protecting key knowledge assets, including those from external sources?

v. **KM technology:** Is there a rigorously maintained catalogue of knowledge products on the Knowledge Portal that clearly identifies knowledge owners and is readily accessible across the organization? Can all important information be easily found and accessed by new users on the portal and is knowledge properly maintained and protected from loss? Does an archiving policy exist so that copies of old documents are timely archived?

vi. **Knowledge capture and sharing:** What knowledge is produced by the organization? Who produces and uses it? How frequently is it used? Where is the knowledge stored? Has knowledge that has already been produced been reviewed for quality and quantity? Does it link to strategic objectives and identified knowledge gaps? Is a knowledge update happening regularly? Does the organization know who the best experts are for different fields?

vii. **Reflection:** Do planned and structured reflection processes routinely take place for key areas of work? Are lessons from reflection used to shape and improve future practice? Are staff encouraged to acknowledge, accept and learn from mistakes?

viii. **Culture/Structure:** Is knowledge sharing across departmental boundaries actively encouraged and rewarded? Does the workplace setting, and format of meetings encourage informal knowledge exchange? Is knowledge management discussed as part of staff performance and appraisal?

ix. **Institutional memory:** Is there a handover process for all instances of staff changing roles or leaving?

1.8 Knowledge Management Framework: Capture and Sharing

Knowledge management initiatives should be a collective practice, part of everyday ways of working. It is essential to highlight that knowledge can and should come from anyone in the organization, from the most experienced employee to the newly hired. Regularly scheduling knowledge sharing sessions, during which employees take turns presenting to MWE staff about an issue, will encourage employees at all levels to capture knowledge on a regular basis.

1.8.1 Recommendations for meetings and trainings

Several team meetings and trainings are conducted at MWE. Staff also attend various external trainings and meetings. To generate and track lessons, all directorates and departments are recommended to conduct internal monthly meetings and review programs, projects and activities. During the monthly internal meetings, staff will mainly discuss the following areas and record discussions and recommendations over time, per knowledge item:

a. What lessons were learned and why? Please explain.

b. During the process of the project, how were lessons learned adapted in practice?

c. What were the successes and why?

d. What aspects of this project/experience were most challenging?

e. What made these changes happen?

f. What were mistakes or failures? And what can we learn from them?

g. What should be done differently next time?

1.8.2 Knowledge acquisition techniques

Knowledge capture is the responsibility of all staff. Directors should be encouraged to organize cross-departmental and intradepartmental learning meetings where staff can share knowledge and learning. Line managers should encourage staff to collect stories and document learnings from projects and research studies. The implementation of innovative approaches and technologies must be documented. New work should always build on the foundation of previous knowledge. New knowledge should be captured and stored appropriately for others to access and learn from.

A variety of knowledge acquisition techniques are recommended and listed below:

i. **Knowledge Products:** Narrative recordings of a project's progress and outcomes. A minimum of 3 knowledge products will be expected from each Directorate on an annual basis.

ii. **Rapid evidence reviews (RER):** RER is a way of reviewing research and evidence on a particular issue. It looks at what has been done in an area and records the main outcomes, producing an overview of the knowledge base. Such reviews produce evidence that enables new projects to build on lessons learned. The DWRM will run annual RERs, introduce published material, national and international journals/publications, scan selected resources and introduce them to staff at MWE.

iii. **Documenting learning:** Technical and strategic experiences of a project are a valuable source of intellectual capital that can be applied and reused in other situations. There is no specific format for the documentation, but a person can likely learn through the experiences of others when those

experiences are articulated through an oral or written narrative. Managers can understand not only how to solve a problem, but also why the solution works. All line managers should ensure that staff who report to them contribute to learning and are responsible in reflecting on lessons and capture that for sharing. Key questions can be: What did you learn? What are the successes and why? And what can be done differently?

iv. **Research:** Evidence-based materials addressing a research problem or hypothesis are essential to capturing knowledge.

v. **Video and photography:** The Directors will assign a staff member to support each directorate in producing high-resolutions stills/photographs and high-quality video showing the activities performed under a project or program. Videos should be saved in an editable and shareable format and shared widely on the Ministry website and knowledge management portal. The video should give a quick synopsis and depiction of the problem that the project/program is trying to resolve, how the outcomes can be sustained, and key lessons learned.

1.8.3 Learning meetings and forums

Learning meetings will be organized at the MWE level on a quarterly basis and advertised in advance by email and on the notice boards. The topic for discussion or the case study to be presented will be publicized. The Knowledge Management committee will organize the learning event and record and share the outcomes of the meeting with all MWE staff.

1.8.4 Knowledge portals

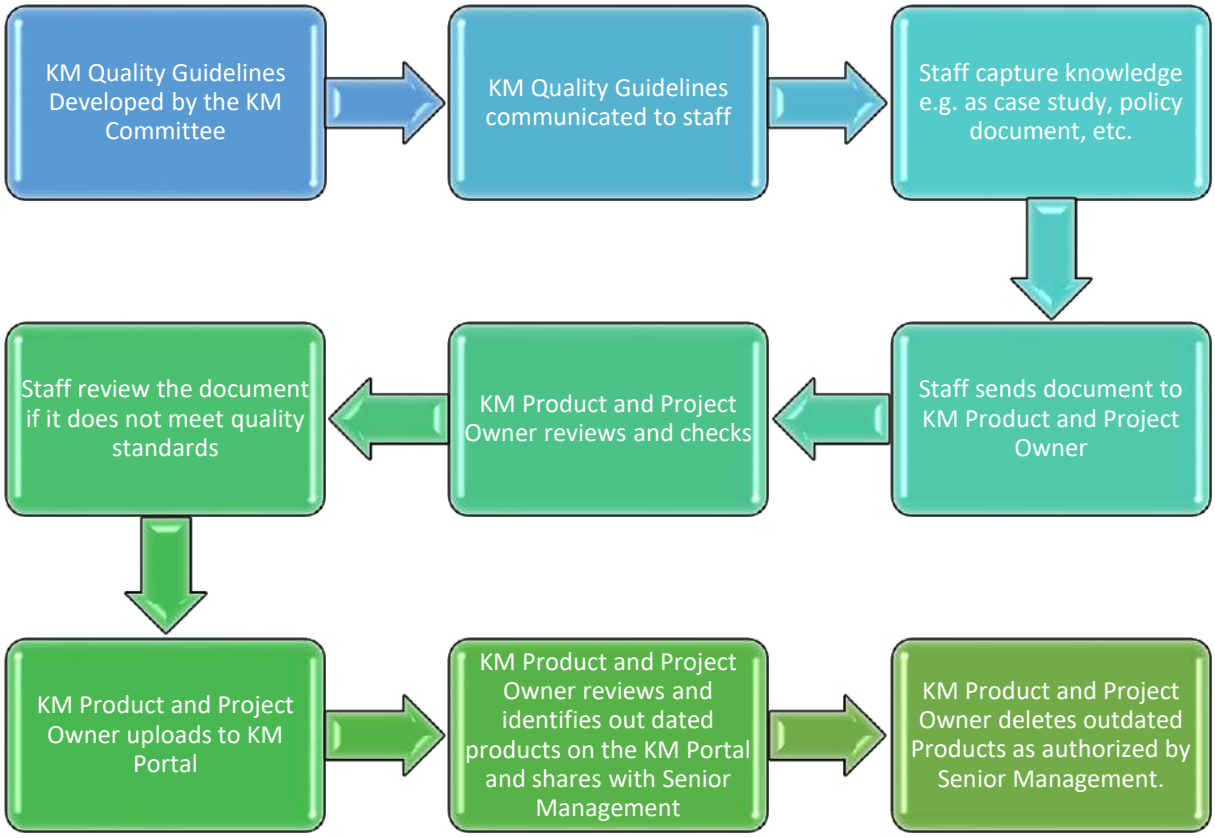
Knowledge portals or banks are online platforms which can store large amounts of information, thereby giving MWE staff one location to access and review policies, guidelines, previous reports and case studies from various projects in the organization. These portals are typically used to showcase the work of an organization and provide signposts to documents, articles and toolkits.

MWE's knowledge management portal – https://weis.mwe.go.ug will soon be launched to provide updated resources to staff, partners and the general public. The Water and Environment information System (WEIS) for Republic of Uganda provides a single-entry point for effective collection, processing and dissemination of water resources data. Apart from creating a knowledge base, WEIS allows interfacing with standard tools, data processing applications and hydrological design aids. The information system consists of portals and databases as catalogued in section 5.1 of this guidelines.

1.8.5 Quality standards for knowledge captured

Developing and maintaining quality standards for knowledge management is essential. These apply especially to new content uploaded to the KM portal. Quality control ensures that newly-uploaded content is relevant, useful, reliable, well-written and branded. Without quality control, content quickly becomes redundant and out-of-date, making useful knowledge hard to find. The following process flow illustration sets out the steps for maintaining quality:

Figure 3: *Knowledge Management Quality*



1.8.6 Library

MWE has a library in its headquarters and the regional offices. MWE needs to modernize its library through the digitization of existing documents and expansion of its digital resources to satisfy users. The library should invest in making both electronic and hard copies of national and international research, articles, maps and hydrogeological data available. The library should also offer more individual assistance and keep up-to-date information stored within the Ministry. A desktop station with access to the knowledge management portal should be available for public use.

1.8.7 Storytelling

Storytelling can be effective as a knowledge transfer technique in an organization where tacit knowledge is dominant. Storytelling has proven benefits in enabling organizations to uncover tacit knowledge as it is a natural learning process. Storytelling will support managers to ensure that operational knowledge is retained and there is operational continuity when employees leave.

A knowledge sharing approach can be used when pairing staff for coaching. Directorates are encouraged to organize informal "coffee meetings" during which useful stories about people, work, the organization, social bonding, the past, and the future and how they relate to organizational operations can be discussed. Such "coffee meetings" could include informal presentations by staff on specific topics to share expertise with colleagues. These discussions can be recorded through meeting minutes and short videos and shared on the knowledge management portal.

1.9 Knowledge supporting processes & creating a knowledge management culture

Creating a knowledge management culture requires:

a. Senior Management to provide an inspiring vision for KM and clarity for staff on what is required and expected of them to achieve it.

b. Directors and line managers to reinforce this vision and provide guidance to staff on how to put KM into practice.

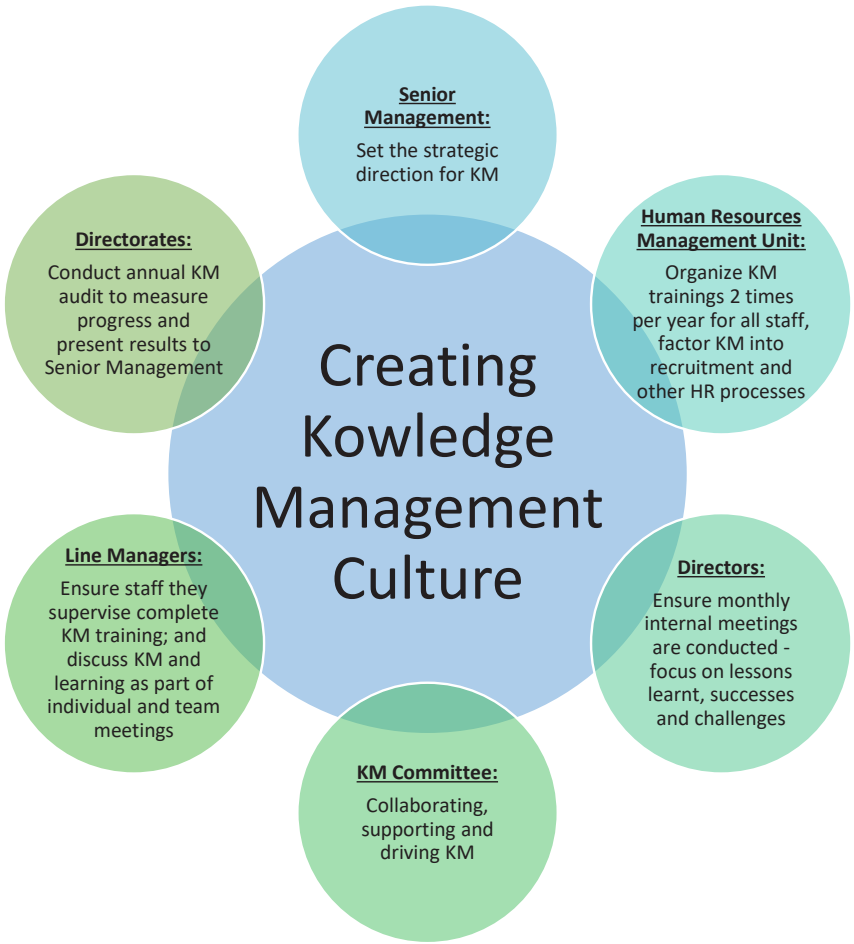
c. Human resources management unit to support staff to understand KM and reward them for putting it into practice.

d. Monitoring, Evaluation and Learning (MEL) to monitor, measure and communicate progress, highlighting successes and areas for improvement.

e. The KM committee to support and collaborate across directorates to make KM a normal part of daily work culture.

Figure 4 below highlights how creating a knowledge management culture involves these stakeholders.

Figure 4: *Collaboration for creating a knowledge management culture*



1.9.1 Leadership

The ideal organizational environment for learning, KM and innovation is achieved through building a shared vision and establishing systems to achieve a common goal. The MWE leadership, at all levels, will play a critical role in institutionalizing and prioritizing learning and knowledge management. The senior and middle management of MWE will develop strategies and structures that will translate guiding ideas into business decisions and create effective learning processes to allow for continuous improvement in all organizational strategies and structures.

Leadership should help facilitate organizational culture to be more knowledge management-friendly by:

i. Acknowledging the existence and influence of organizational culture and addressing organizational culture that hinders sharing and learning.

ii. Having a clear and persistent vision of what the culture should be and of what changes need to be applied to achieve this. The vision must be understood by management at all levels and spread across the organization.

iii. Consciously managing culture by using employee surveys to evaluate progress and direction or by using incentives to motivate employees.

1.9.2 Supporting HR processes

Human Resources (HR) can play several roles in developing knowledge management systems. HR should help the organization articulate the purpose of their knowledge management system. HR must also promote a culture that embraces getting the right information to the right people at the right time. HR unit should function to create systems that allow transforming tacit knowledge into explicit knowledge through education, building employee skills, competencies and careers.

MWE human resources management unit should work with senior management and all directorates to formulate a strategy using the pillars of knowledge retention and understanding risk factors. Risks can occur when insufficient focus has been placed on knowledge capture, informal communication, mentoring programs and employee training and development.

a. **Recruitment:** HR will consider knowledge management skills and competencies in the overall process of attracting, short-listing, selecting and appointing suitable candidates for jobs within the organization. HR will use key competency requirements of knowledge management for selection of all key technical candidates and managers. Collaboration between HR and the KM committee is essential in recruitment, training, rewarding KM as part of performance and providing new staff with access to the KM portal.

b. **Training and development:** HR will organize knowledge management trainings at least twice a year for all MWE staff. Training will focus on creating awareness on the goal and vision of the organization and the role of knowledge retention, organizational training, and learning and culture in the organization. It will also be a forum in which work and knowledge management processes are shared.

c. **Reward and incentive systems:** To encourage a cultural shift in MWE, senior management should start by having a clear reward and incentive system. Rewards and incentives will be critical in changing the knowledge management culture of MWE staff that make additional efforts to innovate and share learning at any level should be rewarded. This will incite increased motivation, job satisfaction and involvement in organizational functions. Incentives are determined by organizational regulations. Monetary incentives that reward workers for performance include annual or semi-annual bonuses. These incentives encourage friendly competition between staff. Non-monetary incentives reward

employee performance by providing opportunities. These rewards include training opportunities that allow workers to learn new skills and pursue advancement opportunities that benefit their career.

d. **Succession planning:** Succession planning is a common knowledge transfer approach. Organizations that have a clear succession plan will empower new employees and avoid loss of knowledge. Succession planning is an ongoing and dynamic process that transfers knowledge from an experienced workforce to the new workforce. Succession planning will also require HR to identify and map out retirement schedules of key staff that are resigning. HR should also engage in talent identification and development, with the support of the respective directorates.

e. **Phased retirement:** Preserving organizational memory must become a key priority as the MWE regularly loses senior staff that hold institutional memory. There should be a fundamental change on how MWE transfers knowledge, especially of long-serving public servants in an organization where most of the knowledge is not written or documented. Phased retirement provides incentives and a defined mechanism for senior staff to transfer their tacit knowledge over a year or two after or before their retirement, linking them up with selected staff and identifying clear objectives of the support process.

f. **Mentoring:** MWE must provide special guidance for line managers and individuals that request mentoring. Mentorship is a relationship in which a more experienced person in a field helps to guide a new or mid-career colleague. HR needs to facilitate mentorship processes and help directorates identify certain areas of expertise. This will create a long-term partnership between senior staff with vast experience and more junior-level staff, through which the latter can receive critical support in their role, career guidance and role modelling. HR can request critical experienced staff to mentor junior staff during their phased retirement period, but also request for mentorship to come from individual staff or their line managers during performance reviews.

g. **Coaching:** Coaching can be used to develop staff and boost team member's performance. It can also be used to help individuals resolve challenges or problems, decide how to best take advantage of opportunities, and develop their potential. When coaching, a senior staff member is a partner, rather than an expert. All directorates must develop coaching plans for selected team members that are identified based on development needs. These plans will be clearly acknowledged in the directorates' annual plans. HR will also support and follow-up on coaching plans, ensuring that they are implemented on a quarterly basis.

h. **Orientation/ induction planning:** HR needs to enforce staff induction, ensuring appropriate orientation is provided to new staff so they can better understand their roles, organizational strategies and policies and the roles of others on their team and in other directorates. This process must be institutionalized by HR providing a full induction plan that includes one-to-one interactions with key staff, team meetings and an orientation booklet with an overview of all key information at MWE.

i. **Handing over:** All staff should be requested to write handover notes that include key activities in the pipeline, priorities, documents, resource materials and contacts before receiving final clearance for departure. HR and all managers should oversee this process, ensuring that itis happening and that handover notes are provided to the newly appointed replacement.

1.10 Knowledge management assessment and benchmarking (MEL)

The successful roll-out and implementation of a knowledge management system should be monitored at the national level by MWE. Quarterly progress reports from each directorate will include one section on learning and sharing. Reported information can include number of staff trained on knowledge

management, documentation collected, case stories written and/ or number of documents shared on the knowledge management portal.

In addition, a strong monitoring system will review;

i. The improvement of organizational culture for knowledge sharing, and

ii. The improvement of business processes and information technology solutions for knowledge capture, storage, and retrieval.

Therefore, the DWRM will conduct the KM Audit to gather information across nine areas of knowledge management:

1. KM Strategy & Leadership
2. Roles & Responsibilities for KM
3. KM awareness and capacity
4. KM systems
5. KM technology
6. Knowledge Capture and Sharing
7. Reflection: Learning and reflecting upon successes and mistakes
8. Knowledge Sharing Culture, and
9. Institutional memory. The KM Audit results will be presented to management to benchmark and measure progress and inform future approaches.

1.11 Knowledge storage information and communication technology

Information Technology plays a key role in facilitating knowledge creation, sharing and management. IT systems can be used to support communication, coordination and collaboration among people working in groups, teams and across organizations. IT 'search' functionality is useful in the transformation, analysis and integration of available explicit knowledge. Managing explicit knowledge requires significant investment in IT browsing, presentation, search, location and filtering functions.

MWE's Information Technology resources will be managed in accordance with its needs and priorities. These resources will include tangible investments in computer hardware, software, data, networks and data center facilities, as well as in the staff who are hired to maintain them. MWE will regularly ensure that core IT infrastructures and staff are in place, well-managed and updated to new and emerging technologies, systems and processes.

1.12 Sign off procedures and confidentiality clause

To encourage information sharing and retrieval, all documents uploaded to the KM portal (https://weis.mwe.go.ug/) will be shared with the public, unless confidential or require payment of a fee.

1.12.1 Access and Sharing Water Resources Information

The Water and Environment information System (WEIS) for Republic of Uganda consists of portals and databases in a wide range of areas including but not limited to;

1. National Wetland Information

2. Permits and Compliance
3. Dam and Waterways Safety
4. Uganda Borehole Information
5. Water Resources Monitoring and Assessment
6. Water Quality Management Information
7. Forestry Sector Support
8. Document Management Information
9. Rural Water and Sanitation.

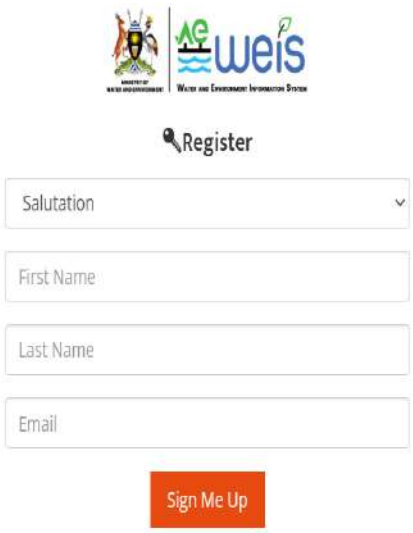
The procedure below is mandatory for accessing the water and environment information and knowledge in the WEIS:

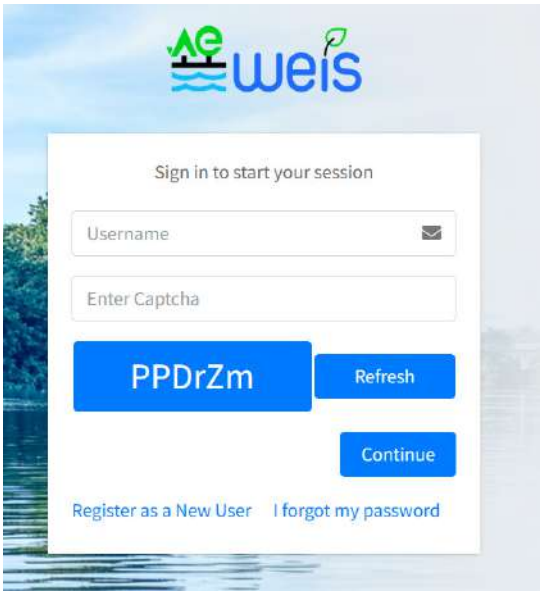
a. There is public information available on the WEIS homepage carousel, accessible by visiting https://weis.mwe.go.ug. Due to the limitations of this carousel, it is necessary for a user to login to drill-down for more categories of data. The prerequisite to access this page is an active internet service connection.

b. It is mandatory for a user to register before login is granted. Upon visiting https://weis.mwe.go.ug, click the "Register" button to fill in the registration form. A verification email will be sent to the email address provided. This email contains a set of instructions that should be followed to complete the registration process. Upon success registration, login to your profile and choose any of the above portals and databases from the services section.

c. Staff of MWE are advised to use their MWE email address during registration, while the rest of the prospective users have no special condition.

d. It is mandatory for a WEIS registered user to login at https://weis.mwe.go.ug/login to submit any data request. This requirement applies to both the MWE staff and the general public.





1.13 Data Management Guidelines for Water Resources

To ensure consistency and reliability of water resources data, these guidelines, closely aligned with globally recognized International Organization for Standardization (ISO) standards[2] have been developed to aid collection, validation, storage, and dissemination of water resources data in the Ministry of Water and Environment (MWE). The data types addressed in these guidelines include but not limited to water quality, meteorological, hydrogeological, and hydrological data.

1.13.1 Data Collection Guidelines

The following data types are addressed in this section: river discharge, water levels, sediment load, and flood data (hydrological); groundwater levels, recharge rates, abstraction rates, and salinity (hydrogeological); rainfall, temperature, wind speed, humidity, and evaporation rates (meteorological); and pH, turbidity, dissolved oxygen, nitrates, phosphates, heavy metals, and microbial contamination for water quality data.

Standardized Protocols

- Ensure consistent measurement of parameters such as pH, nitrates, and heavy metals. Use compliant methods for water quality sampling (ISO 5667).
- Use tools like weirs and acoustic doppler current profiler (ADCPs) to accurately measure river discharge.
- To capture meteorological data accurately, deploy calibrated automated weather stations.

Equipment and Tools

- Install flow meters, pressure transducers, and sediment samplers for river monitoring.
- Utilize piezometers and geophysical instruments for groundwater assessment.
- Set up rain gauges and evaporation pans in strategic locations.
- Use portable multi-parameter probes for in-situ measurements and laboratory equipment for detailed water quality analysis.

Site Selection

- Select sites that are representative of the region's hydrological and hydrogeological characteristics.
- Include locations upstream and downstream of potential pollution sources for water quality monitoring.

Sampling Frequency

- Conduct river discharge measurements daily during wet seasons and weekly during dry periods.
- Monitor groundwater levels monthly to track seasonal trends.
- Perform water quality sampling quarterly and after significant rainfall events.

Field Metadata Logging

- Document metadata, including site location (GPS coordinates), time, instrument settings, and field conditions, in compliance with ISO 19115.

1.13.2 Data Validation Guidelines

Error Detection

- Apply threshold checks for hydrological parameters to identify sensor anomalies.
- Flag outliers in groundwater level measurements based on regional norms.
- Detect anomalies in rainfall data using statistical methods.

2 ISO 9001 (Quality Management), ISO 19115 (Geographic Metadata), ISO 27001 (Information Security), ISO 5667 (Water Quality Sampling), and ISO 14001 (Environmental Management).

Cross-Validation with Historical Data

- For river discharge, compare current measurements with long-term historical averages.
- Align groundwater recharge rates with historical patterns to validate accuracy.

Field Validation

- Perform duplicate sampling for water quality to verify laboratory results.
- Revisit monitoring sites to remeasure critical parameters if inconsistencies arise.

Automated Tools and Software

- Use hydrological modelling tools like HEC-RAS to validate discharge data.
- Implement GIS-based validation for spatial datasets, such as aquifer maps and rainfall patterns.

1.13.3 Data Storage Guidelines

Centralized Repositories

- Store datasets in relational databases, such as PostgreSQL with PostGIS extensions for geospatial data.
- Maintain cloud backups for critical datasets like historical flood records.

Data Formats

- Use CSV and NetCDF formats for hydrological and meteorological data to ensure compatibility with analytical tools.
- Store spatial datasets in GeoTIFF format and ensure metadata is standardized.

Metadata Management

- Record detailed metadata, including collection methods, data resolution, and source reliability, in compliance with ISO 19115.

Backup and Redundancy

- Regularly back up all datasets, ensuring multiple redundant storage locations for disaster recovery.

Access Control

- Implement role-based access controls, especially for sensitive water quality and hydrogeological data.

1.13.4 Data Dissemination Guidelines

Open Data Standards

- Share non-sensitive datasets like rainfall trends through publicly accessible platforms.
- Provide restricted access to datasets such as groundwater contamination reports under clear data-sharing agreements.

User-Friendly Reporting

- Use dashboards and visualizations to present key findings, such as seasonal hydrological trends or pollution hotspots.

Real-Time Updates

- Provide real-time flood alerts and water level updates via online platforms and SMS notifications.

Version Control

- Maintain update logs for all datasets, ensuring stakeholders have access to the latest information.

2.0 EXISTING WATER-RELATED INFORMATION SOURCES, DATABASES, AND DATASETS IN UGANDA

2.1 Water and Environment Information System

The Water and Environment information System (WEIS) for Republic of Uganda provides a single-entry point for effective collection, processing and dissemination of water resources data. Apart from creating a knowledge base, WEIS allows interfacing with standard tools, data processing applications and hydrological design aids.

CONTENT	ACCESS
INFORMATION SOURCES, DATABASES, AND DATASETS:	**Water and Environment Information System (WEIS)**
The Water and Environment information System (WEIS) for Republic of Uganda provides a single-entry point for effective collection, processing and dissemination of water resources data. Apart from creating a knowledge base, WEIS allows interfacing with standard tools, data processing applications and hydrological design aids. The information system consists of portals and databases as catalogued below;	https://weis.mwe.go.ug/
National Wetland Information System: **Wetland information** Moving to the National Wetland Portal, WEIS provides a window into our wetland ecosystems, promoting sustainable conservation practices through update of inventories of the wetlands. Through this portal, wetland status is monitored at key monitoring locations. Providing an integrated view of WIS related spatial data. GIS datasets come to the SDS from isolated systems, containing different kind of heterogeneous data.	https://weis.mwe.go.ug/nwis
Permits and Compliance Database: **Water Resources Planning and Regulations** On-line Permit request registration & automated processing flow path to ensure fair permit issuance. Need permits for surface and groundwater abstraction, waste water discharge, water supply construction works or drilling firm? Navigate seamlessly through the Permit Portal, ensuring responsible water utilization with the help of WEIS	https://weis.mwe.go.ug/permitkpis

CONTENT	ACCESS
Dam and Waterways Safety Database: **Water Resources Planning and Regulations** Welcome to the Dam and Waterways Safety Portal, an integral component of our comprehensive Water and Environment Information System. This database is exactly designed to provide detailed, up-to-date information on the safety and management of dams and waterways It serves as a crucial resource for professionals in the water and environment sectors, enabling effective monitoring, risk assessment, and maintenance of these vital infrastructures. By centralizing data on dam conditions, water levels, structural integrity, and safety protocols, our portal aims to enhance the safety and sustainability of water resources, ensuring they continue to support communities and ecosystems effectively.	https://weis.mwe.go.ug/Damsafety
Uganda Borehole Information Portal: **Water Resources Monitoring and Assessment** Capture information from borehole completion reports and process to assess ground water and drilling contractor performance... Digging into groundwater resources, the Borehole Portal in WEIS facilitates better understanding of Uganda's hydrogeology and provides access to key information required in maintenance of drilled boreholes countrywide.	https://weis.mwe.go.ug/Borehole
Available Monitoring Stations: **Water Resources Monitoring and Assessment** Time Series data analysis of surface water bodies (Lakes, Rivers etc.,) - Water Level & Other parameters. For a deeper understanding of water availability, WEIS offers dedicated portals for hydrometeorological monitoring. These portals provide dynamic, status on water quantity in Uganda's rivers, lakes and aquifers.	https://weis.mwe.go.ug/surfacewater
Water Quality Management Information Portal: **Water Quality Management** Organizing water quality parameter data obtained through analysis of water samples collected across different WQ monitoring stations. Quality matters. The Water Quality Portal in WEIS offers insights into water quality parameters, supporting initiatives for clean and safe water.	https://weis.mwe.go.ug/wqdtls

CONTENT	ACCESS
Forestry Sector Support Database: The Forestry Sector Database offers comprehensive information related to the forestry sector, along with access to various forest services. This includes the facility to apply for planting materials and access to high-quality planting materials.	https://weis.mwe.go.ug/fssd
Document Management Information: **Document Management System** Manage Document's effectively with the Document Management Portal in WEIS. Stay on top of infrastructure maintenance and optimize resource allocation for sustainable development. Designed to gather, store and make the information products available to the users through the WEIS.	https://weis.mwe.go.ug/dms
Rural Water and Sanitation Database (RUWAS): **Rural Water and Sanitation Database (RUWAS)** The database aggregates information on the utilization of district water and sanitation grants overseen by the Rural Water Supply and Sanitation Department (RWSSD), including resource allocation and technical assistance. It also tracks the planning and implementation of water schemes across local government boundaries, with an emphasis on gravity flow and large motorized piped water schemes.	https://weis.mwe.go.ug/ruwaskpis
INFORMATION SOURCES, DATABASES, AND DATASETS	**Uganda Water Supply Atlas**
By the Ministry of Water & Environment The Water Supply Database is a database that provides stakeholders with good knowledge and information on matters concerning the current safe water supply coverage, functionality and distribution of water among others. The database covers all 137 districts of Uganda and Water information from Point Water Sources, Piped Schemes and National Water & Sewerage Corporation.	http://wsdb.mwe.go.ug/
INFORMATION SOURCES, DATABASES, AND DATASETS	**The British Geological Survey (BGS) Earthwise**
Hydrogeology of Uganda - MediaWiki - BGS Earthwise.	https://earthwise.bgs.ac.uk/index.php/Hydrogeology_of_Uganda

CONTENT	ACCESS
INFORMATION SOURCES, DATABASES, AND DATASETS	**AQUASTAT – FAO's Global Information System on Water and Agriculture**
The country profile is a summary of key information that gives an overview of the water resources and water use at the national level. It can support water-related policy and decision makers in their planning and monitoring activities as well as inform researchers, media and the general public. Information in the report is organized by sections: ➲ Geography, Climate and Population ➲ Economy, Agriculture and Food Security ➲ Water Resources ➲ Water Use ➲ Irrigation and Drainage ➲ Water Management ➲ Policies and Legislation Related to Water Use in Agriculture ➲ Environment and Health ➲ Prospects for Agricultural Water Management.	https://www.fao.org/aquastat/en/countries-and-basins/country-profiles/country/UGA
INFORMATION SOURCES, DATABASES, AND DATASETS	**Water Resources Profile Series**
The Water Resources Profile Series synthesizes information on water resources, water quality, the water-related dimensions of climate change, and water governance and provides an overview of the most critical water resources challenges and stress factors within USAID Water for the World Act High Priority Countries. The profile includes: a summary of available surface and groundwater resources; analysis of surface and groundwater availability and quality challenges related to water and land use practices; discussion of climate change risks; and synthesis of governance issues affecting water resources management institutions and service providers.	https://winrock.org/wp-content/uploads/2021/08/Uganda_Country_Profile_Final.pdf
INFORMATION SOURCES, DATABASES, AND DATASETS	**Uganda's RUMIS (Rural and Urban Management Information System)**

CONTENT	ACCESS
Many organizations use the mWater platform to gather WASH data and manage WASH infrastructure in Uganda. At mWater we've been working with the Ugandan government to provide the same access to real-time data and analytics. The Ugandan Ministry of Water and Environment (MWE) needed a system capable of regularly tracking water service levels, to help them achieve national and international targets for water access and safety.	https://rumis.ug/#/
INFORMATION SOURCES, DATABASES, AND DATASETS	**Uganda Safe Water Coverage**
Delivering Services refers to water supply and sanitation service delivery. Here you can find data on water utilities, irrigation, institutions and water supply and sanitation infrastructure.	https://wbwaterdata.org/dataset/uganda-safe-water-coverage
INFORMATION SOURCES, DATABASES, AND DATASETS	**Waterbodies in Uganda**
Sustaining Water Resources means improving resource management at the river basin, country, and transboundary levels. Here you can find data on quantity and quality of surface and groundwater, water scarcity, and transboundary issues.	https://wbwaterdata.org/dataset/waterbodies-in-uganda

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DEVELOPED UNDER STRENGTHENING THE ADAPTIVE CAPACITY AND RESILIENCE OF COMMUNITIES IN UGANDA'S WATERSHEDS - AWOJA CATCHMENT (SACRiAC) PROJECT

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