ACCESS AND UTILIZATION OF INFORMATION RESOURCES AND SERVICES BY WATER SPECIALISTS IN KENYA: THE CASE OF THE MINISTRY OF WATER AND IRRIGATION

BY

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DECLARATION

I hereby declare that this thesis is my original work and has not been submitted in part or any other form for examination in any other university.

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DEDICATION

This work is dedicated to my parents, Mr Philip Kariuki and Mrs Mary Kariuki, who planted in me the virtue of contentment and hard work.

ABSTRACT

The Ministry of Water and Irrigation (MOWI) is responsible for providing technical information to water specialists, technologists and technicians in Kenya. Although information plays a major role in water development, no empirical studies have been conducted to investigate the ways in which information resources and services are accessed by water specialists. Therefore, the aim of the study was to investigate the access to information resources and services by water specialists and to propose ways in which they can be enhanced. The objectives of the study were: to identify the sources of information available for use at MOWI by water specialists; to establish the channels used by water specialists in accessing information; to examine the role of the library, documentation centre and information services in provision of water information to water specialists in the MOWI; assess the effectiveness of the channels used by water specialists in accessing water information; to establish challenges faced by the water specialist in access to water information resources; to make recommendations to improve access and utilization of water information in Kenya. A case study method was adopted using both qualitative and quantitative approaches. The study was informed by Information Access Model. The study population consisted of water specialists, technologists, technicians and information providers. Seventy four (74) respondents were selected using both probability sampling and stratified sampling techniques. Data was collected by administering questionnaires and interviews. Quantitative data was tabulated and analysed using descriptive statistics while qualitative data was processed thematically. The findings of the study indicated that there was inadequate access to technical information resources and services by water specialists at MOWI. It was concluded that access to information resources and services be re-engineered in order to enhance use of information by water specialists. The major recommendations are that MOWI should develop policies that can enhance access and use of information, restructure library and documentation centre, recruit more special librarians capable of providing service delivery, and provide adequate funds for acquisition of information materials.

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LIST OF ABBREVIATIONS AND ACRONYMS

CAACs: Catchment Area Advisory Committees

GIZ: Deutsche Gesellschaft für Internationale Zusammenarbeit

IWA: International Water Association

KEWI: Kenya Water Institute

MDGs: Millennium Development Goals

MOWI: Ministry of Water and Irrigation

MEWNR: Ministry of Environment, Water and Natural Resources

NIB: National Irrigation Board

NCSTI: National Commission for Science and Technology and Innovation

NWCPC: National Water Conservation and Pipeline Corporation

NWSS: National Water Services Strategy

TNB: Theory of Normative Behaviour

WAB: Water Appeal Board

WRMA: Water Resources Management Authority

WRUAs: Water Resource User Associations

WSPS: Water Services Providers

WSB: Water Services Board

WASREB: Water Services Regulatory Board

WSS: Water Services Trust Fund

WRMIS: Water Resource Management Information System

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

Case (2007) defines information as any difference people perceive in the environment or within themselves. The effectiveness of a library or information resource centre depends on the information available and on the correspondences between the user and the provider. It also depends on the potential the information is to the user and how willing they are to make use of it.

Information is greatly regarded as the key ingredient for solving myriad of problems that face human daily activities. Accessing the information becomes a greater challenge to the people who provide the same information. What takes place in the Ministry of Water and Irrigation necessitates the access of abundant information. Water specialists are the facilitators on the provision of water to the public. In regard to information resources, water information is provided in various formats they include; journals, newspapers, manuals, books on water issues, periodicals and journals.

UNESCO (1998) defines information as any meaningful data that is transmitted from the source to users and that can be stored in information products and systems organized for offering a memory in various forms. The source may be documentary material, institutions or people. Information on any conceivable topic is available due to the fact that there is overwhelming release of printed information as a result of new technology of desktop publishing which stated in 1980s hence managing this information for easy access is the problem that confronts information providers.

According to Wurbs (2002) water is a marvellous and the most common substance on earth. Water covers more than 70 percent of the earth's surface and is available in three forms liquid, solid (ice) and vapour. With the world population predicted to double by the end of the century, water crisis is set to worsen with potentially catastrophic ramifications. The water industry is struggling to cope with current water demands with little or no opportunity for the future. In a 2006 report, the United Nations Development Programme (UNDP) noted that 7000 million people are currently living below the water stress threshold, predicting that this would increase to 3 billion by 2015.The factor identified to be contributing to most water shortage is the effects of climate change on resources.

1.2 Water Resources in Kenya

According to the Water Services Regulatory Board, water is a basic need for human kind and is required for growth and prosperity. Water is a resources that has significant contribution to the economic productivity of a country and the social wellbeing of the people. Irrespective of this, Kenya is considered to have chronic water scarcity. This is mainly due to rapid deforestation, surging population, urbanisation, and increased industrialisation among other social economic activities.

Steiner (2006) states that overall, Kenya has made progress since 1990 in providing its growing population access to clean drinking water – more progress than in the sub-Saharan Africa in general. In Kenya's urban areas, however, access had declined during that time. Much effort is still needed to reach the 2015 target of halving the number of Kenyans without access to clean drinking water.

Nyanchaga (2011) states that Kenya shares about 50 percent of her water resources (rivers, lakes, and aquifers) with her immediate neighbours.

The country has several lakes and river basins, including:

a) Lake Jipe/Chala and River Umba between Kenya and Tanzania
b) Lake Turkana-River Omo Basin between Kenya and Ethiopia
c) Mara River Basin between Kenya and Tanzania
d) Rivers Sio, Malaba, and Malakisi Basin between Kenya and Uganda.
e) The Merti aquifer in the north eastern part of Kenya extending into Somalia.

1.2.1 Lakes

Lakes are considered as very slowly flowing rivers. In Kenya lakes are either fresh water lakes or saline water lakes. Fresh water lakes include: Lake Naivasha, Lake Victoria, Lake Chala and Lake Jipe. Saline water lakes include: Lake Baringo, Lake Bogoria, Lake Turkana, Lake Nakuru and Lake Elementaita.

1.2.2 Drainage Basins

These include: Tana River Basin, Athi River Basin, Rift Valley, Lake Victoria and the Ewaso N'giro River Basin.

1.2.3 Dams and Reservoirs

These include: Masinga Dam, Ruiru Dam, Ndakaini Dam, Sasumua Dam and Nairobi Dam.

1.2.4 Rivers

These include: Nzoia, Yala, Nyando, Sondu, Mara, Turkwel, Kerio, Athi, Tana, Ewaso N'giro and Kuja.

1.3 Challenges Facing Water Resources in Kenya

1.3.1 Water Quality

The quality of water has deteriorated overtime due to a number of factors such as increased commercial farming activities, rapid industrialisation and laxity in law enforcement. In most cases, effluent and chemical waste from various sources are discharged directly into water bodies.

1.3.2 Water Scarcity

According to the First Medium Term Plan (2008-2012) of the Kenya Vision 2030, Kenya suffers from water scarcity since demand outstrips the stock of renewable freshwater. The current water supply is inadequate, with only 57 percent of households using water from sources considered safe. There are disparities in urban water access with informal settlements recording lower levels. Surface water resources account for 86 percent while ground water accounts for 14 percent. Trans-boundary waters constitute 54 percent of water resources in the country.

The FMTP also indicates that in recognition of the importance of sustainable management of water resources, the government initiated reforms in the sector through the enactment of the Water Act, 2002. The challenges of addressing water management have been compounded by rising population, improvement in standards of living and high rural-urban migration which is responsible for the development of densely populated informal settlements in urban and pre-urban areas with poor sanitation facilities.

According to Smith and Ali (2006), demand for water varies significantly between countries due to differences in climate, economic wealth and culture. Pressure on water

supplies is increasing in developing countries due to rising population, new housing development and increase in household size. The problem of dwindling water supplies and escalating demand is worldwide, and is exacerbated in many areas by climate change and migration from rural to urban centres.

According to World Bank (2010),the population in Kenya in 1990 was about 23 million and in 2008 the population increased to about 40 million people. With an increase in population, water is less accessible. Kenya suffers from water scarcity since demand outstrips the stock of renewable freshwater. The available water is often inadequate for industrial, commercial, domestic as well as livestock and wildlife use. This scarcity has intensified competition among various users and often results to conflicts.

1.3.3 Agriculture

The Kenya National Water Development Report (2006) indicates that agriculture is a key pillar of the national economy. Agriculture accounts for about half of the earnings the country earns through exports and provides employment to approximately 80% of people in the country. Agriculture contributes approximately 26% of the national GDP and hence a key contributor to the national economy. However, despite the significance of this sector, it is affected by numerous problems such as shortage of rainfall and an ever surging population. Currently, there is intense struggle for water resources. This is because there is increased need for water for industrial use, increased urbanisation and water-reliant food items. In order to avoid a global water crisis, there is need for farmers to increase productivity to cater for the surging food demand while cities and industries need to seek various means of utilising water in efficient ways. Deforestation has led to

severe degradation of the key water towers in the country. As a result, there is a reduced flow in most rivers which has in turn disrupted electricity generation.

As population continues surging globally, and the demand for food continues increasing, there are efforts to in seeking ways of producing more food with less water requirement. This is achieved through improved irrigation techniques, agricultural water management, crop types, and water monitoring.

1.3.4 Rapid Urbanisation

Poor physical planning in the urban areas and increase poorly planned settlements have become challenges to the provision of safe drinking water. There is increased trend in urbanisation which in turn increases the need for considerable investment in water infrastructure. This would help to ensure there is sufficient water for the people and to process the concentrations of wastewater.

1.3.5 Industrial

The Kenya Vision 2030, First Medium Term Plan (2008-2012) states that water is a key requirement the generation of hydro-electric which accounts for about 72% of the power used in the country. Water is required for various processes in various industries thermoelectric power generation plants, oil production and refinery, production of fertilizer and other chemical factories, extraction of natural gas among other processes. Industries require pure water for many applications and utilise a variety of purification techniques both in water supply and discharge.

Key industrial plants include hydroelectric dams, thermoelectric power plants in which water is required for cooling purposes, ore and oil refinery plants where water is used for chemical processes refineries, and in manufacturing plants in which water is mainly used as a solvent. Geothermal power generation and its sustainability largely depends natural ground water recharge.

The that largely rely on water include tanneries, textile mills, breweries, creameries, paper recycling mills, chemical processing factories (paints, pharmaceuticals, plastics, soaps, detergents, glass, etc.), slaughterhouses, soft drink industries, engineering and metal fabrication, and various other small-scale industries.

1.3.6 Population Growth

Access to safe water in Kenya has been affected negatively by the relative high population growth. Based on the World Bank (2010) data, Kenya's population was approximately 23 milion in 1990 and in 2008, the population had increased to approximately 40 million. The increase in population has made water less accessible. In Kenya, there is also a high trend in rural urban migration which has in turn increased pressure on the available water supply in the urban areas. As this trend increase and as the population keeps on growing, the water demand is expected to continue increasing and hence, there is need for water conservation and recycling. According to the Kenya National Water Development Report (2006), Kenya is classified as a water scarce country with only 647 cubic meters of renewable fresh water per capita.

Water is basic requirement to human kind and it is the right of every Kenyan to have limtless access to water. Article 43(1)(d) of the Constitution of Kenya states that "every

person has the right to clean and safe water in adequate quantities". The government and other relevant stakeholders are therefore mandated to make sure that this basic need and human right is guaranteed, and that every citizen has access to sufficient water at affordable costs. As earlier mentioned, as water catchment areas continue degrading, there a likelihood of water levels in rivers, dams, lakes and other water reservoirs which is likely to lead to water shortage in the country.

According to Gray (2008), water conservation is a key element in managing water resources by ensuring water is not used in a wasteful manner. Wurbs (2002) states that as water become scarcer, this inevitably will lead to conflict over resources. The continued supply of adequate supplies of safe drinking water will be one of the greatest challenges facing mankind during this century.

1.3.7 Climate Change and its impact on water resources

The Kenyan National Climate Action Plan 2013-2017 states that the country is vulnerable to extreme weather conditions and adverse climate-related effects. This poses serious threats to the socio-economic development of the nation. The adverse effects impact on the achievement of the Vision 2030 goals. According to the action plan, floods, droughts and other adversaries have devastating effects on the environment, the society and the country in general. The intra-annual rainfall variability have already started influencing the freshwater resources and other extremes conditions such as floods and drought are expected to further reduce water availability.

According to the Plan, climate change as an opportunity if implemented will make a significant effect on adaptation, mitigation and sustainable development. This will

improve the management of water resources including storage and retention and will contribute to the achievement of the Vision 2030 goal of enhanced access to water. This implies that effective water management is a key precondition for the achievement of the development goals and the transformation of the country to a middle-income economy. The improved management of water resources will offer an opportunity to attain food security, improve human health and enable irrigated agriculture. Besides the socio-economic benefits, effective management of water resources has great benefits through minimizing the effect of floods and droughts, minimizing overreliance on rain-fed agricultural production and improved watershed management.

1.4 Background to the Study

1.4.1 Water Resources Management in Kenya

All water resources in Kenya remain vested in the state. The Ministry of Water and Irrigation (MOWI) is tasked with the responsibility of creating institutions to manage water resources and provide water services.

The Water Act, 2002 introduced new water management institutions to govern water and sanitation. The Act provides a legal framework for the creation of water institutions and limits the Ministry's role to policy formulation, overseeing the implementation of the policies, and resource mobilisation. As a result of the provisions in the Act, an autonomous institutional framework comprising the Water Resources Management Authority (WRMA) and its regional catchment offices are in place, the appointment of Catchment Area Advisory Committees (CAACs) and the establishment of Water Users Associations (WUAs). The establishment of these institutions allowed for

decentralisation, participation and sustainability in the management of water resources. The WRMA, CAACs and the Water Services Regulatory Board (WSRB) became fully operational in December 2004.

The water legislation helps in improving the management and protection of water resources so as to ensure that water is available for equitable allocation for all the demands in the country, including water for domestic and public use, industry, agriculture, energy, livestock, wildlife, tourism, ecosystems and other water uses is a high priority. In order to effectively manage and protect the water resources in a sustainable manner, the management and development have been separated through enactment of the Water Act, 2002.

Table 1.1: Water sector institutions in the MOWI

Level	Water sector Institutions	Roles and Responsibilities
Head of all water sector Institutions	Ministry of Water and Irrigation	Policy and strategy formulation, legislation, coordination, resource mobilization, monitoring and evaluation.
National level	Water Services Regulatory Board(WASREB)	Regulate and monitor service provision
	Water Services Trust Fund(WSS)	Finance provision of WSS to poor areas
	Water Appeal Board (WAB)	Determine appeals and disputes
	National Water Conservation and Pipeline Corporation (NWCPC)	Develop and manage state schemes
	Kenya Water Institute (KEWI)	Training and Research
	National Irrigation Board (NIB)	Develop, manage national schemes
	Water Resources Management Authority(WRMA)	Regulate, manage water resources
Regional Level	Water Services Board (WSB)	Develop water and sewer facilities. Contract Water Service Providers.
	Catchment Area Advisory Committees (CAACs)	Advise on conservation and apportionment
Local Level	Water Services Providers (WSPS)	Direct provision of services
	Water Resource User Associations (WRUAs)	Cooperative management of water resources
	Consumers, Users	

The organisational structure illustrated in Figure 1 below has several departments specialising in management of water resource. The organisational structure illustrates the linkages between several departments. However, the study will only concentrate on the departments where water specialists are involved. Ministry of Water and Irrigation.

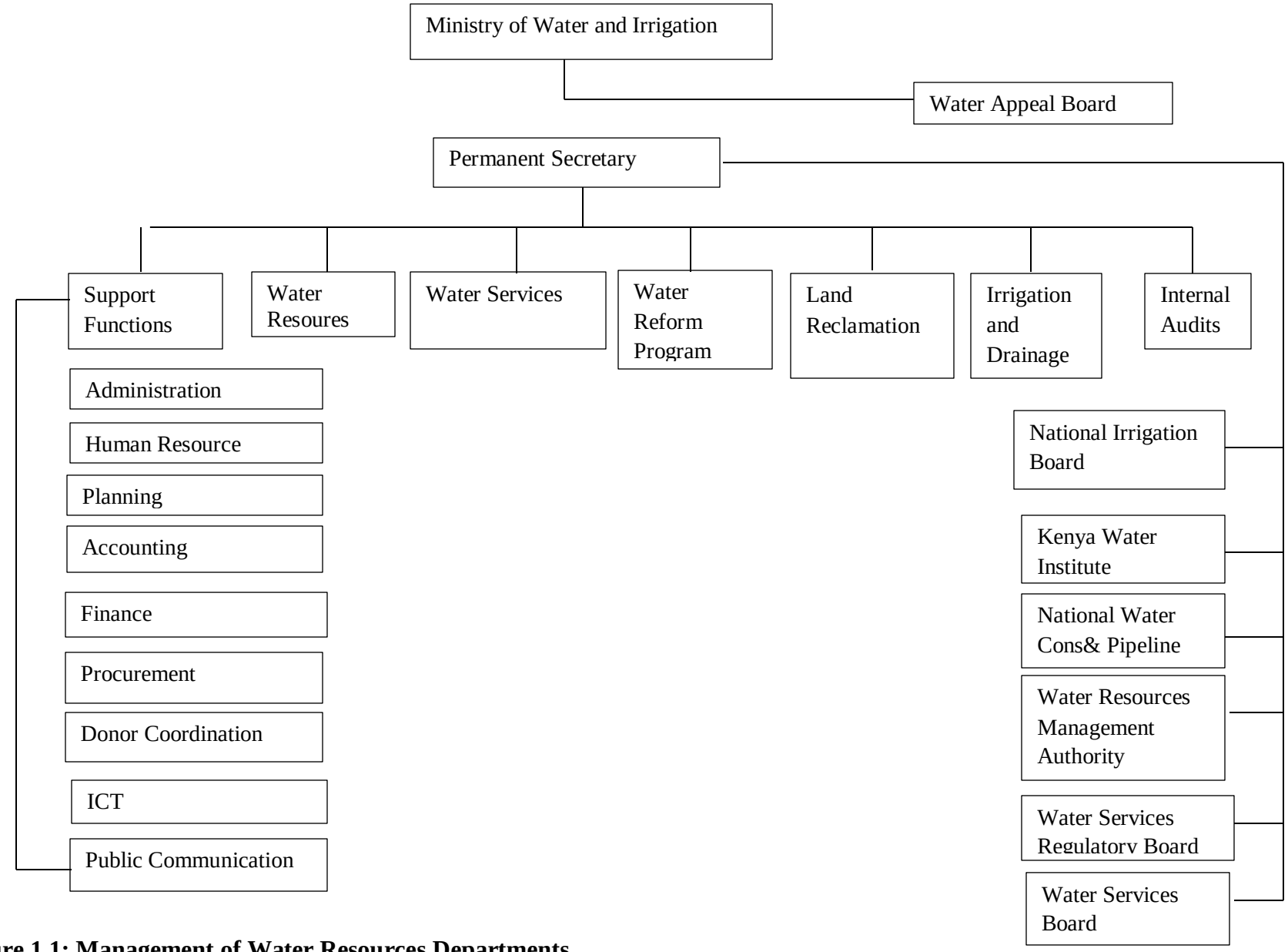


Figure 1.1: Management of Water Resources Departments

1.4.2 Role and Function of the Ministry of Water and Irrigation

The MOWI has its fundamental goal and purpose as conserving, managing and protecting water resources for socio-economic development. Its aim is to improve the living standards of people by ensuring proper access to available water resources. According to the Constitution of Kenya, every citizen has the right to access information held by the state and by another person and required for the exercise or protection of any right or fundamental freedom.

The MOWI Strategic Plan 2009-2012 illustrates the different functions for each department as outlined below.

The Heads of Departments (HOD'S) head these departments and are senior water engineers in their careers and take the managerial role. The tasks associated with their capacity entails being a group leader, finding new customers and contracts in the water sector, planning budgets in their respective departments and water specialists. Coordinating work, making policies and interfacing with the different levels in the MOWI. The water specialists are in the various departments based on their areas of specialization. The HOD's and water specialist's access water information resources for their work activities while the library and records staff acquires, organize & disseminate relevant information resources to users at MOWI. They also educate users on access and use of information resources and services.

1.4.2.1 Department of Water Services

The Director of Water Services is the head of this department. Staff members in this department include senior engineers and senior technicians. This department is

responsible for the formulation of policy, legislation and strategies on water and sewerage services. It is also mandated to maintain a centre for water and sewerage technical information, data and documentation. The department monitors and does supervision of all water services boards.

1.4.2.2 Department of Water Resources Management

This department is headed by the Director of Water Resources Management. The department ensures that water resources are conserved, preserved, protected and provided in such quality and quantity to sustain the various national demands. The department is also responsible for water quality monitoring, testing and surveillance to ensure compliance with drinking standards and others standards for various water uses and effluent discharges into public sewers. This department consists of hydrologists, geologists, chemists and surface water officers.

1.4.2.3 Department of Land Reclamation

The Director of Land Reclamation is the head of this department. Staff members in this department include land reclamation officers and technicians. The department is mandated to develop appropriate tools for the effective management and utilisation of degraded lands, wastelands, arid and semiarid lands, wetlands and fragile ecosystems. The Department is responsible for developing appropriate policies, guidelines and legislation. It is also responsible for promotion of rain water harvesting, water storage and environmental conservation in the wastelands. This department consists of land reclamation officers.

1.4.2.4 Department of Irrigation and Drainage

The Director of Irrigation and Drainage is the head of this department. Staff members in this department include irrigation engineers, water management officers and technicians. The department is responsible for regulation of agriculture, water management and irrigation technology transfer in Kenya. It also develops irrigation, drainage and water harvesting and storage infrastructure. This department consists of irrigation engineers.

1.4.3 Water Information Users in MOWI

Water information is vital in provision of water. The key users of water information comprise the following:

a) Water professionals comprising of geologists, hydrologists, land reclamation officers, irrigation engineers and senior engineers

b) Regulatory bodies such as Water Services Regulatory Board (WASREB), Water Appeal Board (WAB), Water Services Board (WSB), National Irrigation Board (NIB) and Water Resources Management Authority (WRMA).

c) Water Professional Associations such as Water Resource User Associations (WRUAs) and Water Services Trust Fund (WSS).

d) Training institutions offering water-based courses such as the Kenya Water Institute (KEWI).

e) Researchers and other interested members of the public.

1.4.4 Information Needs of MOWI

The MOWI Strategic Plan (2009) identifies various information needs of water specialists as illustrated below.

1.4.4.1 Information Needs of Senior Water Engineers

a) Information about water and sewerage technical information, data and documentation.

b) Information on quality assurance and safety of hydraulic structures in water and sewerage infrastructure development.

c) Information on all water service boards.

d) Information on policy legislation and strategies for water and sewerage services.

1.4.4.2 Information Needs of Hydrologists and Geologists

a) Water Resources Database Organisation and dissemination.

b) Information on ground water recharge.

c) Information on mitigation against natural disasters like floods and droughts.

d) Mapping of key water catchment areas, groundwater resources and flood prone areas.

e) Information on water quality testing and compliance with drinking water standards.

1.4.4.3 Information Needs of Land Reclamation Officers

a) Information on rainwater harvesting, water storage, waste lands and environmental conservation

b) Development of appropriate tools for the effective management and utilisation of degraded lands, wastelands, arid and semi- arid lands, wetlands and fragile ecosystems.

1.4.4.4 Information Needs of Irrigation Officers

a) Information on irrigation, drainage, water harvesting and storage infrastructure

b) Information on agriculture water management and irrigation technology transfer in Kenya.

1.4.5 MOWI Library

The MOWI library is located at the Ministry headquarters in Nairobi. The library mainly collects information materials relevant to the needs of its users. The library has two staff members and its clientele comprises of all staff in the Ministry and authorised external users.

The following are functions and services offered by the library:

a) Provision of support in research activities.
b) Keeping of comprehensive and accurate records and statistics.
c) Ensuring effective delivery of library services.
d) Preparing annual work plans and budgets for the library.
e) Issuing and discharging all library materials and shelving the same.

f) Conduct selective dissemination of information.

g) Cataloguing, classifying and indexing all library materials and physically describing and assigning subject headings for easy retrieval.

h) Disseminating information to the general public.

i) Assisting users in searching the catalogue and in locating the materials on the shelves for faster retrieval of information.

j) Developing a reference system for the library and maintaining up-to- date list of the publications in stock.

1.4.5.1 Information Resources at MOWI Library

Olowu, (2004) asserts that information resources comprise of different materials both print, non print and electronic those are offered for use. Today is almost impossible for any possible development of knowledge without relying on various information materials available in the libraries. The researcher identified various kinds of information resources availed in the MOWI library. These include guides and manuals, bibliographies, encyclopaedias, dictionaries, textbooks and data compilations. The books are organised using the Dewey decimal classification scheme (DDC). The library receives donation of journals from the World Bank and other water sector institutions whose publication are published and availed there. Local daily newspapers such as *The Standard*, *Daily Nation*, and *The East African* are also available. The MOWI library is the custodian of the Ministry's information collection.

1.4.5.2 Water Information Systems in the MOWI

According to the National Water Services Strategy (2009) there are several water information systems in place this includes:

a) Water Regulation Information System (WARIS) by WASREB.

b) Water Resource Management Information System (WRMIS).

c) Maji Data System.

a) Water Regulation Information System (WARIS) by WASREB

According to National Water Services Strategy (2007) performance report, the Water Act mandates the Water Services Regulatory Board (WASREB) to be the custodian of information in the water services sector. It developed Water regulation information system (WARIS) software which improves data collection at Water Services Boards and Water Service Providers levels. This data is analysed and the generated information is shared with various relevant stakeholders for use in making informed decisions. It via WARIS that outputs has been derived to determine the performance of WSBs and WSPs.

WARIS thus assists and facilitates WASREB's legal requirement to:

a) Monitor adherence to the set standards;

b) Monitor the Service Provision Agreements operations

c) Release information pertaining to water services;

d) Collect and maintain water services information

e) Advise the Minister

Implementation plan for the National Water Services Strategy (2007) states that as at end of the financial year 2007, WARIS had been installed and used for data capture by all licensees'. There is increasing internalization of ICT within the water sector, which is likely to improve information sharing. This will make it easy to monitor and enforce Regulation.

b) Water Resource Management Information System (WRMIS)

According to The Water Resource Management Authority (2009) WRMIS is a web-based system developed to provide a web-based solution to Kenya's Water Sector towards contributing to sustainable management of water resources in the country. The WRMIS utilises Web-based and Open Source Technologies to make a dynamic and real-time information-based water resources management system over geographically dispersed areas and actors a reality in Kenya.

The system incorporates web-based data entry forms and reports, web-mapping and offline-mapping. The Management Information System was piloted with the Water Service Board, a State Corporation under the Ministry of Water and Irrigation. ERMIS Africa has been on the forefront in providing Environmental Information Systems solutions towards a built-up, liberated, nourished and expanded information society across Africa. ERMIS Africa is seeking the support of like-minded development actors within the water sector including Government and Private Organisations, NGOs and Donor Community towards successful development and operations of the Water Resource Management Information System.

c) Maji Data System

According to a performance report of National Water service strategy (2007) MWI and Water Services Trust Fund cooperated with the UN-Habitat, Google.org and GIZ to develop Maji Data. This is a database that covers all urban areas with low income which have been prepared by the Ministry of Water and Irrigation (MWI) and the Water Services Trust Fund (WSTF) in collaboration with UN-Habitat, the German Development Bank, Google org. and GIZ.

Maji Data stress a vast amount of vital data about all urban low income areas of Kenya. It helps the Water Service Providers (WSPs) and Water Services Boards (WSBs) to design well-tailored water provision and sanitation proposals for the slum areas for and other low income areas. Since the data is linked to satellite imagery, it is easier for WSPs to easily manage the operation in these areas. The Maji Data Team develops Quality of Life Indicators for the urban low income areas in Kenya that are in the database. The sector indicators are based on the present water supply and sanitation situation.

1.4.6 MOWI Documentation Centre

The documentation centre is part of the Ministry and its function is to support the work of the Ministry though documenting and analysing water-related issues. The documentation centre has two full-time staff members, one who mostly deals with enquiries and another who does most of the management and collection development. The documentation centre has various categories of users, including staff of the documentation centre, internal users and external users.

This collection has grown out of the activities of the Ministry that deals with water related activities. It consists of about two thousand reports, pamphlets and journals. The documentation centre also provides grey literature and these includes; conference working papers and water reports, documents issued by governments and inter-governmental organisations, leaflets, brochures, statements, newspaper clippings, theses, dissertations, etc.

There are also documents on the work of agencies in this and other countries that work with the MOWI. There is also a collection of newspaper cuttings and photographs, mostly about water issues. The documentation centre gets outside enquiries every day by post, telephone and electronic mail and is used as a reference information centre. There is a database for books and a written list of the journals that come regularly. Press cuttings and photographs are sorted by region and described in a word processor file. There are plans in place to computerize all holdings.

1.4.7Accessibility to Information Resources

Garba (2009) indicates that telecommunication and information technology can enhance the accessibility to information resources. The accessibility to information resources depends on the ability of the inquirer to make use of the resources effectively. Generally, accessibility is utilised to describe the extent to which a system can be used by a wide range of users as possible. Accessibility can also be viewed as the ability to access the functionality and possible benefit of some system or entity. Qamar (2002) defined access to information sources as the increase and provision of information resources to clientele with an aim of increasing their knowledge.

McCreadie and Rice(1999) point out that the first access to knowledge and its representations is most common across disciplines. They further indicate that this includes messages sent and received, printed and audio-visual materials, digital data, analysis and advice, and education. The conception of access typically includes books, documents, periodicals, citations, and databases.

Table 2.1: Conceptualization of Access to Information by McCreadie and Rice (1999)

Category	Examples	Implications
Knowledge	Message sent, information flow; Observation, visual sources, evidence; Documents, books, periodicals, numerical or digital data, databases, citations; Analysis, advise, interpretation, debate, answers, education	Can lead to decision – making, control over information flow To quality of life, quality of work life To power, influence To socioeconomic opportunities: equity, funds, legal advantage, participation in democratic society and citizenship activities
Technology	Range of technologies and media: computer, telephone, movies, books, newspapers, magazines, music, TV, etc. Information delivery systems, systems that generate, store, create information; Interface or command language, software programming; Use of system Linking technologies: interactive, communication, networking technologies	Assumes that access to technologies leads to access to information; assumes an infrastructure of support; Assumes knowledge of how to use; Can lead to access to multiple data sources, automatic methods of surveillance, increased control, creativity Compounding effect: access to one technology can increase future access, experience, advantage
Communication	Making sense of things: content, comprehension, retention, explanation; Making use of information: accuracy, relevance, format, level, decision making; connectivity; communication competence	Assumes communication competence; Requires broader meaning of relevance; Can lead to social, political participation with implications for democracy, equity, power relations; Compounding effect: access likely to lead to greater competence access

Control	Over who has access to what to whose advantage; Over agenda, terms of debate, content, organisation, design, program; Over processes and flows of information Over production of culture	Assumes that power and control are associated with information and knowledge ; Compounding effect: those who control access are more likely to decide, design in favour of others most like them
Goods/ Commodities	Information as social, economic good with value, costs, benefits; Distribution of control capacities, availability of resources; New markets for information industry	Assumes potential for public good, social value; Value not known until used; Compounding effect: potential for economic barriers and paths to be reinforced by social dynamics
Participation	Services: governmental, communication, information; advocacy; privacy	Can influence right to participate as citizen; Compounding effect: those most in need often least likely to obtain services

1.5 Statement of the Problem

The MOWI is the centre of all experts in water-related issues hence responsible for providing adequate technical information to water specialists, technologists and technicians in Kenya. Despite the important role played by the MOWI in provision of technical information it remains underutilised.

MOWI is responsible for the development of policies and strategy formulations for the water sector hence the need to have adequate information on water for water resources mobilisation. MOWI plays a vital role in dissemination of mainly water based information to water specialists, policy makers and water boards located at the national, regional and at the local level. Water information is vital for use in developing sustainable water sector. It is the key ingredient in accumulating knowledge that backs up the activities necessary in a water sector in any country. The information is geared for use by key players who comprise of hydrologists, geologists, land reclamation officers and

irrigation engineers. Better management of this information can bring development in facilitating easy provision to this information and enhanced.

The MOWI involves in various water research projects. However, access to adequate information resources and services is still a challenge to the water sector hence the need to establish regular exchange with national and international scientific bodies. This is so as to feed into research, make use of their information and scientific findings and also to enhance sound management of water resources in Kenya.

A review of literature reveals that no research has been done on access to information resources and services by water specialists in MOWI in Kenya.

1.6 Aim of the Study

The study investigated the access to information resources and services by water specialists in the MOWI, and proposes ways by which they can be enhanced.

1.7 Objectives of the Study

The specific objectives of this study were:

a) To identify the sources of information available for use at MOWI by water specialists.
b) To establish the channels used by water specialists in accessing information.
c) To examine the role of the library, documentation centre and information services in provision of water information to water specialists in the MOWI.
d) Assess the effectiveness of the channels used by water specialists in accessing water information.

e) To establish challenges faced by the water specialist in accessing water information resources.

f) To make recommendations to improve access and utilization of water information in Kenya.

1.8 Research Questions

The specific research questions of this study were:

a) What types of information sources are accessible by water specialists in the MOWI?

b) Which media are used by water specialists to access water information in the MOWI?

c) What is the role of library, documentation centre and information services in provision of water information to water specialist in the MOWI?

d) How effective are the channels used by water specialists in accessing water information?

e) What are the challenges faced by water specialists in accessing water information resources?

f) What can be done to improve access to water information by water specialists in the MOWI?

1.9 Assumptions of Study

a) There is considerable amount of information that exists in the MOWI that can be use by water specialists but access to this information may be difficult as a result of poor provision systems and networks.

b) The existing media of information to water specialists in the MOWI are inadequate and so very little information is provided to water specialist.

1.10 Significance of the Study

1.10.1 Theoretical Significance of the Study

It is a new contribution to existing body of knowledge on access to information resources and services to water specialists.

1.10.2 Practical Significance

It provides practical solutions to challenges facing water specialists in regard to access to information resources and services.

1.10.3 Policy-related Significance

It will inform policy formulation on the best practices for access to information resources and services by water specialists.

1.11 Scope of the Study

1.11.1 Scope of the Study

The study focused only on access to information resources and services by water specialists at MOWI.

1.12 Chapter Summary

Chapter one provides the background to the problem and the research questions, the aim of the study, the objectives, the significance and defines the technical terms used in the study. The discussion in the chapter gave a background of access to information resources and services by water specialists in the MOWI. However, no studies had been

undertaken to establish the ways in which the various water specialists and technicians accessed information on water resources The access to information resources and services by water specialists at the MOWI was investigated in the study in order to find out the level to which water information systems were used by the water specialist to support development programmes in water fields.

1.13 Operational Definition of Terms

Engineer: A person, who designs, builds or maintains structures.

Geologist: A scientist who deals with the physical structure and substance of the earth, their history, and the processes which act on them.

Hydrologist: A scientist concerned with the properties of the earth's water, especially its movement in relation to land.

Information: Data that has been verified to be accurate and timely, is specific and organised for a purpose and presented within a context that gives it meaning and relevance and that can lead to an increase in understanding and decrease in uncertainty.

Information resources: An arrangement of people, things, information, and other contributions that has the capacity to create, acquire, provide, process, store or disseminate information.

Irrigation Engineers: A person who conducts research on problems of soil drainage and conservation, applying knowledge of civil engineering.

Land reclamation officers: People responsible for reconverting disturbed land to its former or other productive uses.

Stakeholder: An individual, institution or community that has a stake in the operations of an organisation and how it does business.

Water: A colourless, transparent, odourless, liquid which forms the seas, lakes, rivers and rain and is the basis of the fluids of living organisms.

Water Resource: Good quality water contained in rivers and aquifers that can be used used for human purposes

Water Resources Management: The decision-making, manipulative, and non-manipulative processes by which water is protected, allocated, and/or developed.

Water Specialist: Water Specialists are responsible for the development of programmes to protect water resources and the public's health.

Water Technician: An expert in the practical application of water supply equipment

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Literature review is founded on the basis that knowledge is cumulative. The literature review aimed at analysing what other scholars and researchers have documented with regards to access to water information. The reviews enabled the researcher gain insight on the topic for research and identify key issues that need to be explored hence forming the basis for justification for research.

2.1.1 Purposes of Conducting Literature Review

The literature review made the researcher aware of the current state of knowledge of the topic being examined, existing gaps and areas of further studies.

The first section looks at theories and models that were used to give a theoretical foundation to the study. The theoretical framework covers the main component of this study that is access of information resources and services by water specialists in the MOWI. The aim of theoretical research is to describe, explore, and explain rather than simply collect data and then piece together solutions to observed problems without greater understanding of the phenomena as a whole.

The second part reviews the materials and works that have been written in the area under study. The proposed study reviewed various types of information materials which include print and electronic sources, secondary and primary sources, published and unpublished sources. This study intended to investigate the access of information resources and services by water specialists in the MOWI.

2.2 Theoretical Framework

2.2.1 Introduction

A theoretical framework refers to an examination of the available theories in relation to the objectives of the study (Oso & Onen, 2005). In this study, the theoretical framework was derived from theories examined on access of information services and resources.

2.2.2 Theoretical Framework

The researcher therefore acknowledges that several theories applicable to access of information resources and services exist.

Such theories include:

a) The standard model of information seeking.

b) Leckie et.al (1996) General Model of the Information Seeking

c) Information access model :Tripartite model

The study is based on the Information Access Model: the Tripartite Model.

2.2.2.1 The Standard Model of Information Seeking

According to Shneiderman et al. (1998), information seeking process assume an interaction cycle which consist of identifying an information need, followed by query specification activities, examination of retrieval results, and if needed, reformulation of the query, repeating the cycle until a satisfactory result set is obtained .

Sutcliffe and Ennis (1998) further explain that information seeking process model is a cycle that consist of four key activities. These activities include:

- Identification of the problem
- Articulation of information need(s),
- Query formulation, and
- Evaluation of results.

Information seeking process is defined by Marchionini (1989) as a special case of problem solving. He further identifies the information seeking process as a process that involves:

a) Recognition of information needs
b) Acceptance of the challenge to take the necessary action to meet the need.
c) Problem formulation
d) Expression of the information need in a search system,
e) Assessment of the results,
f) Problem reformulation and its expression
g) Utilisation of the results.

Broder (2002) illustrates the process of information seeking with a standard model of the search process as illustrated below;

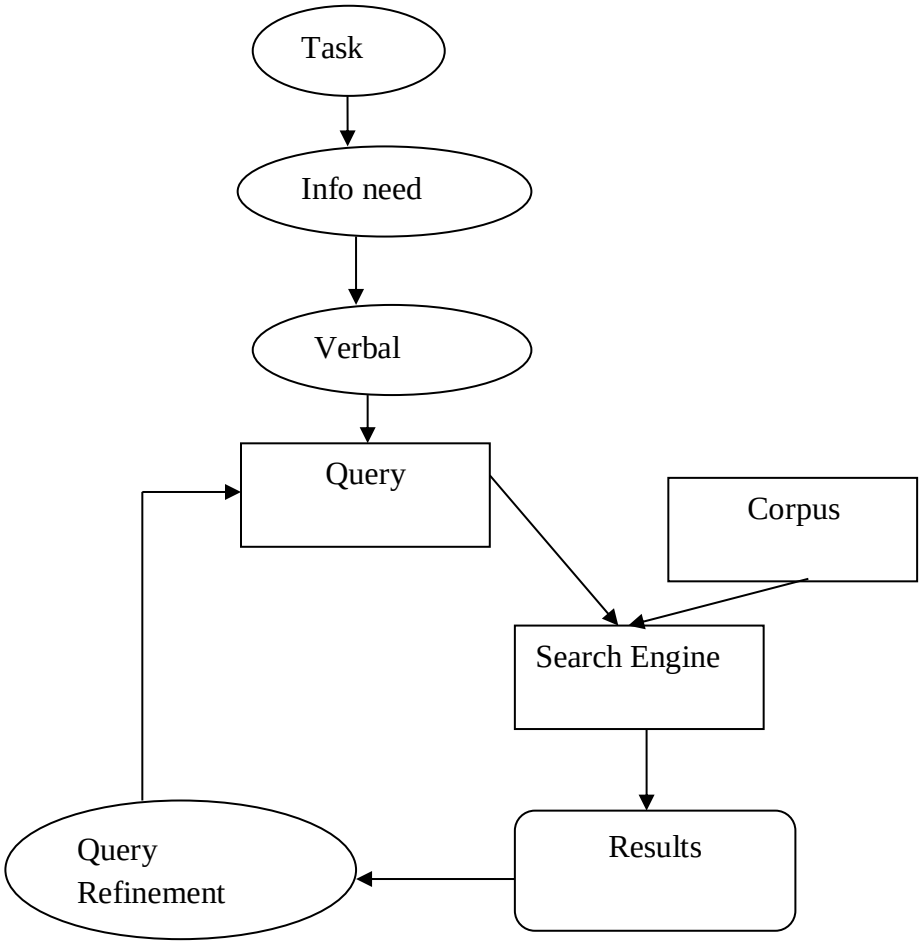


Figure 2.1: The Standard Model of the Search Process, adapted from Broder (2002)

Although these models put a lot of emphasis on information seeking processes, their basis i0s majorly on the observations of involved in information seeking process. It can be deduced from these models that they represent the key actions within general information seeking tasks by users in fulfilment of their information needs.

2.2.2.2Leckie et.al (1996) General Model of the Information Seeking

Leckie et al. (1996) model of the information seeking illustrates that roles and associate tasks undertaken by professionals in their daily practice prompt particular information

needs. The model examines how information practices embedded within professional work and how those information practices function to contribute to the professional's work. Leckie et al.(1996)observed that professionals have complex lives because of the multiple roles in their daily work.

The author further explains that information needs are characterised by their context, frequency, importance, profession and specialization. The model points out that information seeking is greatly influenced by a number of factors such as sources of information, awareness of existence of information, work roles, associated tasks, outcomes of information seeking and characteristics of information needs.

The General Model of the Information Seeking by Leckie et al.(1996) below shows the relationship between the different components in the model.

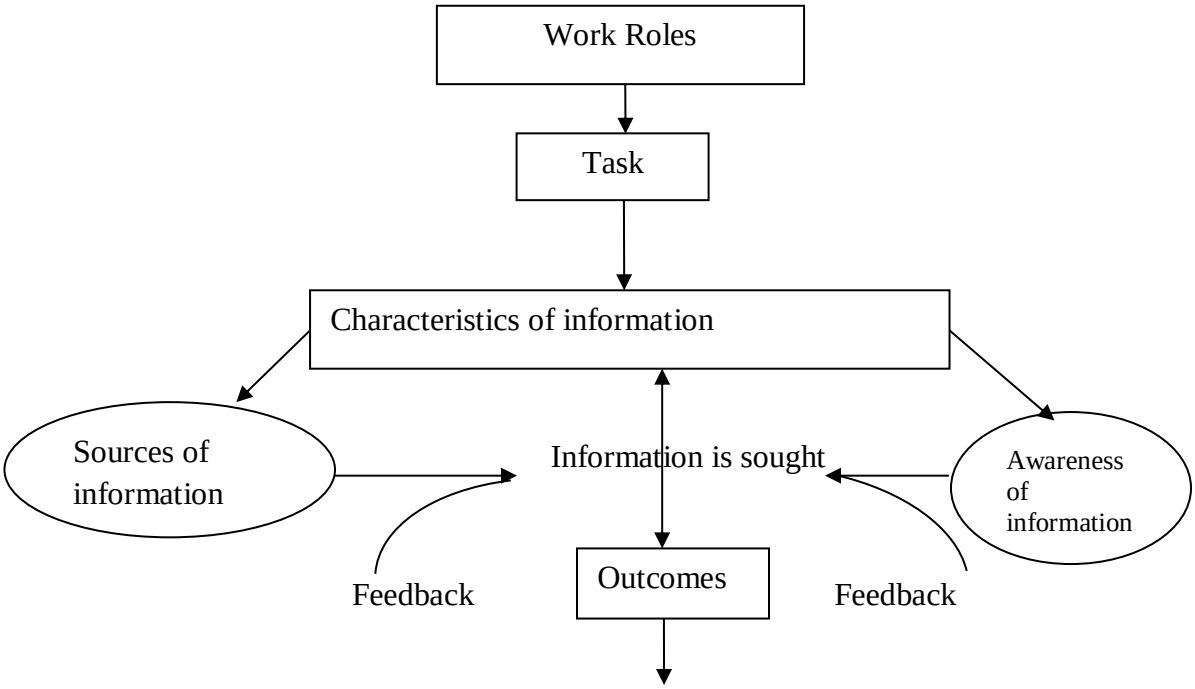


Figure 2.2: Leckie et.al (1996) General Model of the Information Seeking

2.2.2.3 Tripartite: Information Access Model

Jaeger & Burnett (2005) explain that information access is the presence of a robust system through which information is made available. They further explain that information access has physical, intellectual, and social aspects, each of which can be affected by real external and internal factors, as well as by the knowledge, skills, and perceptions of individuals seeking information.

Whiteley (1994) emphasizes that information access includes not only the ability to obtain information but also the ability to use the information obtained. Burnett et al. (2008) proposes that information access begins at a point where a user comes into contact with information. The nature of this contact is largely determined by three aspects of

information access, namely the physical, intellectual, and socio-cultural access to information. The author acknowledges that information access is a continuum beginning with information acquisition and culminating at information use and in order for individuals and groups to fully participate, users require access to the information that grants full enfranchisement.

The information Access Model by Burnett et al. (2008) below illustrates the three approaches to information access, focusing on physical, intellectual, and social access issues.

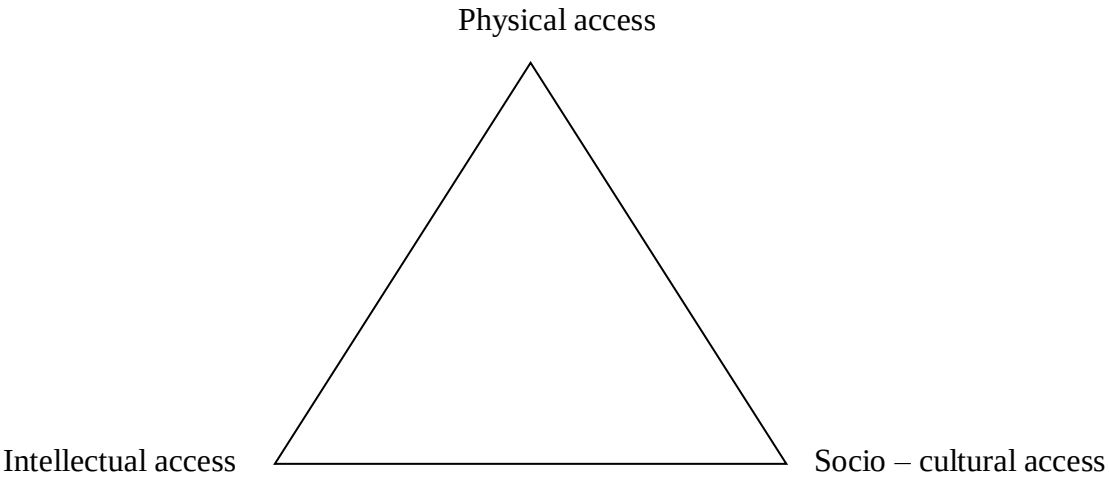


Figure 2.3: Information Access Model by Burnett et.al (2008)

a) Physical Access

Ohysical access refers to access to the documents containing the information (Svenonius, 2000) Jaeger and Burnett (2005) further argue that the discourse on information access manly focuses on the physical issues such as the physical structures in which the information is contained and the paths followed to access the information. The model

advocates for the establishment of effective and efficient structures that would make it easier for information to be stirred and retrieved when needed. The authors' further explain that physical access to information is paramount since without it, other types of access are impossible. Physical access relate to the physical location as well as the format of the document and the necessary condition need for the retrieval of the document.

b) Intellectual Access

Culnan (1985) points out that the ability to get information and the ability for the information to be utilised to accomplish specific goals are very different. The author argues that due to this, is vital to consider both the physical and the intellectual access aspects of information.

Svenonius (2000) defines intellectual access as access to information contained in a document .It revolves around the ability to understand how to get to and, in particular, how to understand the information itself once it has been physically obtained.

Jaeger & Bowman (2005) propose that studying intellectual access can reveal the best ways to make information accessible and to bring the information seeker and the information together in the most efficient manner possible through representation of the available information sources. According to Pitts and Stripling (1990) intellectual access can only occur if the person has information that is sufficient for critical thinking and has been exposed to different perspectives. Intellectual access is influenced by numerous personal issues that are distinctive to each individual, since it hinges on the way the users understand the information when they access the information.

The model is helpful in the identification of factors that can influence intellectual access. These include the behaviours of information seeking, language, dialect, education, literacy, technological knowhow, cognitive ability, vocabulary, and individual opinions. These factors determine the accessibility of information contained in a source. The model also highlights intellectual access issues which involve understanding the categorisation of the information, how information is organised, displayed, and represented.

c) Social Access

The model acknowledges that wide spread adoption allows users to have full access of the information. Lack of trust of other information may lead to lack of access to information as well as low belief that the information is useful to meet the user's needs. Due widespread adoption by users to the changes in technology users engage with up to date information to perform everyday life tasks.

It can be observed from the model that there is continuous interaction among the physical, intellectual, and socio-cultural access constructs and they support each other. The model also suggests that physical, intellectual, and socio-cultural aspects of access interact with each other to shape the overarching access phenomenon.

2.2.3 Justification in choosing Tripartite: Information Access Model

Other theories in access and utilization of information resources and services that were considered by the researcher are: The Standard Model of Information Seeking and the Normative Behaviour and Information: The Social Aspects of Information Access. The researcher settled on anchoring the study on Tripartite: Information Access Model because the theory dominate on access to information and barriers that hinder full access

to information by the user. Some of the ways tripartite model of information access continue to dominate access to information are:

a) Tripartite: Information Access Model puts into consideration the physical access to information which involves the lack of appropriate technologies or overall information infrastructure. Information service providers can benefit greatly when using the tripartite model while designing information spaces, services, programs, and products. Taking all three approaches into account will lead to information providers with fewer information barriers. For information providers efforts might be created to provide physical access to the user outside the boundaries of the brick and mortar library itself.

b) Tripartite: Information Access Model measures the Intellectual access to information which entails lack of information skills or training. User seminars might be designed to inform users about information evaluation and right. Other than the libraries, the model brings into perspective other information venues. Such as the, television, radio and even the Internet which provide up-to-date and significant information.

c) Tripartite: Information Access Model assesses the socio – cultural access which involves lack of trust and acceptance in the technologies to retrieve the required information by users. The model proposes that use of social networks, websites and email should not be seen as a waste of resources, but rather as yet another information service that users use to access information.

d) Other issues the model helps to understand are;

- Information is the right information to meet users or group's information needs.
- Information literacy workshops and seminars that might help provide appropriate training for all users within an institution on access of information.
- The kinds of information users need to access in order to be considered to have full access.

2.2.4 Relevance of Tripartite: Information Access Model to the Present Study

Physical access to information is basically an MOWI issue based on formalized structures that exist to make sure the information is well located and readily available. For the water specialists to achieve physical access, it is vital for them to whether the information exist or not, where the information is located, and the ways to navigate to access the information. Other factors that influence the physical access to information include technology, geography, insufficient finances, and substantial distance from the source of information.

Regarding intellectual access, it is necessary for the water specialists to understand the information contained in a source. This requires them to understand the information source, the ability understand the language and dialect used, and the knowledge of the given vocabulary used. It is also vital for the user to have the ability to utilise any technology that would facilitate the access to information source such as computer

systems and the internet. Poor language skills and illiteracy can hinder the water specialists from accessing the information irrespective of the value of the information.

Socio – cultural access helps to determine what it is about specific formats of information offerings that are so appealing to water specialists, which in turn could be used by information providers as they decide how information formats can be restructured in a way that is more appealing to the specific users.

The three approaches help understand how information exists within a given environment and help the researcher to develop useful ways of addressing information access barriers at the infra-structural level, technology advances, trainings on adaptive technologies and social inclusion.

2.3 Review of Related Literature

2.3.1 Information as a Resource

Case (2007) defines information as any difference perceived in an environment or within oneself. The effectiveness of a library or information resource centre depends on the information available and on the correspondences between the user and the provider. It also depends on the potential the information is to the user and how willing they are to make use of it.

Information forms the major base on which the growth of knowledge and so much else depends. Without information decisions will be random ad-hoc choices, projects are unlikely to meet set objectives; reports will not adequately reflect situations. Information is used at all levels and everyone has information needs. However, the characteristics of information as a resource greatly differ from the characteristics of traditional resources

such as land, capital and labour. The characteristics of information as a resource have been identified by Cleveland (1985) as follows;

a) Information is expandable: He argues that information has the ability to expand the more it is used. No matter how much information is consumed, it does get depleted. Information growth is only limited by time and capacity
b) Information is not resource hungry: unlike other valuable products in the market, only few resources are required for information to be produced and transmitted.
c) Information is substitutable: information can replace physical materials, capital and labour.
d) Information is transportable: Information can travel very quickly unlike other resources as it is nt affected by geographical aspects and other resources.
e) Information is diffusive: Information has the ability to leak which makes its more available for access and use by people.
f) Information can be shared: Unlike other things that can only be exchanged, a erson can share information and still retains it.

2.3.2 Sources of information in Water Resources

Types of information sources

Information can come from virtually anywhere – media, blogs, personal experiences, books, journal and magazine articles, expert opinions, encyclopaedias, and web pages.

2.3.2.1 Sources of Information

Popoola (2008) states that information is part of a process of converting messages received into knowledge. Buckland (1991) further defines it as a process which occurs in the mind when a problem is united with data that can help solve it. Information sources

refer to print and non-print information materials which contain the required data or ideas.

Tenopir et al. (2005) points out that information in its original form such as raw data or statistics that have been collected but not yet analysed or first reports of research studies or eye witness account of events is referred to as primary information. Primary sources of water information include: water technical reports, research papers and discussions on water resources. IWA (2010) identifies various journals which contain current information on water related issues. These journals include; journal of water and climate, journal of water and health, water research and journal of water supply. These journals are available online and access is granted on subscription. Secondary sources of water information include: textbooks on water resources, conference papers on water resources and other external sources.

According to Oyedokun (2007) tertiary information are sources which provide information for an overall feel of the subject or initial stages of searching but provide little substance to support academic statements. Examples of tertiary water information sources include bibliography of water resources, water resources abstracts and water resources thesaurus. A non-documentary source refers to oral discussions on water resources such as meetings of water specialists.

Aguolu (2002) explains that resources may be available in the library and identified bibliographically as relevant to ones subject of interest, but the user may not be able to lay hands on them. The author further states that the more accessible information resources are, the more likely they are to be used as readers tend to use information

resources that require least effort to access. This study tried to identify information sources accessed by water specialists at MOWI to satisfy their needs. It would be of interest to know other information sources that MOWI collaborates with in its efforts to satisfy the information needs of water specialists.

2.3.2.2 Information is Provided in three Media

Information can come from virtually anywhere – media, blogs, personal experiences, books, journal and magazine articles, expert opinions, encyclopaedias, and web pages — and the type of information you need will change depending on the question you are trying to answer.

Types of information media:

a) Print

These are newspapers, magazines, journals, newsletters, and other printed material. These publications are collectively known as the print media. The print media is responsible for more reporting than other news sources. Many news reports on television, for example, are merely follow-up stories about news that first appeared in newspapers.

b) *Electronic*

The Internet is slowly transforming the news media because more users are relying on online sources instead of traditional print and broadcast media. Websites can provide text, audio, and video information. The web allows for a more interactive approach by allowing people to personally tailor the information they receive via personalized web portals, podcasts, and RSS feeds. Weblogs have become very influential since the start of

the twenty-first century. Leading bloggers write their opinions on a variety of issues, and thousands of people respond on message boards.

c) Audio-visual

Audio-visual (AV) means possessing both a sound and a visual component, such as slide-tape presentations, films, television programs and live theatre productions. In a typical presentation, the presenter provides the audio by speaking, and supplements it with a series of images projected onto a screen, either from a slide projector, or from a computer connected to a projector using software. Another audio-visual expression is the visual presentation of sound (visual music), web streaming, video conferencing and live broadcast services. Audio visual media resource maintains a large collection of DVD in order to provide video content to supplement classroom teaching.

According to Rao (2002) advances in information technology are transforming the mode of work, communication and information media. In the current information society, information is now considered as a resource after land, labour and capital. Information, self-generative resource, is a key economic element. The information sources available and the media to be used to convey information are crucial to accessibility and must relate to complex information-seeking behaviour.

Fisheret al (2005) argue that while research has established that the preferred sources of information are different based on the information needed, word-of-mouth sources are ususlly more preferable by people. Informal sources and word of mouth are more particularly vital since information acquisition does not always take place via purposeful searching but can also occur incidentally in the day to day life routines.

Pettigrew (1999) assessed the various ways through which information can be shared spontaneously as a by-product of other activity. In his findings, he concluded that information grounds are environments from which in which individuals gather for some activity which involve social interactions, through which information sharing occurs.

It is evident that the sources of information consulted differ based on the circumstances and individual preferences or according to the information need. However, probems can be experienced in accessing information access especially where the sources of information available are erroneous, unreliable, inconvenient to reach or difficult to utilise. The sources of information can only offer sufficient information if the users have the capability and sufficient resources and skills to use them.

Water specialists in MOWI access different media of information. It would be of interest for this study to establish the channels used by water specialists in accessing information and the preferred media for information delivery.

2.3.3 Role of the Library in Provision of Information

Gorman and Crawford (1995) emphasize that the dominant ethic of librarianship is service that libraries exist to serve the individual community and society as a whole.Rusbridge (1998) observes that the role of the library is to select, acquire, organise and make available an appropriate subset of resources.

Thompson (2008) further suggests that libraries should focus on information service and access rather than on the physical collection the walls contain therein .Others have likewise argued that libraries and librarians have a central role in information access.

According to Jaeger (2005) lack of access to information can lead to no exchange, use, collection, or management of information**.** Information access model takes the three approaches into account and will help information providers understand their role is not simply collecting information, but rather it is developing a paradigm to help improve access to information.

Ray (2004) explains that the library should be organised to utilise the efforts required by users to access the needed information when the need arises. MOWI library is involved in provision of all kinds of information resources for use of their clients because they play a vital role in transmission of knowledge in the water sector.

This study tried to examine the role of MOWI library in provision of water information as information should also be easily accessible to all people. Dealing with diversity is the real problem for providers interested in offering quality services and for users it is accessing relevant sources to answer their information problems.

2.3.4 Role of the librarian in Provision of Information

According to Rice-Livy & Racine (1997) librarians are moving beyond the traditional roles of collection maintenance and custodial duties to newer functions of translating, accessing and marketing resources beyond the walls of the physical library collection.

Batt (1999) states that there is an increasing diversity of information resources from which to choose the most appropriate hence librarians must widen their selection processes in order to decide on the right medium for each situation.

MOWI library staff acquires, organize, and disseminate relevant information resources to users. The library staff also provides services geared towards specific user groups.

The MOWI library staff can be classified as specialised staff who offer instruction and assistance in interpreting resources and access to resources among such however, it would be of interest for this study to examine the role of library staff in MOWI in provision of water information to water specialists

2.3.5 Role of the Documentation Centre

A documentalist maintains a documentation centre and seeks to match the information needs of users with the materials available. Verstappen (2007), states that a documentation centre is usually part of an organisation and its emphasis is on how to build and manage information collections that serve the action purposes of the organisation they belong to. MOWI documentation centre is centralized in MOWI where it collects, maintains and provides a relevant, up-to-date, and outstanding collection of documents to fulfil the information needs of policy makers, practitioners and the general public.

ITN Philippines (1999) observes that having a multitude and variety of concerns in the delivery of water information and services, resource centres play a vital role. The author further explains that resource centres can influence and even enhance the development of the sector as they look into the future and foresee trends and directions. They also anticipate change and help in managing it.

This study will examine therole of the documentation centre in MOWI in provision of water information to water specialists

2.3.6 Role of Information Service Unit

Kumar (1982) states it is a key role of the library to build a story library. He further argued that the satisfaction of the users depends on the quality of services offered and the collection available. Currently, the significance and the need for information services as a social function in communication is becoming more basic.

Ocholla and Ojiambo(1993) identifies factors that influence information services as:

a) Exponential growth in number of publications and other formats of information holding
b) Use of new technology and the nature and level of specialization.
c) Level of accessibility to information resources
d) Nature and system of information dissemination.

Users can only have interest in services that are accurate, reliable and efficient to meet the actual needs. MOWI library serves all categories of people in MOWI and is an accessible for educational or other information need for users. According to Ocholla (1993), an information service unit is designed and organised to provide information to use. MOWI library has various kinds of information services for users as listed below;

a) Current awareness services (CAS) keeps information users up-to-date and well informed in the field of specialisation. Water specialists are informed about recent developments in the water resources field. Reitz (2004) defines CAS as a service

or publication designed to alert scholars, researchers, readers, customers, or employees of recently published literature in their field of specialization, usually available in special libraries serving companies, organisations, and institutions in which access to current information is essential. Such services can be tailored to fit the interest profile of a specific individual or group.

b) Selective dissemination of information (SDI) makes it possible to alert water specialists about new publications or news enabling them to stay current. It allows constant knowledge update of a user or user group and informs them of new acquisitions on particular subjects or issues.

c) As a way of helping the water specialists to get maximum benefit from information resources bulletin, abstracts from all the bullets are included. The index is of great value to water specialists in locating authorities to citations. Kumar (1987) defines an abstract as a summary of intellectual content of a book. It is a precise outline of a research article, thesis, review, conference proceeding or any in-depth analysis of a specific subject and is rottenly utilised to enable the reader to gain a quick glimpse of the purpose of the paper..

d) An internet service according to Gospal (2005) is a network of networks and is a gateway for libraries and information centres to enter into the electronic information era. The internet has rapidly spread around the world in the past decade and has had an impact on the lives of millions of people. The importance of internet arise largely form the fact that it has changed the way information is processed, stored, transmitted, retrieved and disseminated. It is also a complex electronic network of computers throughout the world that has literally millions of

information sources. Water specialists can hence use it to access and share information through email and World Wide Web among other facilities availed through the internet.

e) MOWI library has numerous information resources which include dictionaries, encyclopaedias and bibliographies. Reference service directs water specialists to the location of information resources, assist in evaluating of information, and refers water specialists to information resources outside the information centre when appropriate.

f) According to Reitz (2004)a referral service is a type of reference transaction in which a patron with an information need is directed to a reputable person or agency outside the information centre better qualified to provide assistance. It is provided in cases where the information sought is not available within the scope of a given information centre.

This study will examine the role of the information services in MOWI in provision of water information to water specialists

2.3.7 ICTs in Access to Water Information

According to Wheeler (2012) numerous libraries are largely utilising the social media platforms to reach a wider audience unlike that reached using traditional means which largely restricted the reach to the institution only. The libraries largely use different social media platforms to give alerts and updates.

Libraries have grasped the opportunities presented by the application of new technologies to revolutionize the technical processes required to deliver services. The most dramatic

impacts have been in the expansion of the range of materials collected and made available, together with the ability to reach users regardless of geography.

Vey, J (2013) indicates that libraries are already utilising new technologies to improve their services. The author further explains that social networking allow users to download e-books without even visiting the library, subscribe to digital collections, and provide online chat access to librarians.

According to the National Policy Water Resources Management and Development (1999) an effective information base is a key prerequisite for the effectiveness of in the management of water resources. In the water sector, since most materials are related to activities of the country, water information databases that are accessible over the internet will help the water specialists in identifying information material on water related issues that is available in the world. The greatest exposure to new, full- text research data has come in the form of electronic access to peer-reviewed journals which are provided via major academic research databases.

Lynch and Garcia-Molina (1995) assert that the purpose for the establishment of a virtual library is to develop information systems that provide effective accessibility to a large collection of information sources in a digital form. They have promoted the availability of iformatin in numerous forms which are easier to access and use.

Ajuwon (2008) explains that the development in computer and information infrastructures has changed the way we access, collect and use information. Just like other sectors, the water sector also thrives on the generation and use of information.

Information technology has emerged various media that enable information managers to disseminate information in effective manner.

This study sought to determine if MOWI has invested in resources to facilitate the use of IT equipment's in accessing information.

2.4 Challenges in Access to Water Information

The National Land Reclamation policy (2011) states that the water specialists are not in a position to access water information resources due to a number of challenges they experience. These include:

Limitation of appropriate technology: Information technology has changed communication thus new developments in information access. There is need for the water sector to invest in resources to facilitate use of Information Technology in resources such as water software for the water specialists in the various departments at the Ministry of Water and Irrigation. As a result databases have emerged to consolidate information access making it easier to retrieve information by users.

Lack of information network in the water sector: Networking of access points enables easy access to water information by the users.

Lack of skills in accessing information: Investors in the water sector need to access information from a benefitting organisation and may want to understand how certain terms are used before they venture into projects. Local content will also be useful to academic and research institutions in providing access to their users well known terms. If local content is harnessed in networked databases, users will benefit and there will be an improvement in the access and use of information by individuals in the water sector.

Information resources are unevenly distributed just as access to information is limited: The national water resources information systems which facilitate the use of relevant data and information in support of sustainable socio-economic development are few hence insufficient to provide information to water management institutions and water specialists in the various institutions involved.

Inadequate extension and training services: The country is affected by climatic changes, scarcity of water, and increase in water demand and water quality therefore putting pressure on the need for more water supplies to meet on the demands. These roles need to be supported by improving access to information needs and seeking skills of the water specialists

The United Nations Development Programme & Water Governance Facility (2007) continues to identify other challenges faced by water specialists in access to water information as:

Poor coordination and lack of proper information sharing on the on-going sector reform processes at various especially at the levels local and regional levels hence water specialists have limited data and information awareness on water related issues. The Non-Governmental Organisation in the water sector function separately without a general platform that can enable experience and learning to be exchanged and therefore, a lot of information regarding the activities are not known to other actors in the water sector in other levels.

There inadequate quality staff in the water sector and the skills available are insufficient for effective surveillance in water service providers. There is also lack of efficient Information, Education, and Communication (IEC) Strategy.

As a result of insufficient information base, the Ministry lacks reliable data that can be used for planning and that can enable the ministry to make informed decisions and undertake effective monitoring and evaluation. This therefore limits the capacity of implementers to note implementation challenges early enough and take suitable measures.

Satisfying the diverse information needs by several key players is a problem of information providers and handlers in the water sector. In the proposed research the challenges of accessing information in the water sector becomes a major investigation of factors that enable or hinder the possibilities of access. These include the investigation of access to information resources available for obtaining information for use by the water specialists for practical purposes.

2.5 Chapter Summary

This chapter has presented the theoretical framework upon which the study is based. Literature onTripartite: Information Access Model by Burnett et al. (2008) which informs this study has been reviewed.

What takes place in the Ministry of Water and Irrigation necessitates the access of abundant information.The water specialists access information at all levels and everyone has information needshence literature has been reviewed on sources of information in water resources, role of librarian in ensuring water specialists have access to the right

information to their information needs and different media of information accessed by the water specialists.Access of information resources by water specialists was given prominence.

The study sought to determine the challenges water specialists face in access to water information resources with a view to suggesting possible solutions.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter covers the methodology that was used in data collection and analysis. It discusses research design, study population, sampling procedure and sample size, data presentation, analysis and interpretation. This study investigated the access to information resources and services by water specialists in the MOWI and suggested ways in which it could be enhanced.

3.2 Research Design

According to Kothari (2004), a research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure.

The study was modelled on a case study as it involved careful and complete observation of a group; efforts were made to study each and every aspect of the concerning group then case data generalizations and inferences were made.

3.3 Research Approach

3.3.1 Quantitative Approach

Creswell (2007) defines quantitative approach as an experimental strategy of inquiry and pre- and post –test measures of attitudes. He further indicates data are collected on an instrument that measures attitudes and the information is analysed using statistical procedures and hypothesis testing.

The researcher used quantitative approach to analyse responses of respondents. The researcher used tables, frequencies, percentages charts to represent summaries of responses. In quantitative approach, closed- ended questions were employed and numeric data.

3.3.2Qualitative Approach

Creswell (2007) defines it as a narrative design and open-ended interviewing. He further states that it involves open-ended questions and text or image data. In qualitative approach, the researcher seeks to establish the meaning of a phenomenon from the views of participants. The results in qualitative research are rich in detail and insights into the respondent's experiences of the world. The researcher applied qualitative approach in different ways.

a) The researcher interacted with the Heads of Departments and Library staffs helping the researcher identify various challenges they faced in their daily duties
b) A visit to the library and documentation centre enabled the researcher to observe the natural setting of both respectively.

Qualitative research approach was most appropriate in gathering descriptive and explanatory data.

3.3.3 Mixed Approach

Creswell (2007) defines mixed approach as collection of both quantitative and qualitative data sequentially. The researcher bases the inquiry on the assumption that collecting diverse types of data best provides an understanding of a research problem. Mixed

approach integrates the data at different stages of inquiry and employs the practices of both qualitative and quantitative research.

The study incorporated mixed approach in the sampling procedures for it used purposive sampling for the water specialists in the various departments because they were judged by the researcher as most able to give the data that was most relevant to the study. Probability sampling was useful to the study because the various water specialists in the different water areas in MOWI had an equal probability of being picked up and each of them in the entire population having an equal chance of being included in the sample.

Mixed approach was used in designing of instruments for the research. The researcher felt that the questionnaire to the water specialists was the best instrument because water specialists could fill in the questionnaire using their own words. The questionnaires were corroborated by interviews to the heads of departments and library staff that the researcher felt would bring out issues on access of information resources and services through interviews and also afford the researcher interaction with them.

The data collection instruments (questionnaires and interviews) were the most appropriate for the issue under study and answering of the research questions.

The responses from both the questionnaires and interviews provided a general picture of all perspectives and aspects in access of information resources and services by water specialists as proposed in the research questions.

The concurrent embedded strategy was employed since the researcher chose to utilise different methods to study different levels. According to Creswell (2007), concurrent

embedded strategy of mixed methods can be identified by its use of one data collection phase, during which both quantitative and qualitative data are collected simultaneously. In the study concurrent embedded strategy was employed because the water specialists were studied quantitatively while the Heads of departments and library staff were studied qualitatively. This model was used because it helped the researcher gain broader perspectives as a result of using different types of data from different levels within the study as opposed to using the predominant method alone. The study was able to collect the two types of data simultaneously.

In the study the researcher embedded the data by collecting the data in one form that is quantitative and had the other form of data that is qualitative provide support information. In combining both quantitative and qualitative data helped to better understand the research problem by converging broad numeric trends from quantitative research and the detail of qualitative research.

3.4 Study Population

The study population consisted of water specialists, library and record staffs of the MOWI. Their distribution is shown in Table 3.1

Table 3.1: Categories of water specialists in the MOWI

Department	Water Specialists	Population
Water Services (Administration &Support Services)	Senior engineers	20
Water Resources Management	Hydrologists and Geologists	66
Land Reclamation	Land reclamation officers	28
Irrigation and Drainage	Irrigation Engineers	26
Administration	Heads of departments, library and records staff	4
Total		148

3.5 Sampling Methods

Lucey (2002) stated that sampling is the process of examining a representative set of items (people or things) out of the whole population or universe. The purpose is to gain an understanding about some feature or attribute of the whole population, based on the characteristics of the sample.

3.5.1 Probability Sampling

The study adopted probability sampling method so as to select a reasonable number of subjects that represent that target population. According to Kothari (2004) probability sampling is also known as random sampling or chance sampling. The researcher found

that by using probability sampling the various water specialists in the different water areas in MOWI had an equal probability of being picked up and each of them in the entire population having an equal chance of being included in the sample.

3.5.2 Sampling Techniques

Stratified sampling was used in the study. Mugenda (1999) indicates that the goal of stratified sampling is to achieve desired representation from various subgroups in the population. Stratified sampling was used to categorise water specialists in the MOWI on the basis of common characteristics. In the study the water specialists in the various departments were divided into several sub-populations based on their area of specialization. These were land reclamation officers, irrigation engineers, hydrologists and geologists that are individually more alike than the total population. A group was further selected from each specialization to constitute a sample.

3.5.3 Sampling Frame

According to Kothari (2004) a sampling frame consists of a list of items from which the sample is to be drawn. Subjects or cases selected from the sampling frame form the units of observation in a study. From the study the sampling frame was the water specialist's in the various Departments in the MOWI. Since the water specialists embraced a number of distinct areas of specialization, they were organised into separate "strata." Each group was then sampled as an independent sub-population, out of which individual elements were randomly selected. Every water specialists in a stratum had same chance of being selected. Using same sampling fraction for all strata ensured proportionate representation in the sample.

3.5.4 Study Sample Size and Sampling Procedures

The study used the method of proportional allocation by Kothari (2004) under which the sizes of the samples from the different strata of the water specialists were kept proportional to the sizes of the strata. From Kothari (2004) formula, a sample size of n=74 was drawn from a population of size N=148 which is divide into 5 strata of size N_1=20, N_2=66, N_3=28, N_4=26 and N_5=8.In adopting the proportional allocation method, the researcher was able to get the sample size for the different categories.

That is if P_1 represents the proportion of population included in category i and n represents the total sample size, the number of elements selected from category iis n. P_i.

N- Population size which is 148

n-sample size which is 74

Formula used was $n_{1=}$ n.P_1

For category with N_1=20 we have P_1=20/148 and hence n_1= n.P_1=74(20/148) =10

For category with N_2=70 we have P_2=70/148 and hence n_2= n.P_2=74(66/148) =33

For category with N_3=28 we have P_3=28/148 and hence n_3= n.P_3=74(28/148) =14

For category with N_4=26 we have P_4=26/148 and hence n_4= n.P_4=74(26/148) =13

For category with N_5=8 we have P_5=8/148 and hence n_5= n.P_5=74(8/148) =4

Using the proportional allocation, the sample sizes for the different categories were; Water services 10, Water Resources Management 33, Land reclamation officers 14, Irrigation engineers 13, Heads of departments, library and records staff 4.

Kothari (2004) indicates that proportional allocation is considered most efficient and an optimal design when the cost of selecting an item is equal for each category and the purpose of sampling happens to be to estimate the population value of some characteristic.

The following departments were purposively sampled out of the seven departments that constitute MOWI as indicated in Table 3.2.the researcher used purposive sampling in selecting the departments because the researcher the researcher felt that the water specialists in these departments had the required information with respect to the objectives of the study. The Heads of Departments were found to of value in the study as they were more knowledgeable on the information needs of the water specialists in their respective departments while the library and record staff provided the information required by the water specialists.

Study Sample Size (n=74)

Table 3.2: Various Water Specialists, Sample Size and Proportion

Department	Water Specialists	Population	Sample size
Water Services (Administration &Support Services)	Senior engineers	20	10
Water Resources Management	Hydrologists and Geologists	66	33
Land Reclamation	Land reclamation officers	28	14
Irrigation and drainage	Irrigation Engineers	26	13
Administration	Heads of departments and library and records staff	8	4
Total		148	74

3.6 Data Collection Methods

3.6.1 Administration of Questionnaires

The main data collection method was the questionnaire. In the study, self-administered questionnaires were issued to water specialists in the MOWI and were hand delivered to them. The use of questionnaires gave the respondents adequate time to give well thought out answers. The researcher administered the questionnaire because some of the respondents were not readily available due to the nature of their work. Majority of the water specialists were engaged in field work away from their work station. The administered questionnaire also helped to avoid bias from the respondents as the answers were in their own words. The questionnaire used in the study carried both open-and closed-ended questions.

3.6.2 Interviews

Kothari (2004) indicates that the interview method of collecting data, involves presentation of oral-verbal stimuli and reply in terms of oral-verbal responses. He continues to indicate that interview method can be used through personal interviews and if possible, through telephone interviews. In this study personal interviews were used for the heads of Departments and library staff. They were judged to have vital information on access of information resources and services by virtue of their work and position held. Their information was in greater depth and the language of the interview was adapted to the ability or educational level of the person interviewed hence misinterpretation concerning questions was avoided. The interview method was chosen by the researcher because it gave the researcher an opportunity to interact with the various heads of Departments in the MOWI and library staff. This gave the researcher an opportunity to

interact, perceive feelings and attitudes towards access to information resources and services.

3.7 Data Collection Instruments

3.7.1 Questionnaires

The study used a questionnaire (see appendix 2) which was administered to the water specialists to respond to. The study used questionnaires because the water specialists are well informed in their areas of occupation and there was wider and more representative distribution of the sample. The water specialists were also not readily available in their offices as most of them were engaged in field work away from Headquarters. Therefore they could fill the questionnaire when they were available at the Headquarters. Questionnaires were administered to the water specialists in the MOWI by the researcher through the Heads of Departments. The questionnaire had both open ended and close ended questions. The open ended questions enabled the exploration of water specialist's perceptions, feelings and attitudes towards issues on access of information resources and services. The close ended questions ensured maximum comparability of responses to confirm specific issues on some variables in water information access. The questionnaire had Section A is on general information while the other Section was divided into subsection under sub-headings which were informed by the study objectives.

3.7.2 Interview Schedule

Interview schedules were used in this study (see appendix 3 and 4). According to Mugenda (1999) an interview is an oral administration of a questionnaire or an interview schedule. The interview schedules were two, one schedule was used to interview Heads

of Departments in the MOWI and the other was used to interview library and record staffs. The interview schedule was useful as it led to fairly reliable results. The interview schedule was used by the researcher because it reduced biasness and information was collected well in time as the schedule was filled by the researcher. The interview schedule also gave the researcher the chance if any to remove difficulties faced by respondents in correctly understanding the questions.

3.8 Validity and Reliability of Data Collection Instruments

3.8.1 Validity of Data Collection Instruments

Mugenda (1999) stated that validity is the accuracy and meaningfulness of inferences, which are based on the research results. According to Kothari (2004) there are three types of validity that can help the researcher to determine validity without direct confirming knowledge. This includes: content validity, criterion- related validity and construct validity

In this study, the questionnaire and interview schedule sought to measure whether water specialists have access to water information resources and services. The questionnaire and interview schedule have responses items under thematic subheadings which are based on the objectives of the study. The reason for structuring the questionnaire was to ensure that all objectives of the study were taken into consideration and that every aspect of access of water information and resources by water specialists was adequately covered, and in this way content validity was enhanced. The pilot study which was done on water specialists also attested to the validity of the questionnaire. The researcher also relied on her academic supervisors, students and staff in the School of Information

Science to point out items which would not bring out the intended response and their suggestion was incorporated. This helped to evaluate the questionnaire and interview schedule thus making them valid.

3.8.2 Reliability of Data Collection Instruments

According to Mugenda (1999) reliability is a measure of the degree to which a research instrument yields consistent results or data after repeated trials. The two aspects of reliability are stability and equivalence aspect.

Reliability in research is influenced by random error. Random error is the deviation from a true measurement due to factors that may not have been addressed by the researcher. In the interview maintaining stability was challenging. This is because as the interview was conducted, there was response for answers in potentially different ways due to re-phrasing of the questions from one Head of Department to the other.

There was likely the ambiguous and omission of reply by the water specialists when answering the questionnaire hence this was a challenge for the researcher. However, the researcher clearly explained to the Heads of departments and water specialists the aim of the interview and questionnaire respectively and that the information given would be treated with confidentiality. The questionnaire suggestions in the pilot test were analysed and incorporated.

Mugenda, (1999) identifies that the test-retest technique of assessing reliability of data involves administering the same instrument twice to the same group of subjects. The researcher also enhanced reliability through the test- retest technique. The researcher administered the questionnaires to four water specialists in the MOWI.

On administering the first test, the researcher waited for a period of three weeks before administering the test a second time. The researcher then correlated the scores from both testing periods and the coefficient of reliability was high. The questionnaires were hence said to yield data that has high test-retest reliability. If the quality of reliability is satisfied by the data collecting instrument, then while using it the researcher can be confident that the transient and situational factors are not interfering.

3.8.3 Pre-Testing Data Collection Instruments

3.8.3.1 What was Pre-tested?

During the pilot study, pre-testing of the questionnaire was done as a way of assessing the validity and reliability of the data collection instrument. This was done by use of a pre-test checklist for the questionnaires for water specialists in the MOWI.

The pre-test check list for the questionnaire looked into various issues such as;

a) Clarity of the questions
b) Sequence of the questions
c) Jargon or technical terms used
d) Form of language used and
e) Suggestions for improvement

3.8.3.2 On whom was the pre-test done

The pilot study was carried out in a trial fieldwork with 8 water specialists in the MOWI. Two water specialists from every department were requested to fill in the questionnaire. In questionnaires there is the possibility of ambiguous replies or omission of replies all together to certain questions.

3.8.3.3 How the Pilot Study was carried out

The study used a pre-test check list which was administered to 8 water specialists to respond to. The aim of pretesting was to help reveal any necessary changes in the data collection instrument and whether the questions asked by the researcher measured what they were expected to measure.

3.8.3.4 Findings of the Pilot Study

The researcher found that, there was use of technical terms in two questions, the questions were rephrased and clarity achieved. Some of the long questions were also made short and simple. The researcher on piloting the questionnaire found it necessary to re-arrange the questions so as to proceed in logical sequence moving from easy to more difficult questions. The researcher was also able to gauge the time needed to fill in the questionnaire and this made the questionnaire more effective for the study. The change identified in the data collection instrument was revised to reflect the change in readiness for the actual fieldwork.

3.9 Data Collection Procedures

Permission to carry out research was obtained from the Ministry of Education-National Council of Science and Technology-Utalii House. The researcher conducted a familiarization visit to introduce herself and during this visit she booked an appointment with the Heads of Departments. The researcher administered the questionnaires herself after which she collected the completed questionnaires on a later date.

3.10 Data Presentation, Analysis and Interpretation

The data was both qualitatively and quantitatively analysed. The data was analysed using a combination of statistical and text analysis. Fraenkel (1990) elaborates that in qualitative research data are reported in words or pictures rather than in numbers and tables which is the case in quantitative research.

The researcher presented the data by use of descriptive narratives under various research questions themes and where necessary, data was presented in form of tables, charts and figures. Data was analysed thematically by use of research questions, that is the open-ended and closed- ended questions and responses from the interview schedule, the researcher organised them in terms of themes that were carried in the research questions. After analysing the data the researcher interpreted the data.

Kothari (2004) points out that interpretation is the task of drawing inferences from the collected facts after an analytical or experimental study. The study used both the text and statistical technique method of data interpretation. The purpose for data interpretation was for the researcher to understand why the findings are what they are and can make others understand the real significance of the research findings.

3.11 Ethical Considerations

The study maintained confidential identity of the respondent and are only known by the researcher. The study gave credit, appreciated, recognized and acknowledged other authors work hence avoided plagiarism and fraud. The data collection instruments had a letter of introduction attached and assurance on confidentiality of the information given by the respondents.

3.12 Chapter Summary

In this study quantitative and qualitative research approaches were employed. A questionnaire was administered to the water specialist in the MOWI who were sampled from the various departments dealing with water issues. An interview schedule for the Heads of departments and library staff in the MOWI was used in the study. Data on water information and questions in the questionnaire were quantitatively analysed. Qualitative data was organized by transcribing the interview responses, sorting it and familiarizing with the data.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents analyses and interprets the research findings in line with the study objectives and research questions. The findings have been analysed, tabulated and recorded as frequencies and percentages where appropriate. The interview response rates are also presented.

Information in Chapter 4 addresses the following objectives of the study:

a) To identify the sources of information available for use at MOWI by water specialists.
b) To establish the channels used by water specialists in accessing information.
c) To examine the role of the library, documentation centre and information services in provision of water information to water specialists in the MOWI.
d) Assess the effectiveness of the channels used by water specialists in accessing water information.
e) To establish challenges faced by the water specialist in accessing water information resources.
f) To make recommendations to improve access and utilization of water information in Kenya.

4.2 Response Rates

The research had (74) respondents from the following five departments in the MOWI: Water Services, Water Resources Management, Land Reclamation, Irrigation and

drainage and Administration. The researcher administered questionnaires to 70 respondents in the Water Services, Water Resources Management, Land Reclamation, Irrigation and drainage departments and interviewed 2 Heads of Departments and 2 Library and records staff respectively. Therefore; the total population sample size was 74 respondents.

Table 4.1: Response Rate and Sample size (n=64)

Department	Study sample	Sample size	Response rate	Percentage (%)
Water Services	Senior engineers	10	8	12.5
Water Resources Management	Hydrologists and Geologists	33	30	46.8
Land Reclamation	Land reclamation officers	14	10	15.6
Irrigation and drainage	Irrigation Engineers	13	12	18.75
Administration	Heads of departments and library and records staff	4	4	6.25
Total Number		74	64	100

The findings from the response rate indicate that 8 (12.5%) out of 64 water specialist was a senior engineer, 30(46.8%) out of 64 was a hydrologists or geologists, 10 (15.6%) out of 64 was a land reclamation officer, 12 (18.75%) out of 64 was an irrigation engineers and 4(6.25%) out of 64 water specialists was a Head of department or library and records staff

4.3 Information Sources Available in MOWI

Table 4.2: Water Information Source Available in the MOWI (n=64)

Water information sources	Frequency	Percentage (%)
Films and Videos	55	86
Newspapers	60	94
Magazines	22	34
MEWNR calendar of events	10	16
Brochures	36	56
Internet	58	91
Library	20	31
TV	30	47
Radio	12	19
Resource persons	24	38

***Multiple responses**

38% stated that resource people were available in MOWI; 94% stated that newspapers were available in MOWI; 31% stated that a library was available in MOWI; 47% stated a TV was available in MOWI and 34% stated magazines were available in MOWI. However, only 19% stated radios were available in MOWI; 16% stated that calendar of events for the Ministry was available; 34% said magazines were available in MOWI;

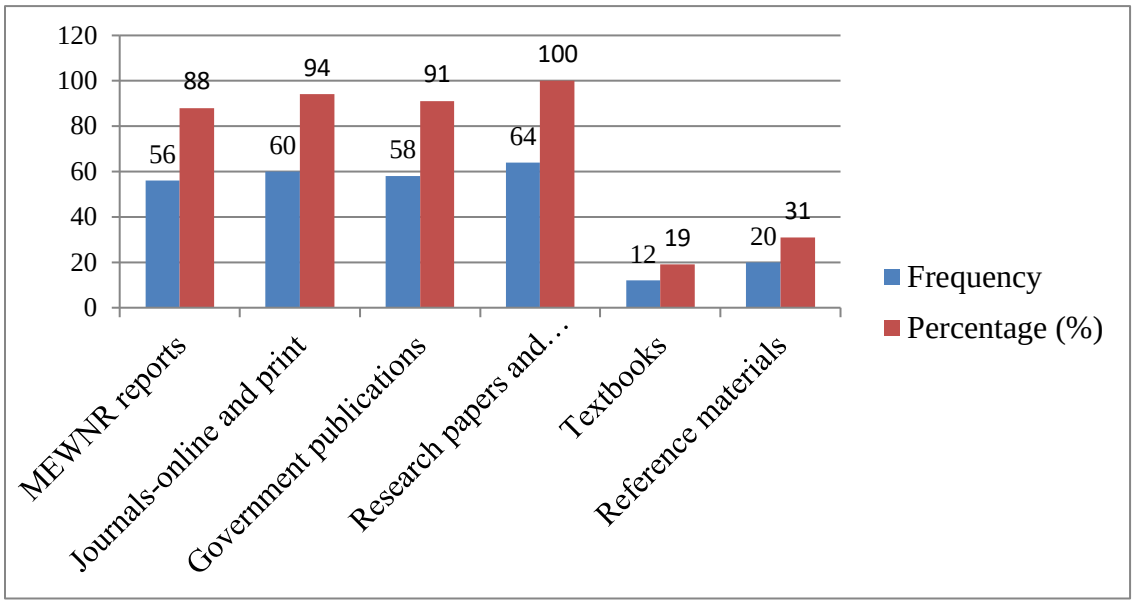
86% stated films were available in MOWI; 56 % stated they had the Ministry brochures available in MOWI and 91% stated they had internet available in MOWI.

4.3.1 Information Resources mostly used by Respondents

The study sought to find out information resources mostly used by water specialists in the MOWI and the summary of findings is as indicated in Figure 4.1.

Figure 4.1 indicates that research papers and projects from other water bodies such as: National Irrigation Board, Water Resources Management Authority, Water Services Board and Kenya Water Institute were mostly used as cited by 64(100% of the respondents while Textbooks materials were least used as cited by 12(19%) respondents.

20(31%) of the respondents used reference information materials. The reference information materials as used by the respondents include encyclopaedias; Dictionaries; Yearbooks and Grey books. 60(94%) of the respondents used journals both online and print. This is because they provide updated and wide information which is helpful for their reseach.56 (88%) of the respondents mostly used the MEWNR reports as most of the projects carried out gave recommendations which created room for further research.58 (91%) of the respondents indicated they used Government publications. They indicated that the Government publications met their information needs as most Ministries in the Government relate in their activities in one way or another.



***Multiple responses**

Figure 4.1: Information Resources mostly used by Water Specialists

4.4 Channels used by water specialists in Accessing Water Information

The study also sought to find out the channels used by water specialists in accessing information from MOWI for their work. The study found that most of the respondents were able to obtain their information needs in the right media. The study identified a number of ways in which the water specialists went about in accessing information on water. These included:

a) Printed sources

b) Electronic sources

c) Watching television

d) Listening to radios

e) Attending conferences and seminars presented by resources persons

4.4.1 Preferred Format for Information Delivery by Water specialists

The study sought to find out the format used in accessing information by water specialists in the MOWI and the summary of findings is as indicated in Figure 4.2

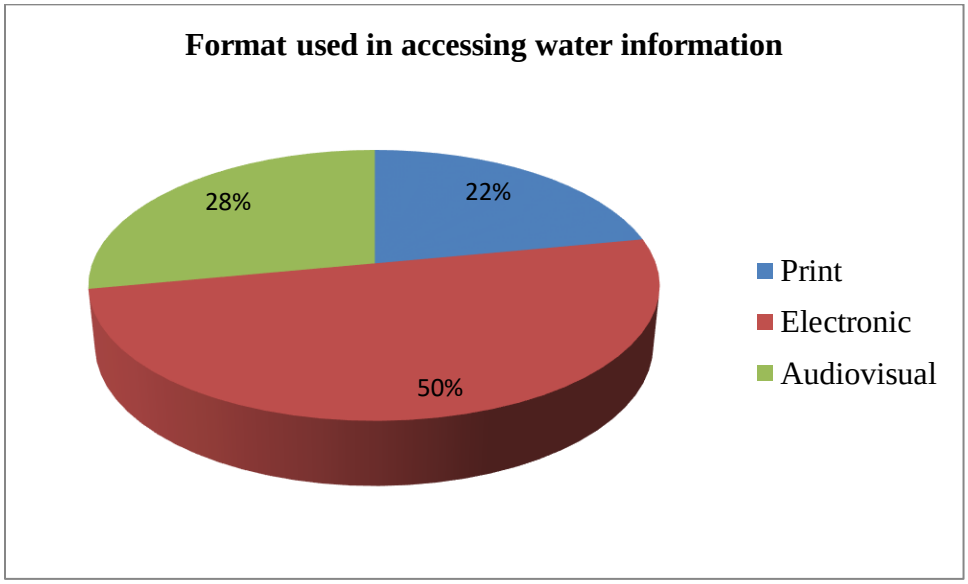


Figure 4.2: Format used in Accessing Water Information

The findings showed that 32 (50%) out of 64 respondents preferred information in soft copy. Various reasons were given as to the preference of electronic information; the information was

easy to edit and save, could be sent online with much ease and less time, the water specialists could work from any place even outside the Ministry hence increase in accessibility. Searching for information in electronic form was also stated to be easier as the information could be searched using different titles and terms as compared to the perusing of print information resources. Some respondents indicated that most of the up to date information is found in electronic form hence their preference. Examples given were the on line journals, information systems and databases.

14 (22%) out of 64 water specialists preferred print format and stated that their preference was based on several issues. Some of the stated issues were, the print format was easy to authenticate as the chance for altering the information was less minimal. The print format could be used even in absence of power or network hence they preferred it as compared to the electronic format. Other water specialists also stated heath issues that are as a result of the electronic format hence they preferred the print format. Grenquist (1997) indicates that reading a large amount of data on the screen can be very difficult and may cause back pain or vision problem. 18 (28%) out of 64 water specialists stated that they preferred audio visual formats due to the nature of their work.

4.5 Role of the Library, Documentation Centre and Information Services

4.5.1 Role of the Library

The water specialists were asked whether they find the MOWI library useful in providing water information. From the findings it was clear that there was a library for provision of information for the water specialists however Figure 4.3 shows that a majority of the water specialists 52 (81%) do not find the library useful in provision of water information while 12 (19%) of the water specialists stated that the library is useful for their information needs. The 52 (81%) of the water specialists who do not find the library adequate were asked to state why. They stated eight reasons which are in Table 4.3 below.

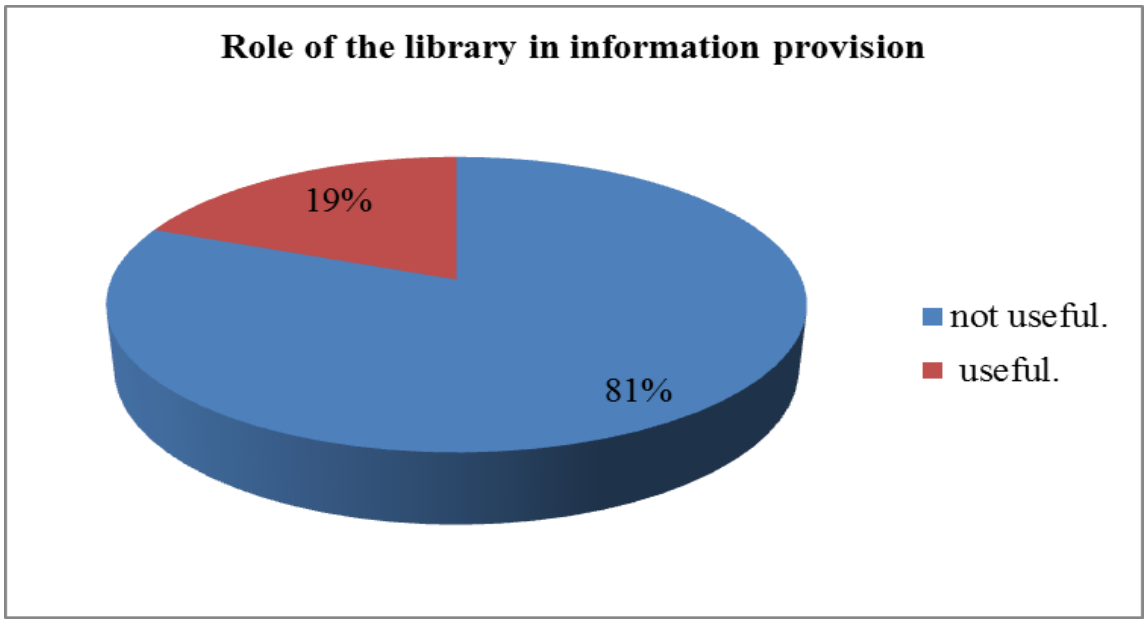


Figure 4.3: Role of the Library in Information Provision

Table 4.3 summarises some of the reasons as to why the library is not useful in provision of water information in the MOWI. The water specialists gave various reasons as to why the library is not useful in provision of information to their information needs. 29 (45%) of the water specialists stated that the information provided in the library is not up to date.10 (16%) of the water specialists pointed out that the information resources in the library were inadequate hence they rarely visited the library. 8 (12%) of the water specialists stated that the library is not developed. The water specialists went on to state that the capacity of library at the MOWI is small hence cannot accommodate more information resources and more facilities for use by the users.

Five (8%) of the water specialists indicated that the information materials in the library were not user-friendly hence this was a challenge as they could not access the information they needed. Two (3%) of the water specialists went on to say that they did not have access to library resources.

Table 4.3 Perception of the Library by the Respondents (n=64)

Reasons	**Frequency**	**Percentage (%)**
Inadequate water information resources	10	16
The information available is not updated/specific	29	45
We do not have access to library information resources	2	3
We rarely visit the library	10	16
The library is not developed	8	12
Information materials are hard to understand/not user friendly	5	8
Total	**64**	**100**

4.5.1.1 The study sought to find out explanations as to why water information provided by the library is inadequate in the MOWI and the summary of findings is as indicated in Table 4.4.

The water specialists were further asked whether they considered information resources inadequate. The findings show that majority of water specialists (44%) felt that the water information resources were inadequate due to the limited budget allocated to the library hence not acquiring water information resources.19 (30%) of the water specialists felt that the information resources provided in the library were not comprehensive. Another 17(26%) of the water specialists stated that the resources were few hence access to the only available was a problem.

Table 4.4: Level of Water Information Inadequacy (n=64)

Explanation	Frequency	Percentage (%)
The resources are few	17	26
They are not comprehensive	19	30
Limited budget for acquiring water information resources.	28	44
Total	**14**	**100**

4.5.1.2 Water specialists were asked to describe the information resources in the library, the resources were described as indicated in Figure 4.4

Majority 42 (65%) of the water specialists described the library as having journals. 12 (19%) of the water specialists as having brochures while the rest 5(8%)as having textbooks and calendar of events among others sourced by the water specialists.

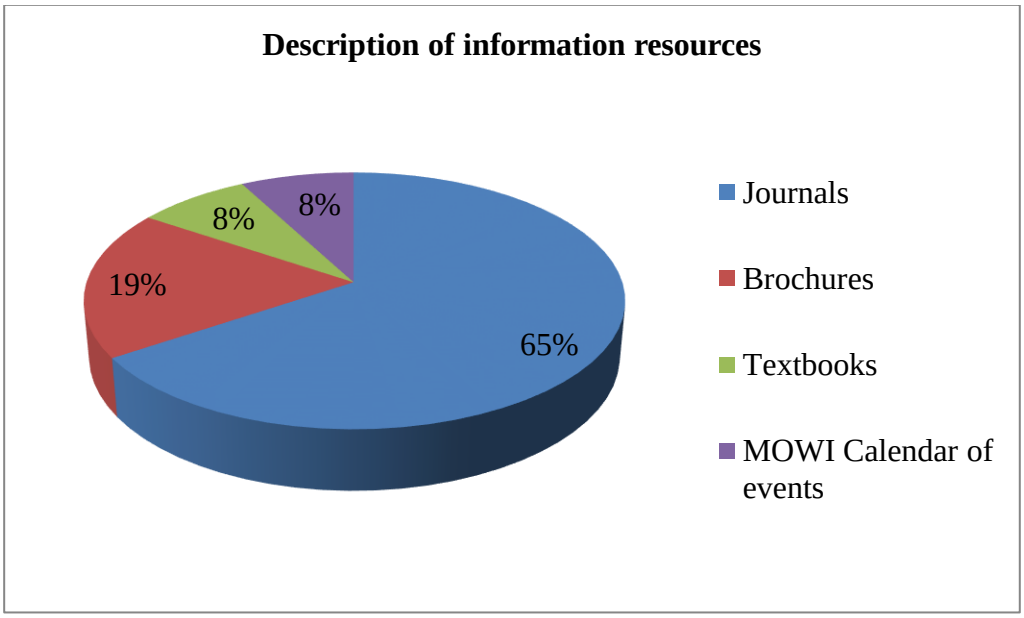


Figure 4.4: Description of Information Resources

4.5.1.3 Additional Information Resources Preferred by Respondents

The study sought to find out additional information resources preferred by respondents. The findings as shown in Figure 4.5 would assist the librarians in updating the library resources.

Figure 4.5 shows that 7 (11%) out of 64 water specialists indicated that the library should acquire more water reports. 18 (28%) of water specialists suggested that the number of water databases be increased. They went on to state that more water databases need to be put in place some department don't have any databases for information access and sharing. 5 (8%) gave their opinion that the library should stock updated water information resources for use as the current ones are outdated. 8 (12%) indicated on the need for more water related policies and reports so that they could be informed on the changes and developments in the water sector. According to 26 (41%) of the water specialists current online journals were few and proposed acquisition of more online journals.

It can be deduced from the above findings that the library needs to carry out a user needs assessment survey so as to put into consideration all the expectations raised by the users.

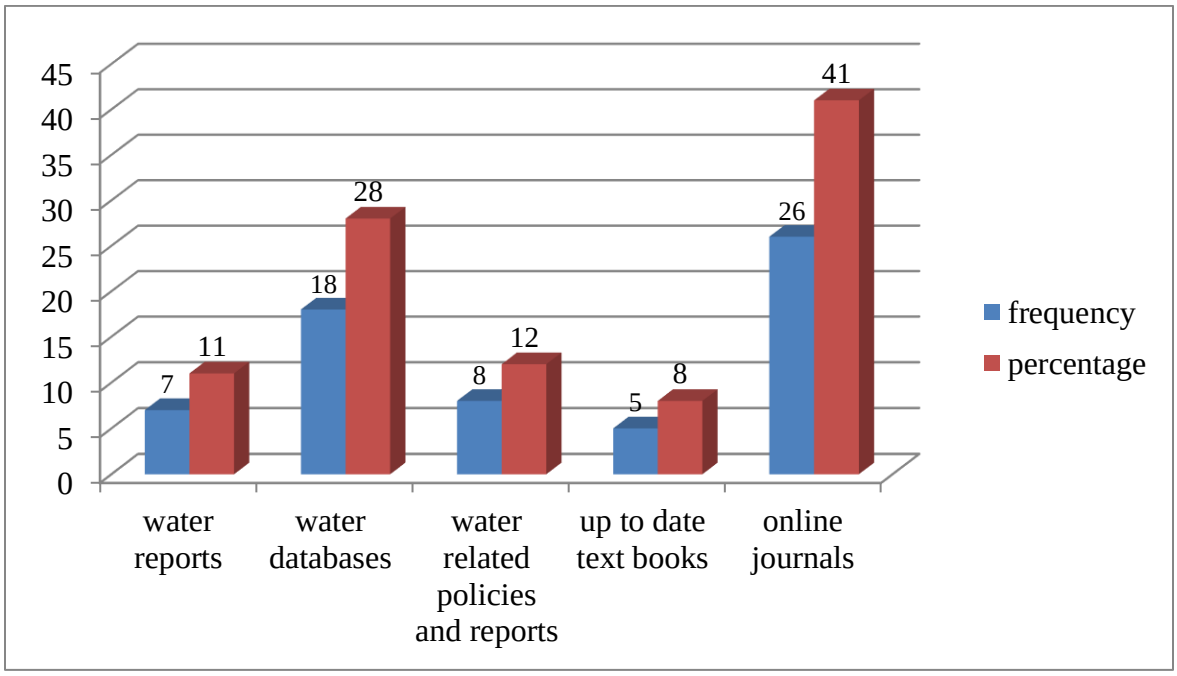


Figure 4.5: Additional Information Resources Preferred by Water Specialists

4.5.2 Role of the Documentation Centre

The water specialists were asked on the adequacy of the documentation centre with regard to water information needs. The responses are analysed in Table 4.5.

As for adequacy of the documentation centre, Table 4.5 shows that majority 52(81%) of the water specialists were quite specific in ranking the documentation centre as inadequate for their information needs while 12 (19%) of the water specialists ranked the documentation centre as adequate .This reason for this can be attributed to poor funding of the documentation centre, lack of adequate infrastructural facilities and essential resources and personnel. The limiting factor to a researcher's success is lack of relevant information resources. The information material in the documentation centre more often than not is obsolete because of underfunding by the parent Ministry due to inadequate budgetary allocation. This argument was supported by Onatola (2005) when he observed

that the common limiting factor to a researcher's success is among factors as inadequate budgetary allocations from the parent institutions.

Table 4.5: Adequacy of the Documentation Centre with Regard to Water Information Needs (n=64)

Adequacy	**Frequency**	**Percentage (%)**
Yes	12	19
No	52	81
Total	64	100

4.5.3 Role of Information Services

The water specialists were asked to identify the information services that they were aware of and the summary of findings is as indicated in Figure 4.6. The findings indicate that 34 (53%) of the water specialists used the internet services for their information needs while 10(16%) used reference and referral services. The water specialists went on to state that the reference and referral services enabled them to interact with resources persons in their field hence gained more experience. This was especially in the field work where some of their activities rely on old technology. 9 (14%) of the water specialised used the selective dissemination of information while 6 (9%) of the water specialists used the indexing and abstracting services.5 (8%) used current awareness services.

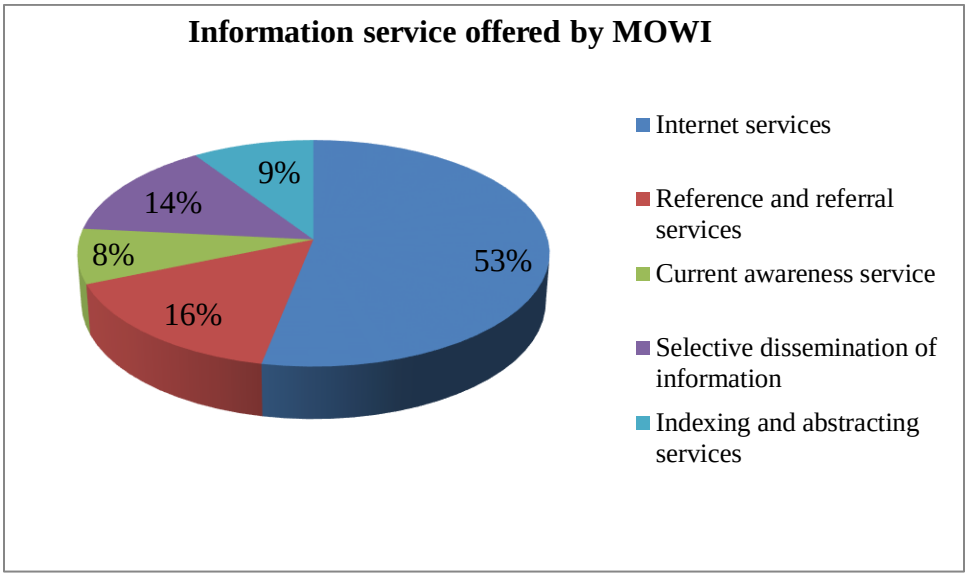


Figure 4.6: Information services offered by MOWI

4.5.3.1 Water Specialists were asked to give their Ratings on Information Services and are as shown in Figure 4.7

Figure 4.7 indicated that 20 (31%) of the water specialists rated the library services as excellent. The water specialists stated that they were able to use some of the information services to attain their information needs. 31 (48%) indicated the services were good and 13(21%) of the water specialists indicated that the services were fair since much more could be done. The findings would help the library staff in improving their services to the water specialists. For example, they could be more efficient in assisting the users in retrieval of information so as to make the available information resources more user-friendly. Morris and Barron (1998) found that consultation enables library management to determine what the users really want, thus enable them:

a) To design and refine services in ways that matches the user's expectations;
b) To set up user-focused initiatives like complaints and redress procedures or consumer charters;

c) To identify or anticipate service problems;

d) To monitor services over time; and

e) To compare one service with others.

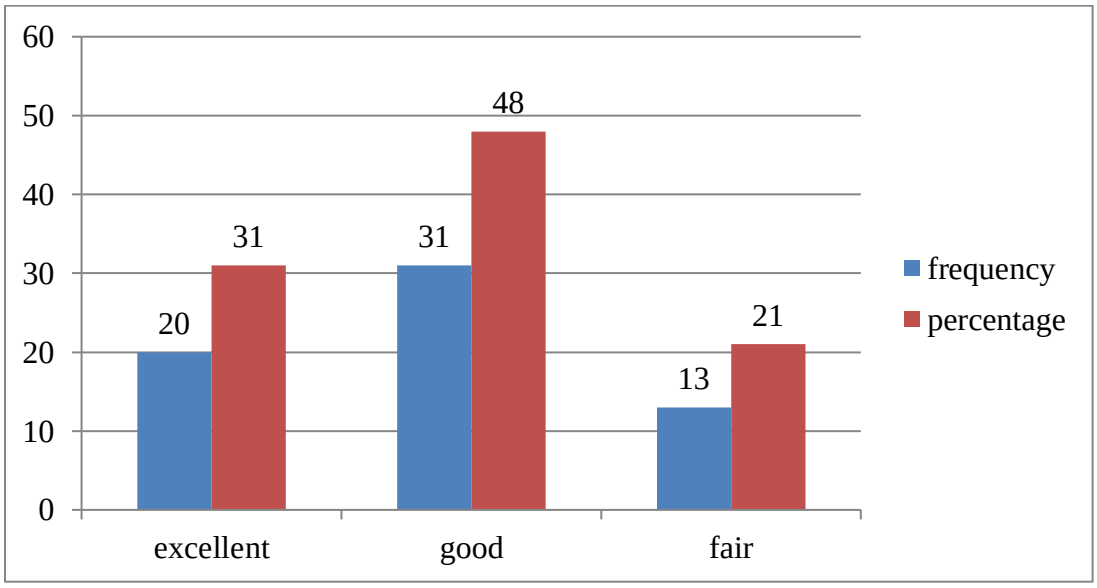


Figure 4.7: Rating of MOWI Library Services by Water Specialists

4.5.3.2The study also sought to find out Additional Information Services Preferred by the water Specialists. The findings are summarised as shown in Table 4.6.

Table 4.6 shows that majority 30 (47%) of the water specialists prefer the MOWI subscribe to online international water journals so as to have access even when in the field work. The water specialists pointed out that the water journal gave them more exposure in their activities as they were in a position to apply similar technology applied in other countries with regard to water issues. 18 (28%) of the water specialist gave preference to current awareness service and went on to say that Current Awareness Service(CAS) as an information service would be of great help as it keeps information users up-to-date and well informed in their field of specialization. It was also a way of creating awareness among the water specialists and information users are kept informed

about recent developments in their field through CAS. The water specialists indicated that various kinds of information could be availed through CAS such as; library catalogues, table of contents and titles of newly acquired materials by the library. It was observed that CAS was provided on minimal basis hence had needed to be improved.

16(25%) of the water specialists suggested that Inter library loan services with other water bodies should be put in place. The water specialists stated that although Inter Library Loan (ILL) is time consuming, it assisted them in accessing information in other related organisations. The water specialists further suggest that ILL would enable them share information with other water bodies hence increase access to the information.

This concurs with Gairlo (2002) findings that claim that mostly peer reviewed online journals are accessible to libraries through expensive bulk plans that force libraries to pay for all resources. In so doing the libraries add to their resources a number of rarely used journals of minimal impact and value simply because they were bundled in with the journals they could not do without.

Table 4.6: Additional Information Services Preferred by Water specialists from MOWI (n=64)

Additional Information Services Preferred by Water specialists from MOWI	**Frequency**	**Percentage (%)**
Connect MOWI to international online journals	30	47
Current Awareness service through email	18	28
Inter Library Loan with other water bodies	16	25
Total	64	100

Additional services that can be offered by MOWI Library

4(100%) of the library personnel suggested increase in provision of current awareness service, water databases, E-mail alerts for new acquisitions and linking of the library catalogue with other libraries in the water sector as some of the additional services they preferred.

4.5.3.3 Other Institutions where Water Specialists Can Access Water Information

The study sought to know of other institutions where water specialists can access water information other than MOWI. The findings are as shown in Figure 4.8

The findings as shown in Figure 4.8 indicate that 60 (94%) of water specialists access information resources from World Bank library. Their explanation was that World Bank library has a wide collection of water publications and reports both print and online. They also indicated ease of access due to its locality close to the MOWI and they therefore use it.

Water Resources Management Authority has a huge collection on water information resources hence 45(70%) of the water specialists access information from it.38 (59%) get their information from Water Services Regulatory Board while 34 (53%) obtain their information needs from Water Services Board.

58 (91%) of the water specialists access information resources from Kenya Water Institute library as it have a variety of books and journals in water while 54(84%) of the water specialists access information from National Irrigation Board. This is especially when there is need for information relating to irrigation as information resources relating to irrigation are stocked there. 44(69%) of the water specialists also access information

from National Water Conservation & Pipeline. There is therefore need for interlibrary loan arrangement between the MOWI and these institutions so as to widen the number of resources water specialists can access.

Library staff stated that with financial support from the mother institution, they can acquire some of these relevant journals as well as liaise with other government organisations that publish water information to have their published resources available and accessible at the MOWI.

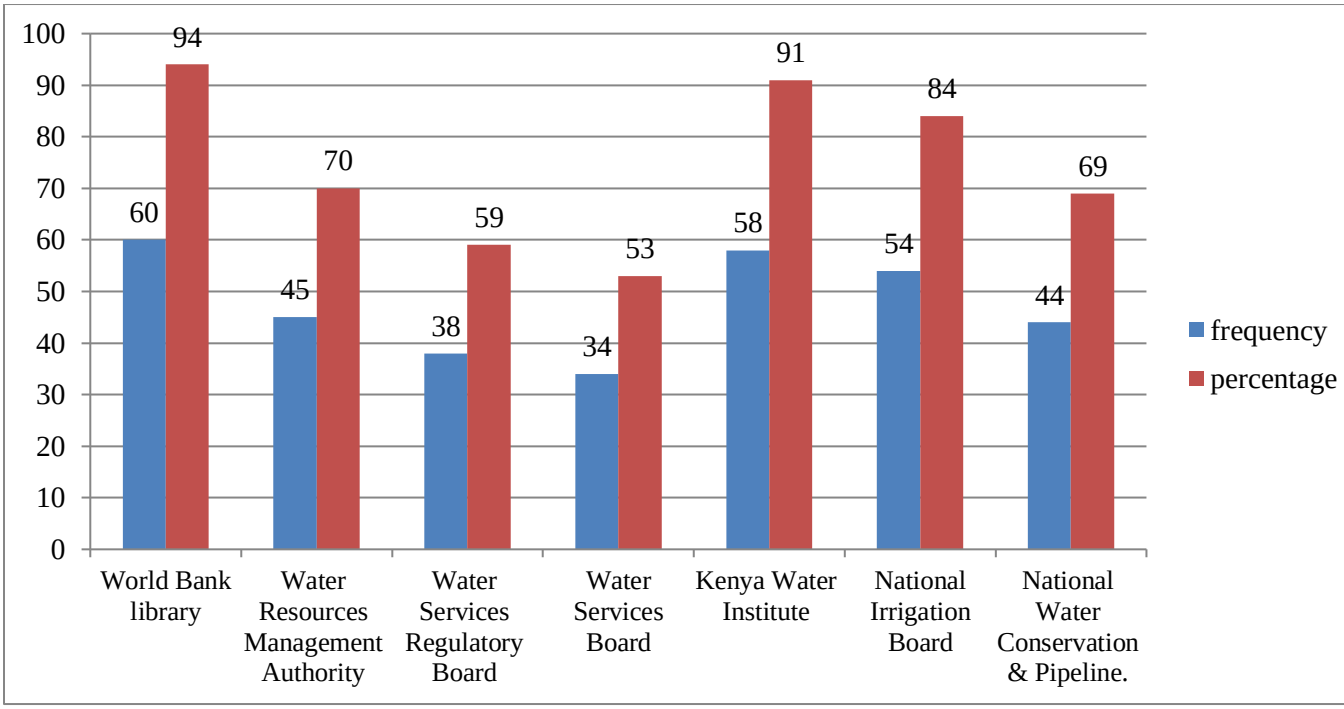


Figure 4.8: Other Institutions where Water Specialists can Access Water Information

***Multiple responses**

4.6 Effectiveness of Media Used In Accessing Information by Water Specialists

The findings as shown in Table 4.7 indicate that 6 (9%) of the water specialists found the media used by the water specialists not effective at all .They pointed out that some of the media provided to them did not meet their information needs. 49 (77%) of the water specialists found the media to be moderately effective while 9(14%) found the media to be effective to a great extent. The water specialists stated that the media provided to them gave the information required; was readily available, clear and easy to understand. They went on to say that by the end, they were knowledgeable and experience.

Table 4.7: Effectiveness of Media used in Accessing Information by water Specialists (n=64)

Extent of effectiveness	Frequency	Percentage (%)
Not effective at all	6	9
Moderately effective	49	77
Effective to a great extent	9	14
Total	64	100

4.6.1 Utilization of Accessed Water Information Resources

There was a disparity in the mode of utilisation of water information resources accessed by the water specialists. Five main areas of utilisation were identified as shown in the Figure 4.9.

From the findings, it is not surprising to find that majority 38 (59%) of the water specialists utilise the information resources available for career progression in the water sector development especially as most of them are engaged in field work water activities.11 (17%)of the water specialists utilise the information resources for research in

water and policy formulation while 10 (16 %) use the information for awareness in the water sector. 3 (5%) of the water specialists use the information for partnership and collaboration in the water sector while 2(3%) of the water specialists did not attempt the question. The findings therefore show that most water specialists are oriented towards the use of information for manpower development hence putting emphasis on application of this new knowledge.

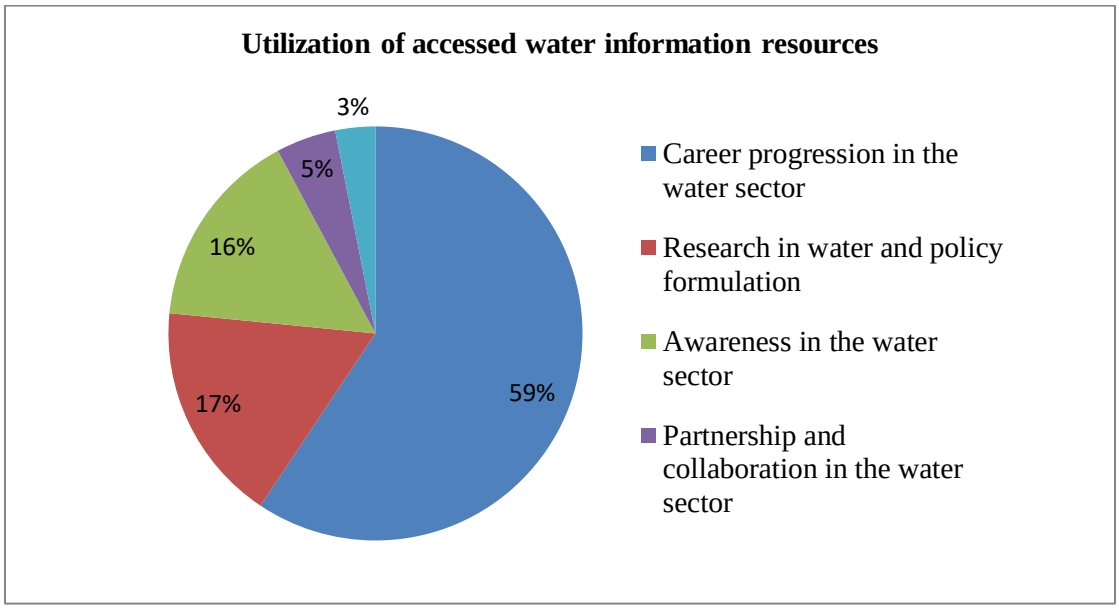


Figure 4.9: Utilization of Accessed Information Resources

4.6.2 The study sought to find out how the water specialists are provided with information. The Responses are analysed in Table 4.8.

The findings showed that the methods used by water specialists are varied. However, the most popular method used by a majority 58 (91%) of the water specialists is reading materials on water resources. 54 (84%) of the water specialised stated that they were provided with information as departments due to their areas of specializations hence the

information was more specific to their activities.52 (81%) pointed out that information was provided through water related activities while 46 (72%) of the water specialists received their information through conferences and seminars held at the MOWI.

40 (63%) of the water specialists indicated that they were provided with information individually which is mostly based on the area of interest and effort of the individual accessing the information.33 (52%) of the water specialists pointed out that on rare cases resource persons in their areas of profession are invited to give lecturers hence through these information is provided to them.

Table 4.8: Methods of Providing Water Information to Water specialists (n=64)

Methods of Providing Water Information to Water specialists (n=14) Method	**Frequency**	**Percentage (%)**
As a department	54	84
Individually	40	63
Invite professional speakers /resources persons	33	52
In Conferences and seminars	46	72
By giving water specialists reading materials on water resources	58	91
Through water related activities e.g. field trips	52	81

***Multiple responses**

4.6.3 In addition, the study wanted to know how often the water Specialists visit the Library for Access to Information. The Responses of the water Specialist are Summarised in Figure 4.10

From the findings, it shows that 35(55%) of the water specialists occasionally visited the library for information access while 17 (26%) of the water specialists frequently visited the library.12 (19%) of the water specialists stated that they rarely visited the library since they would access the same information or even more updated information from other sources. From the findings it is important for the library to know that if water specialists of a department are occasional users it may be because they have developed their own information channels to satisfy needs unsatisfied by the library. These channels constitute dangerous competition and can be extremely difficult to compete against. They include professional grapevine, word of mouth, correspondence, conference and many more with which the library has not been involved.

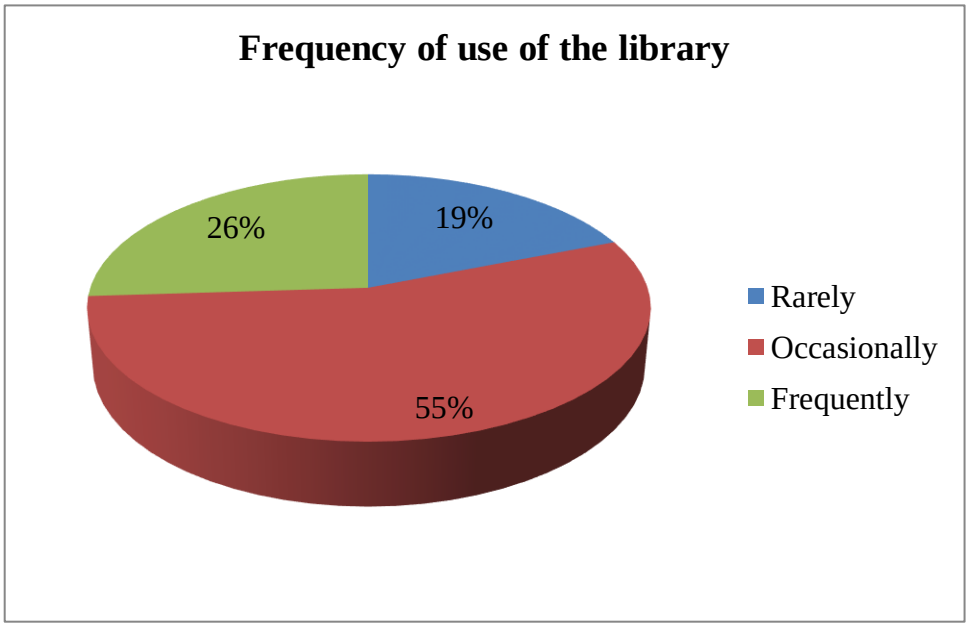


Figure 4.10: Frequency of use of the Library

4.6.4 In addition, the study sought to find out how users obtained the Information they needed. Table 4.9 Summarizes Methods used to obtain Information from MOWI.

The findings indicate that 58 (91%) of the 64 water specialists search online journals and databases while 48(75%) of the water specialists personally call or send their subordinates to the library.

40(63%) of water specialists indicated they use their friends to obtain the information they need. The water specialists used this method of obtaining information when they have exhausted the number of information resources allowed from their accounts. 30 (47%) of water specialists personally perused through the shelves to obtain the information they need.

It can be deduced from these findings that the water specialists face barriers in accessing information which include; unfavourable past experiences, lack of time and a lack of up to date information resources. Water specialists may not feel comfortable in making use of information resources provide because they have limited knowledge and others may be put off by a previous experience.

Table 4.9: Methods used to Obtain Information by Water Specialists from MOWI (n=64)

Methods used to Obtain Information from MOWI by water specialists	**Frequency**	**Percentage (%)**
Personally perusing through the shelves	30	47
Use friends	40	63
Personal calls or sending subordinates	48	75
Search online journals and database	58	91

***Multiple Responses**

4.6.5 Water specialists were asked to state their Preferred Methods of Delivery of Water Information and the findings are as shown in table 4.10. (n=64) Preferred Methods of Delivery

From the findings in table 4.10, 58(91%) of the water specialists indicated that they preferred water information delivered to them through books, magazines and brochures while 52(81%) of the water specialists preferred educational field trips to various water organisations.

47 (73%) of the water specialists preferred inviting professionals to speak to them. They went on to say that through this method they were in a position to ask for clarification on areas not understood and is a fast method.

Table 4.10: Preferred Methods of Delivery of Water Information (n=64)

Preferred methods of delivery	Frequency	Percentage (%)
Educational field trips to various water organisations.	52	81
Inviting people in the professionals in the water sector to speak to water specialists	47	73
Through books, magazines and brochures	58	91

***Multiple responses**

4.7 Value attached to Information Resources and Services by Heads of Departments in the MOWI

This study sought to establish the value attached by Heads of Departments to information resources and services in relation to the work carried out by water specialists. 1 (25%) of the HOD indicated that the information resources and services were very valuable while 2 (50%) HODs said the resources and services are moderately valuable. 1 (25%) indicated the resources and services to be of little value .Various reasons were given by the HODs as;

Majority of the HODs 2 (50%) found information resources and services moderately valuable because their needs were partly satisfied. The findings also indicate that 1(25%) HOD found the resources and services to be of little value. This confirms Ocholla and Ojiambo (1993) views that librarians may gather useful data on the information needs of their users through user surveys but unless they successfully select information sources which are relevant to individual users' or user group needs, they run the risk of damaging the image of the library as an information service; and worst, users branding it as irrelevant. With the above stated reasons this concludes that the library does not adequately meet the information needs of the water specialists and therefore needs to conduct a user's needs assessment survey.

a) All 4(100%) Heads of Departments explained that the few online resources which assist them in their duties were as a result of limited financial resources. They gave an example of online resources subscribed to by the library, which are few journals/ articles that are relevant to water specialists information needs hence forcing the library to spend a lot of funds to subscribe.

b) Four (100%) of the Heads of Departments stated that due to ICT, availability and instant access to information due to a variety of ICT products and services has raised user's expectations for information both in terms of delivery as well as quality of information services and products. They suggested that the MOWI needs to put into consideration more technologies so as to enhance the dissemination of information to the users.

c) All 4(100%) Heads of Departments indicated that they preferred all the formats of information as being in the managerial level, they had to be well equipped and vast in their knowledge .They indicated that in the field for example, more of practical is used as compared to theory hence for demonstration purposes the audio visual formats would be of much preference.

d) All 4(100%) Heads of Departments indicated that the current library and documentation infrastructures are not adequate to cater for the information needs in the MOWI. The information provision personnel were also not adequate for dissemination of information. They went on to state that they are too small to accommodate more facilities in terms of reading materials and facilities hence there is need to create awareness among water specialists about where else they can find what is relevant to them at their convenience

e) Impact of MOWI information access policies on how HODs access and use information.

The study sought to establish the impact of MOWI information access policies on how HODs access and use information. Information access policies determine access level and use of information resources and services hence the researcher sought to establish the HODs awareness on the same. From the findings 4(100%) of the HODs were aware of information policies in place and identified some as: policy on safety against loss, mutilation and theft; circulation policy; acquisition/collection development policy and copyright policy among others.

When asked about their views on the impact of MOWI information access policies on how they access and use information, the HODs had various observations which were summarised as.

2(50%) of the HODs stated that policy on safety against loss, mutilation and theft limits dissemination of information as some of the information materials are only used in specific areas and cannot be borrowed by the users. All the 4(100%) HODs agreed that the copyright policy limits the use of information resources as information providers strive to observe copyright laws as much as possible. They noted that the rights are not absolute especially when it comes to the library which is allowed to apply "Fair use" limitations which give libraries the right to reproduce works for non-commercial purposes.

All HODs 4(100%) pointed out that the circulation policy limited information resources borrowed and the duration of use. The policy also stipulated the fines to be paid in case of overdue by the user and also restricted the borrowing of some information materials like the periodicals which are of much value to their activities. The policy also puts restrictions on the number of information resources to be borrowed by a user hence limiting the circulation and access of information resources.

2(50%) of the HODS stated that the acquisition/collection development policy limits the selection of information resources to a committee hence their needs are not fully put into consideration. They indicated that these may be the reason they hardly visit the library or it may be the reason they find the library inadequate.

From the findings, there is need for the MOWI and its information providers to re-look at the information access policies and come up with policies that encourage but not hinder access and provision of information materials.

The findings also indicate that there is no interlibrary loan policy and external user's policy which allow the sharing and dissemination of information resources. It was observed so as to increase the accessibility of the information; the MOWI may make reasonable provision for the use of its library and documentation centre by other professionals in the water sector.

a) All 4(100%) Heads of Departments in the MOWI indicated that more up to date practical and reference information materials should be availed for use. They suggested that they should be consulted on the information resources suitable in their respective areas of specialization as they are more knowledgeable on the information needs of the water specialists. They further suggested that they rely heavily on online information and use that information for practical activities and hence the need for online journals
b) All 4(100%) Heads of Departments indicated that they hardly visit the library but use the staff in their Department to get the information they require or make personal calls to the library. They gave various reasons as to why they use this method; they find this method faster as compared to others; they indicated that being in the managerial level they have limited time to visit the library and so they use the most appropriate method to meet their information needs; some went on to say that during their work experience in the Ministry they had in one way or

another participated in the purchase of information materials stocked in the library so they were quite familiar with the library only in the case of new acquisitions.

4.8 Findings from the Interviews by the Library Staff in the MOWI

a) All 4(100%) library staff indicated that they obtain the information resources through acquisition and donations from other organisation such as the World Bank. They went on to state that, the library is moderately effective hence provision of information resources to water specialists was not efficient as the library has limited resources in budgets. They suggested that the library requires more resources, on budgets from the Ministry in order to purchase information resources for use by the water specialists. The library staff stated that most of them attend seminars after invitation from their professional bodies and they are sponsored by the Ministry. They went on to state that though they attended these seminars, there was need for training through courses which were tailor made for them. They pointed out that staff who were well trained had left the Ministry as others had passed away hence little experience was shared. They stated that from their observation, all the water specialists used the library resources in one way or another. They indicated that it was difficult to categorise those who heavily use the library services as some water specialists use online services where they access information from their laptops without physically visiting the library.

b) The library staff stated that information resources were in print, electronic and audio-visual format and the information services availed in the library for users were; current awareness services, selective dissemination of information,

indexing and abstracting services, Internet services, Reference Services and Referral Services. Librarians observed that due to the dynamic change of technology, water specialists prefer the electronic as compared to other formats of information. They also stated that the electronic format required less storage space, was widely accessible and was easily disseminated among the water specialists. There major problem was issues of copyright and plagiarism.

c) The library staff indicated that they do much more than simply providing of facts. They have new responsibilities and the user's expectations include the analysis and interpretation of information as well as its delivery. They went on to state that due to change in technology, the information provider of the 21st century has to be a far different person from that of earlier times.

d) The library staff identified promotional methods used so as to create awareness to their users. They stated them as: personal selling by the library staff themselves; use of notices; display of the new arrivals; use of leaflets and brochures. They found that the controlling factor in most of their promotional efforts is the limited budget. They also suggested other promotional methods that would be put in place such as: Uploading the library catalogue on MOWI website, use of MOWI publications, use of exhibitions and talks by librarian during induction week

e) They identified various policies in existence as; policy on safety against loss, mutilation and theft; circulation policy; acquisition/collection development policy and copyright policy among others. They also suggested that a security

system needs to be put in place so as to secure the information resources in place as there was none at the moment.

f) They pointed out that Inter library loan service is currently not in place hence limiting the borrowing and sharing of information resources.

g) From their views they indicated that the library has water information resources but are not adequate for provision of water information. They went on to say that most the water specialists preferred to use the online journals for their information needs.

h) Journals were cited as the difficult information resources to obtain. They pointed out that due to the limited funds allocated to the library; subscription to new journals becomes a challenge as it requires a substantial amount of money.

i) The library staff stated that other resources and service provided by the library were web-based and freely available information resources and coffee shop facility.

4.9 Problems Identified in Access to Water Information

Objective five of the study was to identify challenges faced by water specialists in access of water information resources.

4.9.1 Water Specialists from MOWI indicated that they Faced the following Challenges

a) Outdated Textbooks

Textbooks materials were least used as cited by 19% percent of the water specialists. Most water specialists observed that textbooks provided in water resources and irrigation were out dated. Heads of Departments in the MOWI indicated that more up to date

practical and reference information materials should be availed for use. They suggested that they should be consulted on the information resources suitable in their respective areas of specialization as they are more knowledgeable on the information needs of the water specialists.

b) Inactive Library In Information Provision

81% of the water specialists pointed out that the library was not useful in provision of information resources. The water specialists indicated various reasons as to why the library was not useful. Such as; inadequate water information resource, the information is not updated/specific, limited access to library information resources, rare visit to the library, library is not developed and information materials are hard to understand/not user friendly.

They further explained as to why the library is inadequate and stated it is because of; the information resources are few, information resources are not comprehensive and there is limited budget for acquiring water information resources.

c) Inadequacy of the Documentation Centre

As for adequacy of the documentation centre, 52(81%) of the water specialists are quite specific in ranking the documentation centre as inadequate for their information needs .The reason for this can be attributed to poor funding of the documentation centre, lack of adequate infrastructural facilities and essential resources and personnel. The limiting factor to a researcher's success is lack of relevant information resources. The information material in the documentation centre more often than not is obsolete because of underfunding by the parent Ministry due to inadequate budgetary allocation.

d) No Inter Library Loan (ILL) Services

16(25%) of the water specialists suggested that Inter library loan services with other water bodies should be put in place. The water specialists stated that although the ILL is time consuming, it would assist them in accessing information in other related organisations. The water specialists further suggest that ILL would enable them share information with other water bodies hence increase access to the information.

e) Few Online Databases and Information Systems

They were further asked to state the specific information they used and the water specialists indicated use of Water Regulatory Information System and Water Resource Management Information system. They however stated that data, data collection and information systems in the water sector still do not permit to publish figures on coverage with a satisfying precision. They went on to state that substantial information insufficiencies exists due to the fact that baseline data are missing or if existing in some pilot areas are outdated. Comparison of data from the different information systems, demonstrated the existing information gaps. They stated that donor agencies sometimes in collaboration with other ministries maintain information systems which often produce misleading results.

They indicated that the database and information flow in the water sector is characterised by gaps due to discontinuous water resource assessment programmes, weak monitoring systems and an inadequate user database. Such a situation could lead to production of unreliable reports, wrong conclusions and more risks in planning hence inappropriate plans and poor resources utilisation.

They explained that the few online resources which assist them in their duties were as a result of limited financial resources. They gave an example of online resources subscribed to by the library, which are few journals/ articles that are relevant to water specialists information needs hence forcing the library to spend a lot of funds to subscribe.

f) Lack of Awareness Creation

The 4 (100%) Heads of Departments suggested that there is need to create awareness among water specialists about where else they can find what is relevant to them at their convenience. HODs stated that with enough financial support from the mother institution, they can acquire some of these relevant journals as well as liaise with other government organisations that publish water information to have their published resources available and accessible at the MOWI.5 (8%) of the water specialists also used current awareness services which shows that the service was not well utilised hence keeping track on new acquisitions was hindrance to accessing up to date information.

4.9.2 HODs were asked to give the main Challenges Encountered in the Access to Water Information. They gave the following as the Challenges

a) Inadequate Facilities for the Library and Documentation Centre and Understaffing in Information Provision Personnel

Heads of Departments indicated that the current library and documentation infrastructures are not adequate to cater for the information needs in the MOWI. The information provision personnel were also not adequate for dissemination of information.

b) Inadequate Funds for Acquisition of Information/Budgetary Allocations

The Heads of Departments explained that the few online resources which assist them in their duties were as a result of limited financial resources.

c) No Interlibrary Loan Policy

The findings also indicate that there is no interlibrary loan policy and external user's policy which allow the sharing and dissemination of information resources

d) Inadequate Information Resources

The findings also indicate that 1(25%) HODs found the resources and services to be of little value. This concludes that the library does not adequately meet the information needs of the water specialists and therefore needs to conduct users, needs assessment survey.

4.9.3 Library Personnel were asked to give the main Challenges encountered in the Provision of Water Information. They gave the following as the Challenges

a) No Security System for the Library

The library staff indicated that there is no security system in place hence the need to purchase one so as to enhance the security of the information resources.

b) Inadequate Funds

From the findings it was found that the library is moderately effective hence provision of information resources to water specialists was not efficient as the library has limited financial resources in budgets. They also indicated that the controlling factor in most of their promotional efforts is the limited budget.

c) Understaffing and Inadequate Training

The library staff indicated that they do much more than simply providing of facts. They have new responsibilities and the user's expectations include the analysis and interpretation of information as well as its delivery hence it becomes a challenge when the same staff is expected to serve other clients at the counter and also assist in retrieval of information resources. They also indicated that staffs that were well trained had moved to other Ministries and others had passed on hence those in place had little experience and needed more training.

d) No inter Library Loan

They pointed out that Inter library loan service is currently not in place hence limiting the borrowing and sharing of information resources.

4.10 Ways in Which Access to Information Resources can be improved

4.10.1 The study sought suggestions from respondents to challenges identified in the study. In this regard, water specialists were asked to suggest what should be done to improve access of information resources and services. Their responses were:

a) Update textbooks: Water specialists lamented of old textbooks and suggested they be replaced with newer editions.

b) Water specialists gave the solution of having the library improved both the facilities and the stocked information resources

c) As for the documentation centre they suggested that resources in the documentation centre on water which are limited at the moment should be updated, increased in number and diversity.

d) Establishing of Inter library Loan (ILL) services: Water specialists were of the opinion that there is need to establish ILL service so as to increase accessibility and sharing of information resources.

e) Setting up mechanisms for continuous assessment of water resources which includes strengthening of the institutional capacity of the various agencies responsible for the collection, storage and analysis of water resources data. This should be followed by the establishment of socio-economic databases at all the water resources management levels.

f) Ensure accurate and reliable information is available, well disseminated and used to support effective decision making.

g) They suggested that there is need to create awareness of online databases and resources in place and various methods could be used.

4.10.2The HODs were also asked to give Solutions to Challenges encountered in the to Information Resources. The HODs responses were:

a) Modern facilities for both the library and documentation centre should be put up so as to accommodate new facilities and allow room for improvement so as to increase the provision of information resources.

b) The HODs gave the solution of adding budgetary allocations and suggested that more materials be acquired in their respective fields.

c) There should be the development of the inter library loan policy.

d) The solution to problems encountered in inadequate information resources for water information provision was that there should be provision of comprehensive water information resources, for example, online journals, etc.

4.10.3 The Library Personnel were also asked to give Solutions to Challenges Encountered in the Provision of Information Resources. The Library Personnel Responses were

a) The library staff suggested that a security system needs to be put in place so as to secure the information resources in place as there was none at the moment.
b) Funding should be increased to enable library personnel purchase more water information resources.
c) Increase Library Personnel: Library personnel expressed the need of more personnel especially so as to improve the provision of information resources and assist in their search for information.
d) They suggested that there was need for training the staff so as to equip them with skills that will enable them handle the current information needs of the users.
e) They suggested that the inter library loan policy should be developed.

4.11 Chapter Summary

This chapter has presented, analysed and provided an interpretation of the research findings. It is apparent from the research findings that despite provision of information resources and services by MOWI to water specialists, there still exist some challenges that hinder effective access and use of information resources and services. The study found that water information resources made available to water specialists were inadequate.

CHAPTER FIVE
SUMMARY OF THE FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of the study findings which are linked to the research questions. Conclusions and recommendations based on the study findings are also given. Finally, the study provides suggestions for further research.

The study investigated the access to information resources and services by water specialists in the MOWI, and proposes ways by which they can be enhanced.

This broad objective was guided by the following specific objectives:

a) To identify the sources of information available for use at MOWI by water specialists.
b) To establish the channels used by water specialists in accessing information.
c) To examine the role of the library, documentation centre and information services in provision of water information to water specialists in the MOWI.
d) Assess the effectiveness of the channels used by water specialists in accessing water information.
e) To establish challenges faced by the water specialist in accessing water information resources.
f) To make recommendations to improve access and utilization of water information in Kenya.

In this study, the researcher used a case study research design with quantitative and qualitative research methods. Stratified sampling was used in the study. A sample of 74 respondents from five departments participated in the study. Self-administered

questionnaires were used to collect data from water specialists in the MOWI. The interview schedules were used to interview Heads of Departments and information providers in the MOWI. Quantitative data was analysed using descriptive statistics and qualitative data was processed thematically. Results of quantitative data analysis were presented in tables and charts while results of qualitative data analysis were presented using descriptive narrative prose.

5.2 Summary of Research Findings

Research questions are used to present a summary of research findings as indicated below:

5.2.1 Research Question One: What types of water Information Sources are Accessible by Water Specialists in the MOWI?

The findings established that there were a variety of information sources available to provide water specialists with water information. However the usability of these sources depends on the effort made by the individual water specialists to access them. It can also be concluded here that the frequency to water information access by water specialists to the information sources available at the MOWI was unsatisfactory.

The study findings identified the following sources available in the MOWI:

a) Field Films and Videos
b) Newspapers
c) Magazines
d) MEWNR calendar of events
e) Brochures

f) Internet

g) Library

h) TV

i) Radio

j) Resource people

5.2.2 Research Question Two: Which Media are used by Water Specialists to access Water Information in the MOWI?

From the findings, the most preferred media by the water specialists was the electronic source of information. Various reasons were given as to why they preferred the soft copy and were stated as:

a) the information was easy to edit and save

b) could be sent online with much ease and less time

c) The water specialists could work from any place even outside the Ministry hence increase in accessibility.

d) Searching for information in electronic form was also stated to be easier as the information could be searched using different titles and terms as compared to the perusing of print information resources.

e) Some respondents indicated that most of the up to date information is found in electronic form hence their preference. Examples that were given were the on line journals, information systems and databases.

From the findings it was found that the HODs preferred all the media of information and gave the reason that being in the managerial level, they had to be well equipped and vast in their knowledge.

It was further established from the findings that there were few online resources which assisted the HODs in their duties and were as a result of limited financial resources. It was also established the HODs had suggested that the MOWI needed to put into consideration more technologies so as to enhance the dissemination of information to the users.

It was established that due to the dynamic change of technology, water specialist's preferred the electronic as compared to other media of information. It was found that the electronic media required less storage space, was widely accessible and was easily disseminated among the water specialists.

5.2.3 Research Question Three: What is the role of Library, Documentation Centre and Information Services in Provision of Water Information to Water Specialist in the MOWI?

The study established the following:

The library was not useful in information provision due to a number of reasons stated as:

a) Information resources are inadequate
b) Books are not up to date
c) Library is not developed
d) Rare visit by the water specialists

The findings established that the reason for information resources being inadequate was because they were few and not comprehensive. Additional information resources were also suggested as more water databases, more water reports and updated books.

The study found the documentation centre not to be adequate to the information needs of the water specialists. Reasons stated for its inadequacy was due to poor funding, inadequate facilities and lack of essential information resources and personnel.

The study established several information services that the water specialists were aware of and stated them as:

a) Current awareness services
b) Selective dissemination of information
c) Indexing and Abstracting services
d) Internet services
e) Reference Services and Referral Services

The most used information service was the internet services. The information services were rated good and other services that were suggested for addition were the inter library loan, connection to international journals and use of email alerts.

From the research findings it was established that the current library and documentation centre infrastructures were not adequate to cater for the information needs in the MOWI. The information provision personnel were also not adequate for dissemination of information.

It was found that the library was moderately effective due to limited resources in budgets. It was established that there was need for more budgetary allocation from the Ministry in order to purchase information resources for use by the water specialists.

It was found that the library staff attended seminars through invitations from their professional bodies and were sponsored by the MOWI. The training skill of the staff was also found to be wanting as staffs that were well experienced had left the Ministry.

It was further established that the library staff had much more responsibilities than simply provision of facts. The user's expectations included the analysis and interpretation of information as well as its delivery.

It was found that the library had a number of promotional methods used to create awareness to their users and were stated as: personal selling by the library staff themselves; use of notices; display of the new arrivals; use of leaflets and brochures. They also suggested other promotional methods that would be put in place such as: Uploading the library catalogue on MOWI website, use of MOWI publications, use of exhibitions and talks by librarian during induction week.

It was established that the library staff had suggested for a security system to be put in place so as to secure the information resources in place as there was none at the moment. Inter library loan service had also been suggested so as to avoid limiting the borrowing and sharing of information resources.

From the findings it was established that there was need for the MOWI and its information providers to re-look at the information access policies and come up with policies that would encourage but not hinder access to information materials.

The findings also found that there was no interlibrary loan policy and external user's policy which would have allowed the sharing and dissemination of information resources.

5.2.4 Research Question Four: How Effective are the Channels used by Water Specialists in Accessing Water Information?

The study findings established various channels used by water specialists in accessing water information. They were stated as:

a) As a department
b) Individually
c) Invite professional speakers /resources persons
d) In Conferences and seminars
e) By giving water specialists reading materials on water resources
f) Through water related activities e.g. field trips

From the findings giving reading materials to the water specialists was the channel mostly utilised. It was established from the findings that water specialists were occasional users of the library. The reasons identified as to why they occasionally visited the library was because they had developed their own information channels to satisfy needs unsatisfied by the library. These channels constitute dangerous competition and can be extremely difficult to compete against. They include professional grapevine, word of

mouth, correspondence, conference and many more with which the library has not been involved.

The study further established methods used to obtain information from MOWI by the water specialists: They were stated as:

a) Personally perusing through the shelves
b) Use friends
c) Personal calls or sending subordinates
d) Search online journals and database

The method used most was search of online journals and databases.

The study also established that most water specialists preferred delivery of information through books, magazines and brochures.

5.2.5 Research Question Five: What are the Challenges faced by Water Specialists in Accessing Water Information Resources?

5.2.5.1 The study findings established that the Water Specialists faced the following Challenges in Accessing Water Information:

a) Outdated textbooks
b) Inactive library in information provision
c) Inadequacy of the documentation centre
d) No Inter library Loan (ILL) services
e) Few Online Databases and information systems
f) Lack of Awareness Creation

5.2.5.2What challenges do the HODs experience in relation to Accessing Water Information Resources in the MOWI?

The study findings established that the HODs faced the following challenges in accessing information:

a) Inadequate facilities for the library and documentation centre
b) Understaffing in information provision personnel.
c) Inadequate funds for acquisition of information/budgetary allocations
d) No interlibrary loan policy
e) Inadequate information resources

5.2.5.3What challenges do Library staffs Experience in relation to Provision of Water Information Resources?

The study findings established that the library staffs faced the following challenges in provision of information:

a) No security system for the library
b) Inadequate funds
c) Understaffing
d) Inadequate training
e) No inter library loan

5.2.6 Research Question Six: What can be done to improve access to Water Information by Water Specialists in the MOWI?

The study sought suggestions from water specialists on how to solve the problems encountered in order to improve the accessibility of water information to water specialists. It is essential that appropriate organisation and management structures are put

in place that will ensure water information provision is effectively and efficiently implemented.

In line with the objective: to propose ways in which the challenges identified in the study could be addressed, the respondents came up with the following suggestions:

5.2.6.1 Suggestions by Water Specialists include:

a) Update textbooks
b) Library to improve both the facilities and the stocked information resources
c) Resources in the documentation centre on water should be updated, increased in number and diversity.
d) Establishing of Inter library Loan (ILL) services
e) Create awareness of online resources, information systems and establish comprehensive water resources databases
f) More subscriptions to online journals

5.2.6.2 Suggestions by HODs include:

The HODs were also asked to give solutions to challenges encountered in the access of information. The HODs responses were:

a) Modern facilities for both the library and documentation centre
b) Adding budgetary allocations
c) Development of the inter library loan policy and review some access policies.
d) Provision of comprehensive water information resources

5.2.6.3 Suggestions by Library Personnel include:

The library personnel were also asked to give solutions to challenges encountered in the provision of information. The library personnel responses were:

a) A security system needs to be put in place
b) Funding should be increased
c) Increase Library Personnel:
d) Inter library loan policy should be developed
e) Staff training
f) Additional promotional methods to be put in place

5.3 Conclusion

The study set out to investigate the access to information resources and services by water specialists in the MOWI, and proposes ways by which they can be enhanced. From the study, the following conclusions have been drawn.

It can be concluded that the MOWI provides water specialists with various information sources. However, the accessibility and usability of these resources depends on the effort made by the individual water specialists to access them.

There are a number of ways in which water specialists went about accessing information on water. These included: printed sources, electronic sources, watching television, listening to radios and attending conferences and seminars presented by resources persons. Majority of the water specialists preferred information in soft copy. It can therefore be concluded that the MOWI need to take note of the water specialists' preference and support online water information resources.

The library was not useful in information provision as majority of the water specialists stated that the information available is not updated and specific. It can therefore be concluded that there is need for the MOWI to increase the budget for acquiring water information resources and that the library needs to carry out a user needs assessment survey so as to put into consideration all the expectations raised by the users.

Majority of the water specialists were quite specific in ranking the documentation centre as inadequate to their information needs. The reason for this can be attributed to poor funding of the documentation centre, lack of adequate infrastructural facilities and essential resources and personnel. It can be concluded that the information material in the documentation centre more often than not is obsolete because of underfunding by the parent Ministry due to inadequate budgetary allocation.

There several information services that the water specialists were aware of and from the findings, the most used information service was the internet service. The information services were also rated good while other services suggested for addition were inter library loan, connection to international journals and use of email alerts. This can be concluded that the water specialists have confidence in the internet services as compared to the other services.

The available channels of providing water information were stated to be moderately effective. This can be concluded to mean that the water specialists therefore do not get optimum water information for their frequent need of such information. This could be attributed to their preference for online water information resources which can be convenient for their access and be up to date. Various methods of accessing water

information to water specialist were stated as: as a department, individually, invite professional speaker's resources persons, in Conferences and seminars, by giving water specialists reading materials on water resources and through water related activities. Reading materials to the water specialists was the method mostly utilised. It can be concluded that water specialists have developed their own information channels to satisfy needs unsatisfied by the library. These channels constitute dangerous competition and can be extremely difficult to compete against. They include professional grapevine, word of mouth, correspondence, conference and many more with which the library has not been involved.

Majority of the HODs found information resources and services moderately valuable because their needs were partly satisfied. When asked about their views on the impact of MOWI information access policies on how they access and use information, the HODs had various observations. For example, HODs pointed out that the circulation policy limited information resources borrowed and the duration of use. It can be concluded that there is need for the MOWI and its information providers to re-look at the information access policies and come up with policies that encourage but not hinder access of information materials.

The library staff indicated that the MOWI library provides its users with various information resources in print, electronic and audio visual and information services. From their views they indicated that despite the library having water information resources they are not adequate for provision of water information. It can be concluded that there is need for a security system to be put in place, more library personnel, staff training, funding increased so as to purchase more information resources and having additional

promotional methods put in place so as to make library users aware of the information services and resources.

The water specialists faced the following challenges in access of information resources and services: out dated textbooks, inactive library in information provision, inadequacy of the documentation centre, no Inter library Loan (ILL) services, few online databases and lack of awareness creation. It can be concluded that there is need for, updated textbooks, library improvement both the facilities and the stocked information resources, upgrading of the documentation centre and establishing of Inter library Loan (ILL) services.

The HODs faced the following challenges in accessing information resources: inadequate facilities for the library and documentation centre and understaffing in information provision personnel, inadequate funds for acquisition of information/budgetary allocations, No interlibrary loan policy and inadequate information resources. It can be concluded that there is need for modern facilities for both the library and documentation centre, adding of budgetary allocations and development of the inter library loan policy. It can also be concluded that as for inadequate information resources for water information provision there should be provision of comprehensive water information resources, for example, online journals, etc.

The library staffs faced the following challenges in provision of information: no security system for the library, inadequate funds, understaffing, inadequate training, and no inter library loan. It can be concluded that a security system needs to be put in place so as to secure the information resources in place as there was none at the moment. Funding should be increased to enable library personnel purchase more water information

resources. Library Personnel should be increased and trained so as to improve the provision of information resources and assist in their search for information. The inter library loan service should also be developed.

5.4 Recommendations

The following recommendations have been made arising from the findings and conclusions.

5.4.1 Recommendations for immediate Implementation

a) Water Information Resources

It was found that water specialists access to information resources and services did not satisfy their information needs because the resources were outdated. It is recommended that water information resources availed should be regularly updated to keep pace with the rapidly changing information trends.

The findings established that there were a variety of information sources available to provide water specialists with water information. It is recommended that print sources of water information should be availed in depth of coverage, variety and numbers that are in proportion to the population using them in each department. This would make it possible for all water specialists to access the information. Electronic formats such as videos, internet etc. would be a very welcome variety of water information to spice up and motivate water specialists to access the information in these formats. Other ways include getting information from posters displayed on notice boards.

It is recommended that the source of information which the water specialist access should be empowered and sharpened by giving them professional training in order to disseminate water information effectively.

The MOWI should provide adequate funding for water information resources on provision of water information to the water specialists. The funds should be utilised to purchase information materials on water and facilitate seminars and workshops where research papers are presented and information shared.

This study recommends that the MOWI should ensure water information provided to water specialists is from the preferred source of information, relevant, accurate, current and adequate for their work.

b) Engage Water Specialists in Information Resources Selection

Heads of Departments in the MOWI indicated that they should be consulted on the information resources suitable in their respective areas of specialization as they are more knowledgeable on the information needs of the water specialists.

It is recommended that the information personnel should therefore aim at satisfying the needs of all its users by putting mechanisms in place that enable the involvement of the users in selection of information materials. This shall ensure that the library stocks and enables its users to access and use information that is relevant to their areas of specialization. In relation to this also, an information needs assessment should carried out from time to time to establish the real information needs of the users.

The MOWI should invest in online water information resources which water specialists seem to prefer in accessing water information. Several reasons account for the preference of water specialists to online water information resources and these include;

a) The online resources present information in an interesting manner,

b) They are knowledge based and with wide coverage of information on water,

c) The resources are open and provide detailed information

d) They are clear and easily understood.

c) Channels used in access to water information to water specialists in the MOWI

It is recommended that the MOWI should work together with the Department of Public Communication in order for the mass media (Newspapers, T.V, and Radio) to promote water information and create awareness.

Emerging approaches in communication advocates for participation of the users in the selection of the channels. With proliferation of information in different physical formats, water specialists need to be trained not only in how to retrieve information in print formats, but also on how to do the same for electronic information including online databases. It is recommended that more imaginative ways of delivering information on water to water specialists should be introduced.

It is recommended that the MOWI should also ensure that water information is stored in the right format that water specialists can conveniently access and sensitization done on the availability.

It is recommended that the MOWI should establish comprehensive water resources databases at all management levels, on self-sustainable basis, for use in the water sector development. These databases will contain updated water resources data at all times and in this regard will put in place water resources assessment and monitoring systems in collaboration with relevant organisations and agencies.

Appropriate and cost effective information systems should be established aimed at making relevant information accessible in the form and at the time required to facilitate its use in the country's socio-economic development, environmental protection and in the planning, design and operation of specific water related projects.

In order for water access programs to be effective, there must be up to date information systems. There is therefore need to encourage the parent Ministry to acquire adequate water information resources and also get the water specialists involved in activities that promote water information provision.

Each research activity requires the collection and utilisation of information. With the emergence of the internet, the collection of information by any user is becoming far beyond.

It is recommended that through the internet, networking with consultancies which provide water information would create a good forum with others who are in the water sector.

d) Operationalize Water Resources Information Systems for planning water resources development and policy formulation

The data acquired from information systems do not mean much in terms of management of water resources even if it is properly processed and archived unless it is made available to planners and policy makers. WRMIS that is meant to deliver water resources information to planners and policy makers has inadequate human resource capacity to manage it and this has contributed to the inadequate output from WRMIS.

It is recommended that capacity building on the application of all components of WRMIS needs to be prioritised in order to use it fully, generate adequate information as per the capacity of the system and ensure easy access of available information.

e) Strengthen the Systems that will promote the Sharing of Data and Information on Water use and demand

Knowledge on data from water use and demand is essential for planning and strategically prioritising water use to demand. As outlined in Vision 2030, water is considered as an enabler in achieving the vision. The water use in the major demand areas such as agriculture, energy, domestic, industry and the environment therefore need to be accurately determined.

It is recommended that information dissemination should be up scaled in order to enhance participation and investment in management of water resources.

f) Create awareness for active Participation of Stakeholders and other interested groups in the Water Resources Management

Active participation of stakeholders can be strengthened through public education and incorporating their interests in the management of water resources. It is recommended that the MOWI should carry out capacity building programmes in order to enable them understand their roles and responsibilities and at the same time realise the benefits accruing form participating in such programmes. It would be worth to note that in certain cases an intended action may have some negative consequences and in that case if stakeholders are involved from the initial stages then ownership would be created despite the outcome. Effective communication and transparency among stakeholders would be important in order to build trust in championing the common course.

g) User Assessment Needs Survey

Heads of Departments indicated that they hardly visit the library but use the staff in their Department to get the information they require or make personal calls to the library. They gave various reasons as to why they use this method; they find this method faster as compared to others; they indicated that being in the managerial level they have limited time to visit the library and so they use the most appropriate method to meet their information needs; some went on to say that during their work experience in the Ministry they had in one way or another participated in the purchase of information materials stocked in the library so they were quite familiar with the library only in the case of new acquisitions

It is recommended that information personnel should conduct user assessment needs survey on water information needs of water specialists in order to address those needs specifically and accurately. Information is rapidly changing due to technological advancement. User assessment needs surveys should also be regularly and frequently done.

h) Review of Library Policies

HODs pointed out that the circulation policy limited information resources borrowed and the duration of use. The policy also stipulated the fines to be paid in case of overdue by the user and also restricted the borrowing of some information materials like the periodicals which are of much value to their activities. The policy also puts restrictions on the number of information resources to be borrowed by a user hence limiting the circulation and access of information resources.

It is recommended that there is need for the MOWI and its information providers to re-look at the information access policies and come up with policies that encourage but not hinder access and provision of information materials.

The findings also indicate that there is no interlibrary loan policy and external user's policy which allow the sharing and dissemination of information resources. It is recommended that so as to increase the accessibility of the information; the MOWI should make reasonable provision for the use of its library and documentation centre by other professionals in the water sector.

From the study is recommended that the information professionals should be trained on policy issues so as to be aware of the legal issues surrounding what they stock and enable access to information resources. They should acquaint themselves with the national and international copyright laws as the library acquires and subscribes to information from all over the world. It is recommended that policy interpretation and implementation in the MOWI should be well established so that there is a smooth flow of communication within the departments in the MOWI.

i) Promotion of Library Services

From the findings, it was found that the library had a number of promotional methods used to create awareness to their users and were stated as: personal selling by the library staff themselves; use of notices; display of the new arrivals; use of leaflets and brochures. It is recommended that other promotional methods be put in place such as: Uploading the library catalogue on MOWI website, use of MOWI publications, use of exhibitions and talks by librarian during induction week.

Libraries harness information and knowledge. Libraries increase the value of human intellectual outputs by increasing access to them through professional processing, storage and dissemination. The world's intellectual outputs would be useless if libraries were not there to gather, analyse, classify, catalogue and provide access to them. The hundreds of bibliographic records of published and unpublished materials ensure their use and reuse to satisfy commercial, educational, cultural and recreational needs.

j) Personalised Library Services

34 (53%) of the water specialists used the internet services for their information needs while 10(16%) used reference and referral services. The water specialists went on to state that the reference and referral services enabled them to interact with resources persons in their field hence gained more experience. This was especially in the field work where some of their activities rely on old technology. 9 (14%) of the water specialized used the selective dissemination of information while 6 (9%) of the water specialists used the indexing and abstracting services.5 (8%) used current awareness services.

It is recommended that the library should increase provision of current awareness service, water databases, E-mail alerts for new acquisitions and linking of the library catalogue with other libraries in the water sector.

From the study finding, it is indicated that the users are very varied in relation to their areas of specialization hence it is recommended that there is need to give personalized information services through the availability of effective communication channels like computers, telephone and email.

k) Library Staff Training

The library staff stated that most of them attend seminars after invitation from their professional bodies and they are sponsored by the Ministry. They went on to state that though they attended these seminars, there was need for training through courses which were tailor made for them. They pointed out that staff who were well trained had left the Ministry as others had passed away hence little experience was shared.

It is recommended that there is need to continuously train the library staff of the MOWI library if they have to carry out their duties effectively.

The library staff stated that information resources were in print, electronic and audio-visual format. Hence it is recommended that with rise of information in different formats, they need to be trained not only in how to organise and retrieve information in print formats, but also on how to do the same for @ widely accessible and was easily disseminated among the water specialists. There major problem was issues of copyright and plagiarism.

Information access and use is associated with various ethical and legal issues. It is recommended that the information professionals should be trained in this so as to be aware of the legal issues surrounding what they stock and enable access to. They should acquaint themselves with the national and international copyright laws as the library acquires and subscribes to information from all over the world.

From the above findings, though MOWI has put in place information centres where information can be accessed, the information resources are at risk of being lost since there is no security system to track their movement. Some of these information resources are rare and only available in the Ministry for use. It is recommended that in order for the information resources to be secured there is need for the MOWI to put in place security systems in their information centres. The library staffs need also to have a positive attitude towards their work as enablers of information provision and services.

l) Seminars and Workshops

It is recommended that regular seminars and workshops should be organised in the MOWI to enlighten water specialists about water information resources and also provide

the water specialists with opportunity to ask questions. It is recommended that in such seminars and workshops there is exchange of ideas and notes among the water specialists and other stakeholders in the water sector. In such seminars, water specialists and other education stakeholders would get solutions to problems on water information such as scarcity of water information resources.

m) Effectiveness of the Channels used by Water Specialists in Accessing Water Information

A majority 49 (77%) of the water specialists found channels for access of water resources only moderately effective and therefore need a review to operate optimally. Ensuring optimal operation of access channels of water information resources will improve water specialists' work. It is recommended that water specialists need to adapt to seeking alternatives to access water information. This will ensure that even if one water information resource is not operational, they can still access information using alternative channels and work.

n) It is also recommended that so as to overcome the challenges of provision of information resources on water, all the stakeholders need to share information efficiently and effectively. They also need to invest in the current and versatile information storage and provision methods. This will ensure information is available at all times as needed by the water specialists.

5.4.2 Recommendation for Long Term Implementation.

o) Role of the Library, Documentation Centre and Information Services in Provision of Water Information to Water Specialists in the MOWI

From the research findings it was established that the current library and documentation centre infrastructures were not adequate to cater for the information needs in the MOWI. The information provision personnel were also not adequate for dissemination of information

It is recommended that the library and documentation centre should be renovated through adequate funding by the MOWI. Funding of libraries should be viewed as profitable investments in development and as provision of service which help in efficient use of available information resources.

The right number and calibre of staff for the library should also be employed so that they can acquire, organise and store water information resources. Dissemination of water information from the library would enable water specialists to access water information conveniently.

81% of the water specialists pointed out that the library was not useful in provision of information resources. It is recommended that there is need to improve the information resources available for use through the provision of functional and effective information centres and through the provision of basic skills in information handling. The information centres should be more engaged in dissemination of water information.

The need for well-equipped and stocked library and documentation centre cannot be ignored if any landmark achievements are to be made in the MOWI.

It is also recommended that the library and documentation centre should play a role of providing the necessary water information resources, services and other facilities to support and promote water information.

Information revolution is aiding the library movement by enforcing the material-virtual duality of knowledge and information. It is also helping in transforming our society into an information society based on a strong foundation of knowledge which is universal, objective, timely and drawing from a variety of sources. In developing countries libraries are taking a lead in internet, digitization and virtualization of access to knowledge.

5.5 Proposed Model for Improved Access to Water Information Resources by Water Specialists

This study proposes a model that could be used to facilitate improved access to water information resources. The model presents eight stages that MOWI would require to enhance improved access to water information.

The model has been adopted from T.D. Wilson (Wilson, 2000). The proposed model starts with conducting of a user needs survey and ends with monitoring and evaluation. Diagrammatic representation of the proposed model is shown in Figure 5.1.

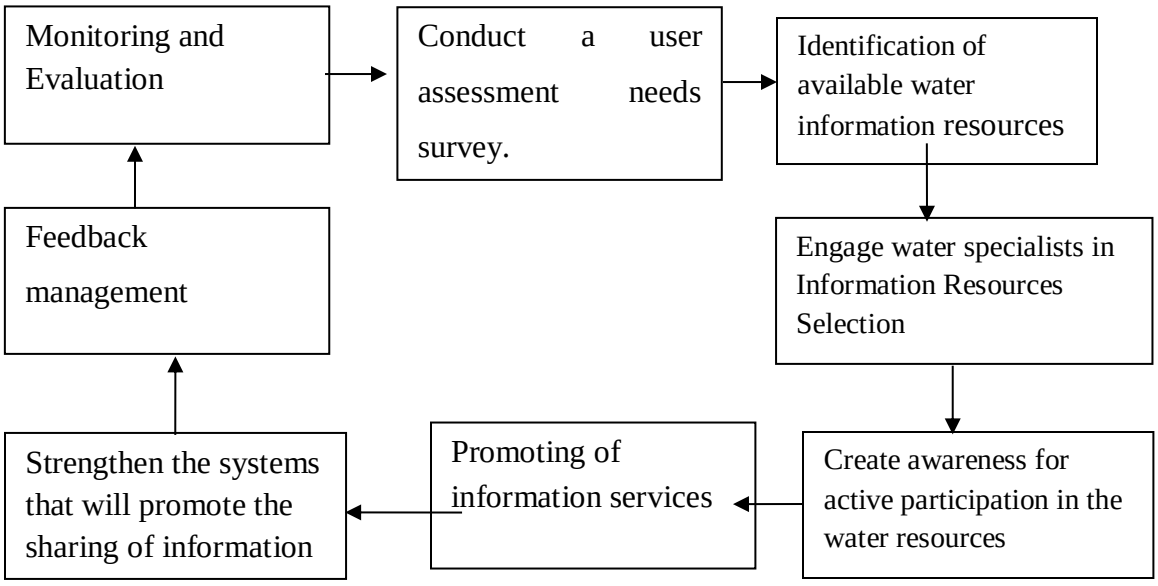


Figure 5.1: Proposed Model for Improved Access to Water Information Resources by Water Specialists

Step 1: Conduct a User Assessment Needs Survey

This step will assist the information personnel to conduct a user assessment needs survey on water information needs of water specialists. This will help to address those needs specifically and accurately. Information is rapidly changing due to technological advancement. User assessment needs surveys should also be regularly and frequently done.

Step 2: Identification of available Water Information Resources

This step will be essential in identifying information resources that meet the user needs expressed in step one. It will ensure that the information resources are aligned to user needs.

Step 3: Engage Water Specialists in Information Resources Selection

This step will involve engaging water specialists in gathering the resources into the MOWI information selection. This will help in satisfying the needs of all users by putting mechanisms in place that enable the involvement of the users in selection of information materials. This will ensure that the library stocks and enables its users to access and use information that is relevant to their areas of specialization.

Step 4: Create Awareness for active Participation in the Water Resources Management

This step will involve active participation of stakeholders through public education and incorporating their interests in the management of water resources. It will entail carrying out capacity building programmes in order to enable the stakeholders to understand their roles and responsibilities and at the same time realise the benefits accruing form participating in such programmes.

Step 5: Promotion of Information Services

This step will involve having a number of promotional methods used to create awareness to users. This can be done through: Uploading the library catalogue on MOWI website, use of MOWI publications, use of exhibitions and talks by librarian during induction week.

Step 6: Strengthen the Systems that will promote the Sharing of Information on Water

This step will help in information dissemination in order to enhance participation and investment in management of water resources. All systems for facilitating access should be activated to ensure sharing of knowledge on data from water use and demand as it is essential for planning and strategically prioritising water use to demand.

Step 7: Feedback Management

This will involve collecting feedback from users on effectiveness of the channels used by water specialists in accessing water information and the satisfaction levels with information resources availed. The feedback is important on identifying areas of improvement to enable improved access to water information resources by water specialists MOWI.

Step 8: Monitoring and Evaluation

This last step entails conducting a periodic review of the information access channels to ensure they meet user needs. It will also involve identifying gaps and corresponding interventions to line up the information services to the MOWI information requirements.

5.6 Suggestions for Further Research

The scope of the study was confined to the MOWI, and in an effort to improve the access to water information resources and services, the following suggestions are made.

a) Similar studies should be conducted to analyse access to information resources and services by other users not covered in the present study in related water

development agencies such as National Irrigation Board, Regional Water Boards in various counties, WRMA, Water Services Board and KEWI. This would help the agencies to know what water information resources and services are accessible to their staff.

b) Further research should be done on individual categories of water specialists. Such as policy makers, water engineers, water technologists and water technicians.

c) Undertake a study on information needs and information seeking behaviours of the policy makers, water engineers, water technologists and water technicians.

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APPENDIX I: LETTER OF INTRODUCTION

Alice Wanjiru Kariuki

P.O.Box 272-20300.

Nyahururu,

Email

allicia_kariuki@yahoo.com

Moi University, Nairobi Campus,
School of Information Science,

P.O.Box 3900, Eldoret

Date 22nd August, 2013

To Whom It May Concern

Dear Participant,

My name is Alice.W. Kariuki, a Masters student at Moi University, Nairobi, Faculty of Information Science. Presently am based at Kenya Water Institute to conduct a research on access of water information resources and services by water specialists in Kenya. The case of the Ministry of Water and Irrigation. The aim of the study is to investigate the access of water information resources by water specialists in the Ministry of Water and Irrigation and to suggest ways in which they can be enhanced. The outcome of this study is to establish the ways in which water information resourcesare accessed by water specialists in Kenya. You have been chosen to participate in this research. You will be given interview schedules and questionnaires to answer questions to help direct this research. This process will be guided by the researcher. It is vital that you answer the questions directed to you frankly and thoroughly as possible. Although a tape recorder will be used to secure accurate responses in order to keep tract of true records, the information given will only be reported for the purpose of analysing data and will be treated with utmost confidentiality. This research is purely an academic exercise. Please answer all questions as appropriate.

Thank you for your assistance and time.

Yours faithfully,

ALICE.W. KARIUKI

APPENDIX II: QUESTIONNAIRES FOR WATER SPECIALISTS IN THE MOWI

Dear Respondent,

My name is Alice. W. Kariuki a postgraduate student at Moi University, Nairobi Campus. The purpose of this questionnaire is to collect information on the current status of access of water information resources by water specialists in the Ministry of Water and Irrigation and to suggest ways in which it can be enhanced. The information you give will be treated with confidentiality and will only be used for research purposes to facilitate data analysis.

Department……
…….

SECTION A: GENERAL INFORMATION

1. Designation/Position of the respondent

   ……
   ….

2. What is your area of specialization?

   ……
   …..

SECTION B: INFORMATION SOURCES

3. Which of the following information sources are available in the MOWI?

a.	Field Films and Videos	☐	Yes	☐	No
b.	Newspapers	☐	Yes	☐	No
c.	Magazines	☐	Yes	☐	No
d.	MOWI calendar of events	☐	Yes	☐	No
e.	Brochures	☐	Yes	☐	No
f.	Internet	☐	Yes	☐	No
g.	Library	☐	Yes	☐	No
h.	TV	☐	Yes	☐	No

i. Radio ☐ Yes ☐ No

j. Resource people ☐ Yes ☐ No

State any other.

……

……

4. Which information resources do you find most useful?

a. MOWI reports ☐

b. Journals – online and print ☐

c. Government publications ☐

d. Research papers and projects ☐

e. Textbooks ☐

f. Reference materials ☐

SECTION C: MEDIA USED IN ACCESS OF WATER INFORMATION

5. Do you access water information in the right media?

   Yes ☐ No ☐

6. In what format do you prefer delivery of the information you require for your work?

   a) Print ☐

   b) Electronic ☐

   c) Audio-visual ☐

   Other (please specify)

   ……

   ……

SECTION D: ROLE OF THE LIBRARY, DOCUMENTATION CENTRE AND INFORMATION SERVICES

Role of the library

7. Do you find the library useful in providing information on water?

Yes ☐

No ☐

If your answer is yes, state why

……

……

If your answer is no, state why?

……

……

8. Do you find the water information available to you in library adequate?

Yes ☐

No ☐

If the answer is no, state why?

……

……

9. Kindly describe the information resources in the MOWI library

……

……

10. Which additional information resources would you like MOWI library to provide you with?

……

……

……..

Role of the documentation centre

11. Do you consider the documentation centre adequate for water information needs?

Yes ☐ No ☐

If No, explain why.

……

……

Role of information services

12. Which information services are you aware of?

a) Current awareness services ☐

b) Selective dissemination of information ☐

c) Indexing and Abstracting services ☐

d) Internet services ☐

e) Reference Services and Referral Services ☐

13. How do you rate the library services?

a) Excellent ☐

b) Good ☐

c) Fair ☐

14. Which additional information services would you like to be offered?

……

……

…….

15. Where else do you access the same information and why?

……

……

……

SECTION E: COMMUNICATION OF WATER INFORMATION BY EXISTING MEDIA

16. To what extent is the media used in access of water information to water specialists effective?

    a. Not effective at all ☐
    b. Moderately effective ☐
    c. Effective to a great extent ☐

17. Kindly indicate the purpose for the acquired information. Tick on the boxes provided below

    a. Education/Manpower Development ☐
    b. Applied Research ☐
    c. General knowledge ☐
    d. Consultancy ☐
    e. Unspecified ☐

18. Methods of Providing Water Information to Water specialists

    a. As a department ☐
    b. Individually ☐
    c. Invite professional speakers ☐
    d. In Conferences and seminars ☐
    e. By giving water specialists reading materials on water resources ☐

f. Through water related activities e.g field trips

19. Frequency of the Water specialists to the library

a. Rarely ☐
b. Once a week ☐
c. Once a fortnight ☐
d. Once a month ☐
e. Twice a year ☐

20. Methods used to Obtain Information from MOWI by water specialists (n=32)

a. Personally perusing through the shelves ☐
b. Use friends ☐
c. Personal calls or sending subordinates ☐
d. Search online journals and database ☐

21. How best would you like the information delivered to you?

a. Educational field trips to various water organisations. ☐
b. Inviting people in the professions to speak to us. ☐
c. Through books, magazines, brochures. ☐

Any other. Please state below

……

……

Section F: Problems identified in access of water information

22. What problems do you experience in access of water information? You can tick more than one.

a. Inactive library ☐
b. Outdated books ☐
c. Inadequate documentation centre ☐
☐

d. Lack of awareness

Any other(s). Please state……

……..

What should be done so that you can access water information in the best way?

……

……

……..

APPENDIX III: INTERVIEW SCHEDULE FOR HEADS OF TECHNICAL DEPARTMENTS AT MOWI

1. Background information

a) Department……

b) Designation ……..

2. Sources/resources

a) In your own opinion, what value do you attach to information resources and services provided by the MOWI?
b) Do you find the funds allocated for information resources adequate?
c) Are there adequate human resources for information delivery?

3. Information media

a) What is the impact of ICT on information on water?
b) How effective is the media used in access of water information to water specialists?
c) In what format do you prefer delivery of the information you require for your work?

4. Role of the library, documentation centre and library services

a) Is the current library and documentation centre adequate enough for the information needs of the water specialists in the MOWI?
b) Are you aware of information policy guidelines?
c) What policies have been drawn on access to information?
d) What effect does the policy have on the way you access and use the library's information resources and services?

5. Use of information resources

a) Is the information accessed specific to water specialists' area of specialization?
b) How do you obtain the information you need fromMOWI?

6. Challenges in access of water information

a) What are the challenges in access to information?

b) What recommendations do you suggest in improving access of information?

Thank you

APPENDIX IV: INTERVIEW SCHEDULE FOR LIBRARY AND DOCUMENTATION STAFF AT MOWI

1. Background Information

a) Designation ……

b) Duties and responsibilities……

2. Sources/resources

a) How do you obtain the information required by users?

b) Is your section effective in meeting the information needs of water specialists?

i. Yes

ii. No

c) If your answer is No why?

d) Do you attend seminars, conferences, workshops or courses on access to information?

e) What categories of water specialists heavily use the library resources?

3. Information media

a) How do you provide water information to water specialists?

i. Print

ii. Electronic

iii. Audio-visual

4. Role of the library, documentation centre and library services

a. What information services are available to users from MOWI library?

b. What assistance do you provide to users in accessing information?

c. How do you make library users aware of the information services and resources that you offer?

d. What are the existing policies and practices for accessing information at MOWI library?

e. What other information services would you like to avail to users in the MOWI but are currently not available?

5. Use of information resources

a) Which sources of information do water specialists mostly consult?

b) Does the library provide water information resources?

i. Yes

ii. No

c) What type of information do you find hard to obtain? And why?

d) Are there other resources available in theMOWI that are accessible to the water specialists?

i. Yes

ii. No

e) If your answer is yes, briefly describe these resources?

6. Challenges in provision and access of information

a) What challenges do you encounter as you offer information services to library users?

b) What measures should be adopted byMOWI library to improve access and use of its information resources and services?

Thank You

APPENDIX V: PRE-TEST CHECKLIST FOR THE QUESTIONNAIRES

Research Title: Provision and access of water information resources and services to water specialists in the MOWI

(Please refer to the accompanying questionnaire attached and kindly answer the following questions after reading the objectives listed below).

Objectives of the study

The study aims to fulfil the following objectives

i. To identify the sources of information available for use at MOWI by water specialists.
ii. To establish the channels used by water specialists in accessing information.
iii. To examine the role of the library, documentation centre and information services in provision of water information to water specialists in the MOWI.
iv. Assess the effectiveness of the channels used by water specialists in accessing water information.
v. To establish challenges faced by the water specialist in access of water information resources.
vi. To make recommendations to improve access and utilization of water information in Kenya.

Pre-test Questions

1. Are the questions too many? Yes ☐
   No ☐

If yes, what do you recommend?

……

……

2. Are the questions clear for understanding? Yes ☐
   No ☐

   If not, identify those that need clarification.

   ……

3. Is the sequence of the questions logical? Yes ☐
   No ☐

   If no, what do you propose?

   ……

   ……

4. Are there any grammatical mistakes identified among the questions? Yes ☐
   No ☐

   If any, identify which mistakes?

   ……

5. Are there jargons or technical terms used in the questions making it difficult to understand the question? Yes ☐
   No ☐

   If there is any, please point out.

   ……

6. Are the objectives of the study adequately covered in the questionnaire?
   Yes ☐

   No ☐

   If no, explain.

   ……

   ……

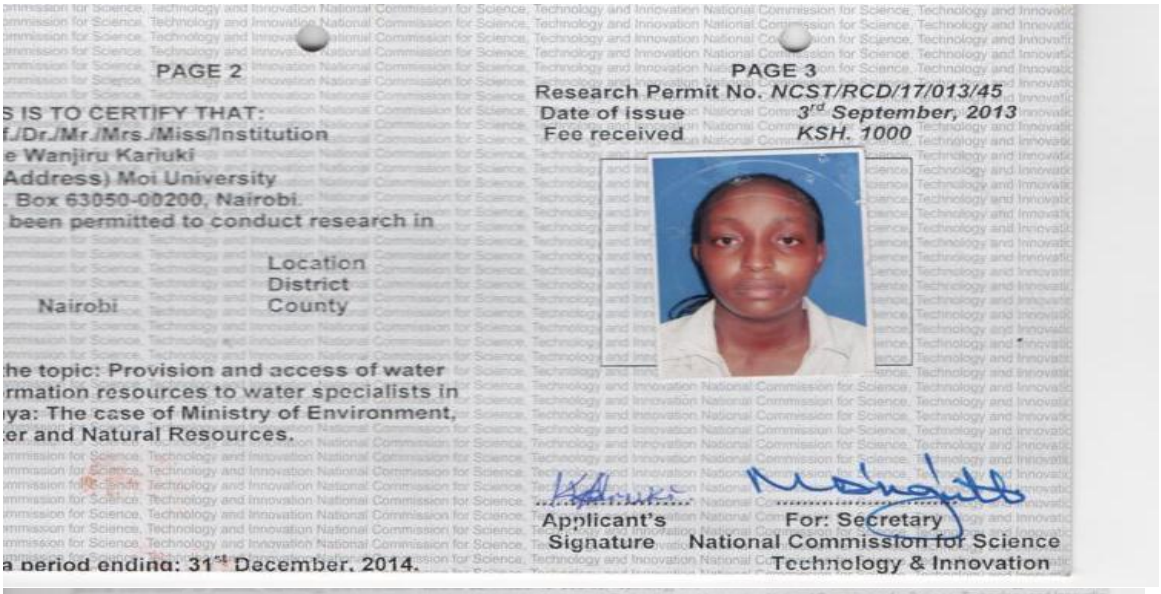
7. What is your view on the diversity of the questions?

   ……

   ……

   ……..

APPENDIX VI: RESEARCH PERMIT



PAGE 2

S IS TO CERTIFY THAT:
f./Dr./Mr./Mrs./Miss/Institution
e Wanjiru Kariuki
Address) Moi University
Box 63050-00200, Nairobi.
been permitted to conduct research in

Location
District
County

Nairobi

he topic: Provision and access of water
rmation resources to water specialists in
ya: The case of Ministry of Environment,
er and Natural Resources.

a period ending: 31st December, 2014.

PAGE 3

Research Permit No. NCST/RCD/17/013/45
Date of issue 3rd September, 2013
Fee received KSH. 1000

Applicant's Signature

For: Secretary
National Commission for Science
Technology & Innovation

CONDITIONS

1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit
2. Government Officers will not be interviewed without prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2) hard copies and one(1) soft copy of your final report.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice

REPUBLIC OF KENYA

NACOSTI

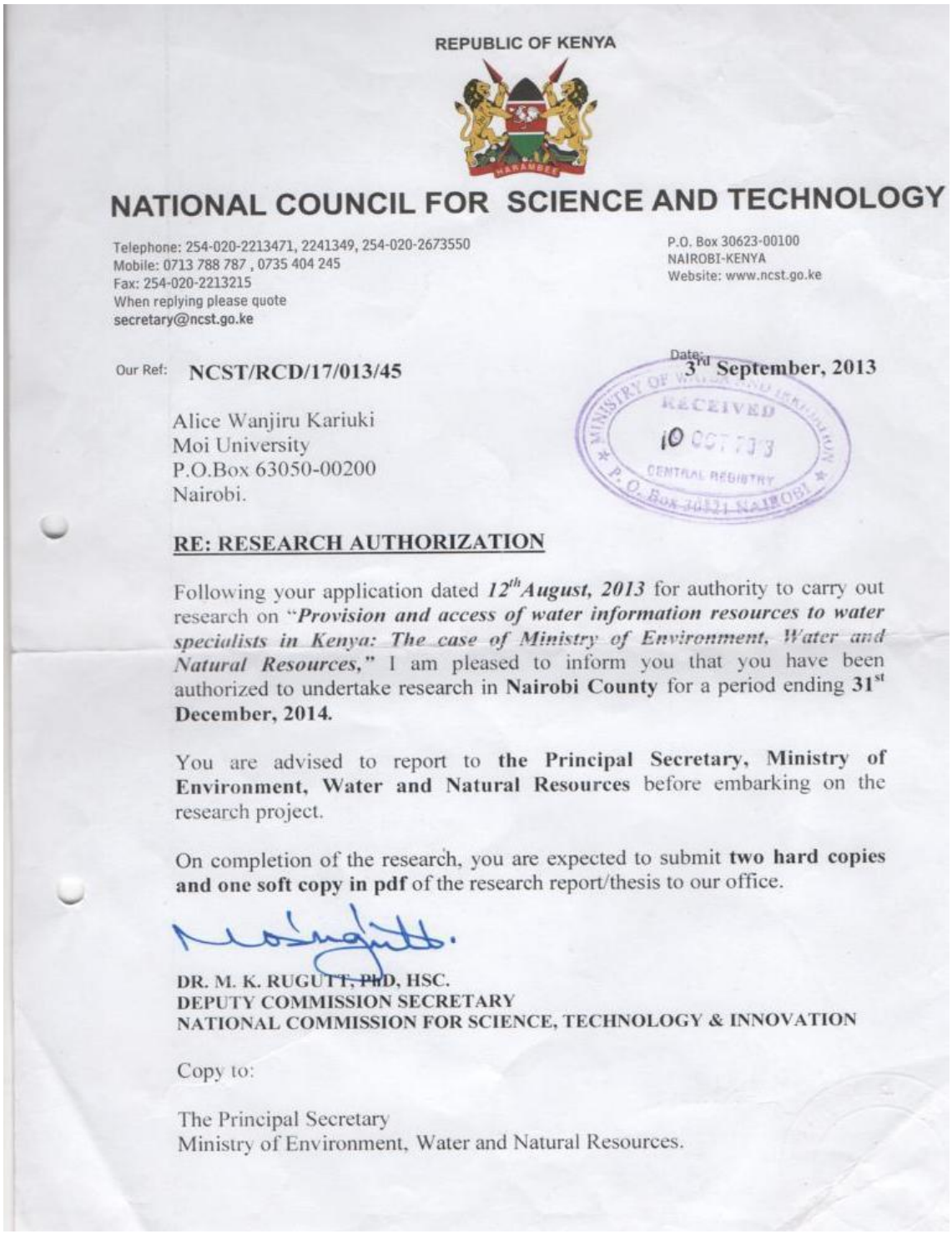
National Commission for Science, Technology and Innovation

RESEARCH CLEARANCE PERMIT

Serial No. A 03092

CONDITIONS: see back page

APPENDIX VII: RESEARCH AUTHORISATION BY NCST



REPUBLIC OF KENYA

NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telephone: 254-020-2213471, 2241349, 254-020-2673550
Mobile: 0713 788 787 , 0735 404 245
Fax: 254-020-2213215
When replying please quote
secretary@ncst.go.ke

P.O. Box 30623-00100
NAIROBI-KENYA
Website: www.ncst.go.ke

Our Ref: **NCST/RCD/17/013/45**

Date: **3rd September, 2013**

MINISTRY OF WATER AND IRRIGATION
RECEIVED
10 OCT 2013
CENTRAL REGISTRY
P. O. Box 30521 NAIROBI

Alice Wanjiru Kariuki
Moi University
P.O.Box 63050-00200
Nairobi.

RE: RESEARCH AUTHORIZATION

Following your application dated ***12th August, 2013*** for authority to carry out research on "***Provision and access of water information resources to water specialists in Kenya: The case of Ministry of Environment, Water and Natural Resources,***" I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for a period ending **31st December, 2014.**

You are advised to report to **the Principal Secretary, Ministry of Environment, Water and Natural Resources** before embarking on the research project.

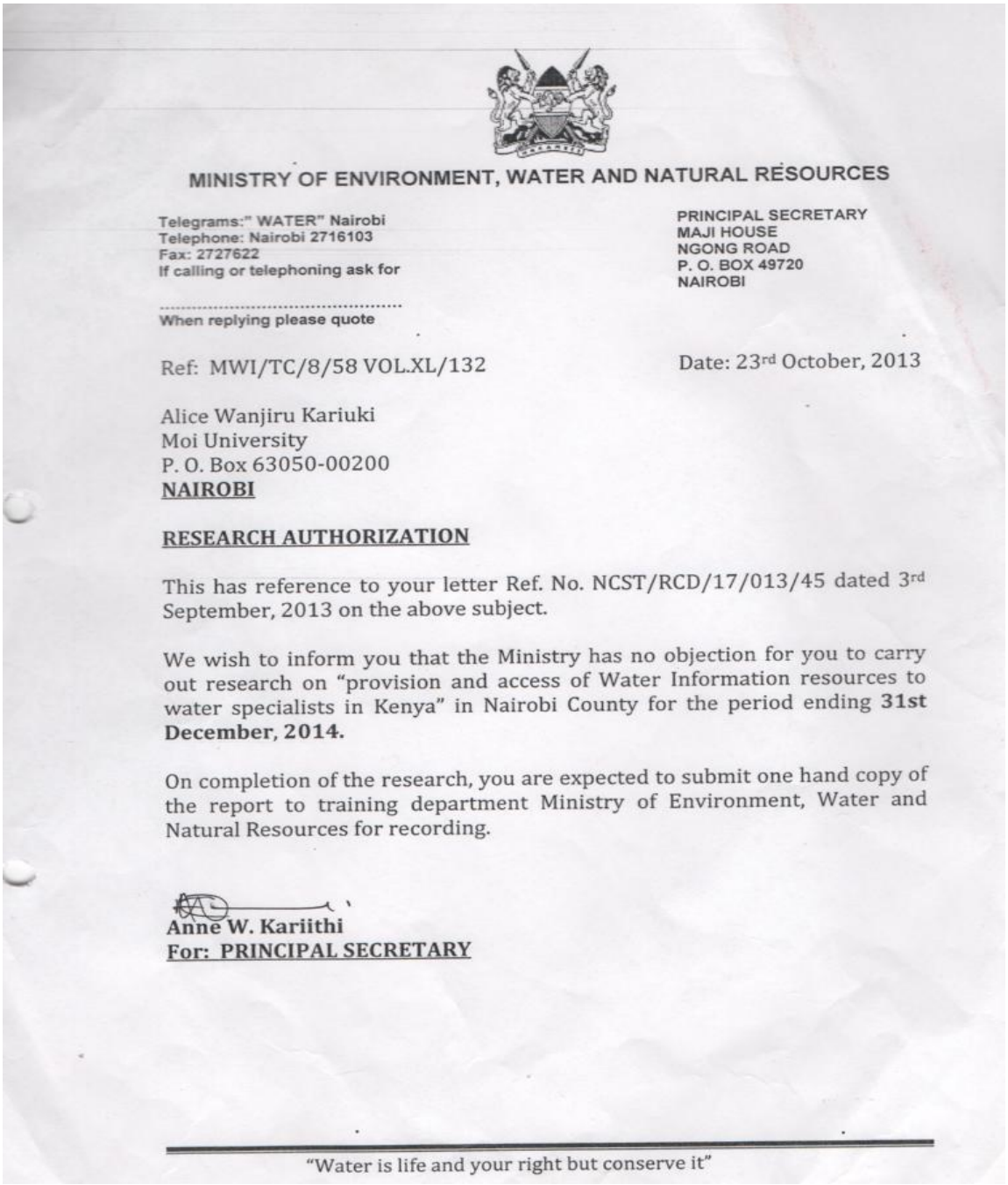
On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

DR. M. K. RUGUTT, PHD, HSC.
DEPUTY COMMISSION SECRETARY
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Copy to:

The Principal Secretary
Ministry of Environment, Water and Natural Resources.

APPENDIX VIII: RESEARCH AUTHORIZATION BY MEWNR



MINISTRY OF ENVIRONMENT, WATER AND NATURAL RESOURCES

Telegrams:" WATER" Nairobi
Telephone: Nairobi 2716103
Fax: 2727622
If calling or telephoning ask for

.....
When replying please quote

PRINCIPAL SECRETARY
MAJI HOUSE
NGONG ROAD
P. O. BOX 49720
NAIROBI

Ref: MWI/TC/8/58 VOL.XL/132

Date: 23rd October, 2013

Alice Wanjiru Kariuki
Moi University
P. O. Box 63050-00200
NAIROBI

RESEARCH AUTHORIZATION

This has reference to your letter Ref. No. NCST/RCD/17/013/45 dated 3rd September, 2013 on the above subject.

We wish to inform you that the Ministry has no objection for you to carry out research on "provision and access of Water Information resources to water specialists in Kenya" in Nairobi County for the period ending **31st December, 2014.**

On completion of the research, you are expected to submit one hand copy of the report to training department Ministry of Environment, Water and Natural Resources for recording.

Anne W. Kariithi
For: PRINCIPAL SECRETARY

"Water is life and your right but conserve it"

APPENDIX IX: RESEARCH BUDGET TABLE

ITEMS	**NUMBER OF UNITS**	**COST PER UNIT**	**TOTAL Kshs:**
Computer	1	45,000	45,000
Printer/Scanner		25,000	25,000
Airtime		4,000	4,000
Stationery		20,000	20,000
Binding	12	100	1,200
Photocopying		4,500	4,500
Transport		4,000	4,000
Printing Paper	10 reams	500	5,000
Printing		10,000	10,000
Miscellaneous		5,000	5,000
TOTAL			123,700