

**INFORMATION COMMUNICATION TECHNOLOGIES APPLICATION  
FOR DOCUMENTING INDIGENOUS FARMING KNOWLEDGE FOR  
IMPROVED PRESERVATION AND UTILIZATION IN PUBLIC  
LIBRARIES, KILIFI COUNTY, KENYA**

**ANDERSON KAHINDI CHAI**

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**A RESEARCH PROJECT SUBMITTED IN FULFILLMENT OF THE  
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LIBRARY AND INFORMATION SCIENCE IN THE SCHOOL OF PURE  
AND APPLIED SCIENCES OF KENYATTA UNIVERSITY**

**MAY 2024**

**DECLARATION**

I declare that this proposal is my original work and has not been presented in any other university for consideration of any certificate. This research proposal has been complemented by referenced sources duly acknowledge. Where text, data (including spoken words), graphics, pictures or tables have been borrowed from other sources, including the internet, these are specifically accredited and references cited using current APA system and in accordance with anti-plagiarism regulations.

Signature.....Date.....

Anderson Kahindi Chai

**E65/OL/MSA/24521/2013**

**COMPUTING AND INFORMATION SCIENCE**

This proposal has been submitted for appraisal with my approval as University Supervisor

Signature.....Date.....

**Dr. Zipporah Gichuhi**

**Computing and Information Science**

**Kenyatta University**

**DEDICATION**

I dedicate this work to my five children Elias, Emma, Mariam, Junior and Yasmin. You have always inspired me to be the best that I can be. My desire is to be an inspiration and a role model father and this work serves as a symbol of that commitment to you.

May GOD BLESS you

Thank you

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I may not be able to thank each and every one who contributed to the completion of this document. However, to all those I might not have mentioned but contributed in one way or the other, I highly appreciate you all.

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**ABBREVIATIONS AND ACRONYMS**

<b>CIRAN</b>	Center for International Research and Advisory Networks
<b>ICT</b>	Information and Communication Technologies
<b>IFLA</b>	International Federation of Library Associations and Institutions
<b>IFK</b>	Indigenous farming knowledge
<b>IK</b>	Indigenous knowledge
<b>LINKS</b>	Local and Indigenous Knowledge Systems
<b>NEPAD</b>	New Partnership for Africa's Development
<b>SCAO</b>	Sub County Agricultural Organization
<b>Unep</b>	United Nations Environmental Programme
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>WIPO</b>	World Intellectual Property Organization
<b>WB</b>	World Bank

## OPERATIONAL DEFINITION OF TERMS

**Information and Communication Technologies** Satellite systems, radio, television, cell phones, computer and network hardware, and software are all included in this broad area.

**Indigenous** A group of individuals who were once residents of a specific area, nation, or territory who frequently retain distinctive cultural, linguistic, and social practices that are strongly rooted in ancestral lands because they have historically resided in the area before it was colonized or settled by other people.

**Indigenous community** This is a social and cultural group with deep roots in the lands and natural resources where they live and work. Intertwined with the land and the resources they rely are all

their identities, traditions, livelihoods, and physical and spiritual well-being.

## **Knowledge**

Understanding, awareness, or familiarity gained via education, experience, or reasoning is all considered forms of knowledge. It includes knowledge about the world, facts, abilities, theoretical and practical insights. Knowledge is dynamic and changes with time as new facts are found, experiences are had, and viewpoints are altered. It is frequently divided into various categories, such as explicit knowledge (information that has been formalized and codified) and tacit knowledge (personal insights and expertise), and it is essential to human

cognition, decision-making, creativity, and problem-solving.

## **Preservation**

The collection of actions designed to increase the informative value and pertinent metadata of a record or other material, as well as its lifespan. It might also apply to actions taken to increase the worth or accessibility of a document, piece of content, or piece of information. It involves measures that record creators take into consideration prior to selection and acquisition. Unlike conservation, preservation aims to keep things or objects in the conditions that they are in. This phrase refers to records that need to be preserved for the future.

**Use**

The act of utilizing something for a certain goal or function is known as use. It entails making use of an item, instrument, resource, or ability to accomplish a certain goal or meet a need. The idea of "use" suggests doing something with it, or using it in a useful way, as opposed to just having it.

It can encompass a broad range of actions, such as the application of knowledge or abilities in many contexts or the actual physical manipulation or consumption of material objects. In the end, the idea of use highlights the proactive involvement and use of resources or skills to achieve objectives or jobs.

## ABSTRACT

The study's objective was to evaluate how librarians in Kilifi County, Kenya, used information and communication technologies to document traditional farming knowledge in order to better its application and preservation. Indigenous knowledge (IK) is defined variously. For the purpose of this research will be viewed as locally owned, modified knowledge and wisdom that have been developed and used over times to aid a community maintain or enhance their way of life in a localized rural context. Due to break down of oral transmission routes of knowledge, non-recording forms of capture and transmission of IK basically oral with increased westernization as well as oral transmission of knowledge has been replaced and IK if not carefully planned for is susceptible to extinct yet was and still remains a rich source of knowledge if well integrated with modern knowledge sources. Libraries could be reservoirs of IK if efforts are made to capture IK for preservation and application. Libraries hold a central role and their mandate is to build and maintain reservoirs of needed information for community. The study's purpose was to employ ICT tools to record essential indigenous farming knowledge in Kilifi County, Kenya, for future generations to use and preserve. The study examined the significant role that a library could play in preserving, managing, storing, and disseminating indigenous farming knowledge as well as identifying issues and concerns related to documentation and preservation of indigenous farming knowledge. It also evaluated the awareness and perception of the study community regarding use of ICT tools in preservation and application of indigenous farming knowledge. The study was undertaken across the seven Sub Counties within Kilifi County, namely Malindi, Magarini, Kilifi North, Kilifi South, Ganze, Kaloleni and Rabai. Total population of the study was 162 respondents comprising 140 Kaya Elders (Farmers), 7 Sub County Agricultural Officers and 15 Library Staff. Utilizing the Krejcie and Morgan formula  $n = \frac{X^2 NP (1-P)}{e^2 (N-1) + X^2 P (1-P)}$ , a sample of ninety-eight respondents was determined. For data collection, interviews and questionnaires for Kaya Elders (Farmers), Sub County Agricultural Officers and Library Staff were used. Video recording was used to capture respondents during interview and document reviews including dependable databases, such as the Kilifi County Development Plan, the Kilifi County Agricultural Sector Development Programme, and the Kilifi County Government Demographic Reports were made. Cronbach's alpha was used to assess the instruments' validity. Data analysis techniques included theme content analysis, tables of averages and inferential statistics using the Statistical Package for Social Science (SSPS). Findings revealed indigenous knowledge is extremely valuable, helps the community to ensure food security, which needs to be transmitted to the following generation. Farmers acknowledge the value of information and communication technologies (ICTs) in maintaining indigenous farming knowledge (IFK), and they concur that if it is not recorded, it might vanish with the farmers. Among the ICT instruments in use were radios, TVs, laptops, memory cards, social media, flash drives, memory cards, and iPads. To record and conserve IFK for upcoming generations, the Sub County Librarians and Agricultural Officers can work with the Kaya Elders (Farmers) who own the IFK. The Public Library repository can serve as a valuable resource for managing and preserving documented indigenous farming practices through the inclusion of uploaded video recordings thereby creating a repository of indigenous farming knowledge experiences. Recommendations of the study are incorporation of indigenous farming knowledge to scientific farming knowledge, educating people on value of indigenous farming knowledge, revampment of public libraries to become viable knowledge assets of IFK and the Kenya National Library Services to take responsibility in the capture, preservation and management of indigenous farming knowledge.

## **CHAPTER ONE**

### **INTRODUCTION**

#### **Overview**

This introduction sets the stage by providing context, stating the research problem, outlining objectives, and highlighting the significance of the study, restrictions and delimitations, and assumptions, among other things are all covered in this chapter.

#### **1.1 Background to the study**

Indigenous Knowledge (IK) is local information that has been gathered and disseminated through time, mainly via word of mouth. It is a community's information foundation promoting communication and decision-making (Makate, 2019). According to Unesco (1995), IK is a society's information base that supports communication and decision-making. Internal innovation, experimentation and contact with outside system continually impact indigenous information systems.

According to UNESCO (1999), indigenous farming knowledge (IFK) includes the distinctive, customary, and locally created farming methods that have their roots in the particular circumstances and habitats of indigenous peoples within a particular geographic area. This information is a treasure trove of agricultural know-how, insight, and comprehension that has been inherited by indigenous groups over many years. IFK is a one-of-a kind, traditional, local farming knowledge that has emerged in response to the unique circumstances of people who are native to a specific geographical area. As a result, the term indigenous knowledge (IFK) as used in this study upholds this view.

Sources of IFK are varied. Some notable indigenous communities who acted as source communities have collaborated with stakeholders to establish national digital memories such as Indigenous knowledge that is preserved at the National Digital Heritage Archive (NDHA) in New Zealand, American Memory, and Australian Digital Collections to help with environmental conservation, stop biopiracy, boost the country's economy, and enhance the livelihoods of the owners and their communities (Masenya, 2023). In South Africa, a number of indigenous knowledge policy frameworks and initiatives including the Indigenous Knowledge System Documentation Centers (IKSDCs) that works with indigenous knowledge owners and entities to document their indigenous knowledge. In Kilifi County, the guardians of indigenous farming knowledge are mostly farmers, hunters, and wine tappers. Older farmers who are familiar with traditional farming methods such as cropping, climate prediction and the use of phenology, examination of various kinds of trees, their fruit yields, and the emergence of new leaves, as well as various kind of bird habits and pests, and emergence of climatic criteria have over the years applied this knowledge in their farming activities which sustained them over the years. This knowledge if harnessed could contribute greatly to enhanced food production. According to the World Bank (1998), decisions on agriculture, healthcare, food production, preservation, and natural resource management are made by rural people using indigenous knowledge.

Indigenous knowledge has been widely used to improve livelihoods through solving urgent problems like in farming and medicine. It is being more and more recognized as a vital source of climatology and adaption skills. Indigenous Farming Knowledge is still used by rural communities to make decisions at the local level

in sectors like agriculture, healthcare, food production, storage, and resource management in modern society (World Bank, 1998). Gwenzi et al, (2015), is of the view that local skill in agri-climatology is essential because most livelihoods that lean on agriculture thrive when weather forecasts are accurate and wise judgments are made.

Information centers have thus to adhere to the universally accepted standards and norms for capture, storage and management of indigenous farming management. The method utilized to acquire, preserve, and disseminate indigenous knowledge must be flexible and respectful of various cultural values and traditions because every indigenous group has its own specific viewpoints, needs, and concerns (UNESCO, 2010; United Nations, 2019, 2021a). The CARE (collective benefit, authority to control, responsibility, and ethics) principles which viewed as are people and purpose oriented were created to supplement the FAIR (findable, accessible, interoperable, and reusable) guiding principles for data management and stewardship in order to ensure that indigenous governance over data and its use is respected (Chigwada, 2023).

Knowledge Management (KM) plays a vital role in recognizing, respecting and harnessing the rich diversity of indigenous farming expertise for the communities' own advantage, sustainable agriculture and global food security by documenting and codifying, knowledge preservation, knowledge sharing and transfer, capacity building, integrating indigenous farming knowledge with scientific knowledge, promoting sustainable practices and revitalizing culture and identity (Chigwada, 2023). Knowledge Management (KM) encompasses use of ICTs as a key to its

processes such as the AgShare project supported by Makerere University and the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) where students with computer and agricultural related background participated in action oriented research on farmers' practices and documented of indigenous agricultural related knowledge (Kaddu & Haumba, 2016).

Mafongonya (2017) supported this assertion by assuring that agro-forestry, traditional medicine, soil science, biodiversity protection, natural resource management, and applied anthropology are among the fields that have recognized indigenous knowledge worthiness. The value of IFK is key to improved farming even in the modern world.

Indigenous knowledge can potentially be preserved in print and digital form with proper guidance and knowledge. Public libraries are charged with responsibility of identification, gathering, storage, preservation and dissemination of information and knowledge. Anwar (2010) asserts that the field of information management, which organizes human knowledge and serves as a route for user information is well positioned to be an important player in indigenous knowledge management from identification to its application. Karbo (2006), points out the role libraries can play in this regard that in order to revitalize indigenous knowledge, many approaches and coordinated efforts must be applied. Ngulube (2002) exhorts information workers to make sure they are involved in the preservation of IFK even as it's communicated orally.

Information centers have thus a responsibility of ensuring that IFK is not left to chance but securely to be integral with use of modern farming knowledge and boost

production. The implicit nature of IFK, form of storage (people's recollections), and mechanism of transference (orally) all make this commodity to be under serious jeopardy because the custodians who are typically old people when they pass on, they pass away with it, leading to its chronic marginalization. Hoarding of IK by some societies due to taboos and superstitious beliefs hinders its even distribution, use and transmission among individuals and groups. Strategies for capturing, preserving, and managing indigenous knowledge for future generations are required due to the significant value linked to it and its instability on the other side.

The International Federation of Library Associations and Institutions (IFLA) urged African public libraries to take a proactive role in preserving and advancing indigenous knowledge because of its significant value. This entails collecting, conserving, and distributing indigenous and local knowledge, while also serving as a central resource for communities seeking pertinent information and expertise (Moahi, 2012). As stated in the Global Forum of Indigenous Peoples and the Information Society's 2003 Geneva Declaration, by using ICTs, local communities, tribes, and nations may promote and protect indigenous knowledge while also supporting and preserving cultural diversity (Lwoga, Ngulube and Stiwell, 2011). This responsibility becomes urgent as custodians of this knowledge are old farmers who when they pass on, they pass away with their knowledge. Librarians can use ICTs to record, store and distribute IFK so that it is passed to future generations. They can also be used to create user-friendly information and knowledge (IFK) systems, expedite the affordable dissemination of IFK, encourage the indigenous farming knowledge incorporation into both formal and informal educational

environments, and offer a forum for the promotion of increased benefits for IFK systems among underserved communities.

ICT tools can be used by librarians to document indigenous knowledge so as to address the demands of the current generation without jeopardizing future generations' capabilities. Information and communication technologies (ICT) comprise a wide variety of technological instruments and assets that are used for gathering, producing, distributing, storing, and organizing data, according to Guemide (2019). Communities both inside and outside of a nation can use both ICT skills and experience to record, save, enhance, digitize, and share a lot of the rich indigenous knowledge (kept for posterity) (Dlamini, 2016). Dlamini (2016) concurs when he said that the expansion of storage devices such as flash drives, hard disks, MP3 players, MP4 players, mobile phones, CD-ROMs, and computer hard disks is attributed to the capability of information and communication technologies (ICTs) to manage data and enable diverse forms of communication between humans and electronic systems. These devices offer fresh approaches to recording, conserving, and sharing indigenous knowledge with a wider audience. This increases accessibility to indigenous knowledge and appeals to younger generations.

Group collaboration can be improved by leveraging knowledge management platforms and tools such as content management systems, which include wikis for group authoring, blogs for online diaries and personal reflections, podcasting for digital media distribution for mobile playback, and synchronized communication for the exchange and capture of indigenous knowledge. In Uganda, the Agricultural

Sharing (AgShare) Project uses smart phone technology and database construction to improve information access and exchange. Its goal is to gather and disseminate Agricultural Indigenous Knowledge (AIK) through a variety of platforms under the Open Education Resources (OERs) standards.

In Kenya, the National Farmers Information Services (NAFIS) was established in 2008 to enable Kenya's farming community to share and receive up-to-date news and information on their cell phones, about agriculture, weather patterns, and other relevant topics. More than 4.5 million farmers can receive agricultural extension information via the service on their phones and on the internet. Field extension officers update the system on a regular basis through a web platform (Kimani, 2015). A large audience of farmers may be reached through ICT enabled communication channels, equipping them with the information and abilities to improve agricultural productivity and sustainability such as National Mission for Sustainable Agriculture (NMSA) in India, International Potato Center (CIP) that collaborates with indigenous farmers to conserve agrobiodiversity and promote resilient farming practices in Peru as well as SMS based services and ICT hubs and Innovation Centers in Kenya. The cited literature clearly points out that ICT deployment could not only preserve IFK but can greatly enhance its use.

Traditional wisdom and agro-biodiversity, such as indigenous foods and kaya forests, distinguish the Mijikenda Communities. Crop production is and has been the most important livelihood activity, with the Mijikenda Community being the most prominent in this activity due to the availability of large tracts of land and indigenous and local knowledge such as seed selection and preservation in seed

banks, development of bio-pesticides that control pests and plant diseases as well as improve crop productivity using traditional herbal plants, and the Rabai Community using spiritual practices and sacrifices (Kaya Council of Elders).

The majority of Kilifi County households (80%) struggle with food insecurity (Chege et al, 2016). The Household Baseline Report of 2014 reported poor yields and advised that community members put what they already know about coping mechanisms into practice in order to handle the hazards posed by the changing climate (Ndalilo et al, 2020, 75). As a result, this study was meant to assess what has contributed to this gap in production and ascertain whether incorporation of IFK into modern farming can enhance production.

The findings were to be documented as a knowledge asset within Kilifi County public library.

## **1.2 Statement of the Problem**

As provided out in the above background, IFK if well harnessed could revolutionize food production challenges have been great thus knowledge has been orally gathered, stored and disseminated and when custodians pass on or lose their memory, all knowledge is rendered unusable. The current study set out to assess how application of ICTs by Librarians could salvage this knowledge for proper management, preservation and utilization of IFK. The study focused on issues of perception of ICTs role in preservation of IFK, the significant role public libraries could play through use of appropriate technologies. The ultimate outcome was to upload these findings in a knowledge database at the Kilifi County Public Library.

Without such efforts made, IFK will become extinct and its benefits buried as its custodians exit the stage through old age, sickness or death. The intended result is a database of information that serves as a collection of indigenous farming experiences, traditions, discoveries and interpretations. It will be stored for future generations in a library or repository and combined with scientific data for use right now. No matter if an individual is available or not, the developed knowledge base will be kept in a public library or repository as a knowledge asset.

### **1.2.1 Purpose of the Study**

To leverage ICTs tools to capture for preservation of vital indigenous farming knowledge to enhance its use and preservation for posterity in Kilifi County, Kenya.

### **1.2.2 Objectives of the Study**

The following objectives guided this investigation:

1. To evaluate the awareness and perception of the study community regarding use of ICT tools in preservation and management of Indigenous Farming Knowledge.
2. To establish the existing ICT tools capable of capturing and documenting indigenous farming experiences for improved preservation and accessibility
3. To examine the significant role a library repository could undertake in preserving, managing, storing and disseminating Indigenous Farming Knowledge.

4. To determine obstacles and issues pertaining to the preservation, accessibility and utilization of Indigenous Farming Knowledge.

### **1.2.3 Research Questions**

1. How is the farmers' awareness and perception level on use of ICT tools in the management and preservation for posterity of indigenous knowledge among the MijiKenda Community?
2. What ICT tools are in the market that can be used to capture and document indigenous farming knowledge experiences for better preservation and management?
3. What important role could libraries play in the preservation, management and dissemination of indigenous farming knowledge in Kilifi County?
4. What are the available obstacles and issues pertaining to the preservation, accessibility and utilization of Indigenous Farming Knowledge?

### **1.3 Significance of the Study**

The Kilifi farming community will easily access this knowledge through internet enabled devices from their most convenient location and find it most conveniently than before through the assistance of this study. The community will also easily access this knowledge which they can mainstream with the already explicit farming knowledge already available and apply it to improve their agricultural practices for improved agricultural production.

Researchers will also benefit by developing measures to be undertaken to mainstream indigenous farming knowledge and international knowledge for use in

agricultural improvement. Indigenous knowledge will then be able to transcend national boundaries and will be applicable or relevant across different countries or cultures. It often pertains to understanding global issues, trends, cultures, languages, policies, and practices. International knowledge can encompass a wide range of subjects, including economics, politics, diplomacy, cultural studies, languages, international law, global health, environmental issues, and more. It involves awareness, understanding, and appreciation of diverse perspectives and contexts from around the world.

Devolved and national government will use this knowledge through their agricultural extension workers who will advise farmers of its importance and improve agricultural production and enhance food security in Kenya while research institutions will have an opportunity to focus on this emerging area that has potential to enhance the state of food security in Kenya and beyond as well as their researchers benefiting by developing measures to be undertaken to mainstream indigenous farming knowledge with international knowledge for use in agricultural improvement.

Policy makers at all levels of government (national and county) may use this knowledge to enhance agriculture production and food security as they may incorporate it in agricultural and food production policies at national and devolved levels of government.

The public libraries will be in a position to offer expanded services to meet the needs of farmers across Kenya as they are found all over country. They will use Kilifi County libraries as a benchmark.

## **1.4 Limitations and Delimitations of the Study**

### **1.4.1 Delimitations of the Study**

The application of ICTs tools to improve preservation, accessibility, and application of IFK in Kilifi County, Kenya was limit of this study. The study was also delimited to indigenous farming knowledge as opposed to the entire coverage of indigenous knowledge because the Mijikenda community is specifically dependent on agriculture for its survival and due to globalization and climate change which has resulted into unpredictable weather patterns, agricultural production has been dwindling at an alarming rate resulting into hunger and in some areas, dependence on food aid. The choice of the study location was informed by factors including the practicing of indigenous farming knowledge among the Mijikenda in Kilifi County and the threat to this knowledge due to assimilation with other communities and migration of most Mijikenda youth to urban centers resulting into none speaking of their indigenous languages and adoption of new cultures. The choice of the research topic was informed by factors related to the erosion of indigenous farming knowledge in the Mijikenda Community and reduction of agricultural production and escalating food insecurity and the importance of indigenous farming knowledge in increasing farm yields.

### **1.4.2 Limitations of the Study**

Literacy levels of the farmers in Kilifi County were a possible limitation that hindered them from interpreting the equipment for gathering data that were used. The researcher enlisted the services of an interpreter to overcome this limitation. Another limitation was language and since all indigenous knowledge is cultural

knowledge and is enshrined and embedded in the peoples' indigenous languages, this informed the choice of research assistants who mostly were from the Mijikenda Community. The researcher too is an indigenous Mijikenda and therefore conversant with the dialects spoken by the research population. Identifying and tracing indigenous knowledge keepers was also a challenge. This called for the use of snowballing and the Agricultural Extension Workers were requested to identify the indigenous farming knowledge keepers. Other limitations included the willingness of the custodians of indigenous knowledge to share this knowledge since some of this knowledge was regarded as spiritual and therefore overly protected. The researcher enlisted the services of a trusted community leader as a mediator and translator. The quality of the extracted information was assessed by an identified knowledge keeper who served as an Agricultural Extension Officer and retired but is currently a practicing farmer.

### **1.5 Assumptions of the Study**

There was a supposition that there is a lot of indigenous farming knowledge among the Mijikenda Community of Kilifi County that could be used to scale up food production and enhance food security in Kilifi County and Coast region at large. Majority of the Mijikenda Community members are pragmatics who interact frequently with peers and serve as opinion leaders. Through easier user training, they will be able to use ICTs tools to record their indigenous farming knowledge and upload it into a repository that can serve as an IFK asset that can be shared independent of the availability of individual users. They are able to make gradual but steady progress. Documenting the Mijikenda Community's indigenous farming knowledge will result in improved economic terms and social prestige and this will

lead into convenience and satisfaction and faster adoption of indigenous farming practices.

## **1.6 Theoretical and Conceptual Framework**

### **1.6.1 Theoretical Framework**

According to Albert Bandura's (1925–present) Social cognitive Theory which originated in the mid-20<sup>th</sup> Century (1970s), is a result of observational learning and research into the mental mechanisms that underlie human behavior. By adding cognitive elements and stressing the importance of observation, imitation and self-regulation in learning and behavior, it represented a dramatic break from the rigid behaviorist ideas of behaviorism. According to social cognitive theory, people pick up knowledge from one another by modeling, imitating, and observing. Individual learning, self-development, and the role of society in socializing individuals are all examined in social learning theory. One will learn new behavioral patterns from firsthand encounters, observation of others' conduct, or interaction within groups while using information, communication, and technology tools to document indigenous farming knowledge preservation, accessibility, and use. Social Cognitive Theory has been used in studying environmental behaviors and the promotion of sustainable practices by examining factors including self efficacy, social norms, and environmental attitudes that influence peoples' interaction with the environment.

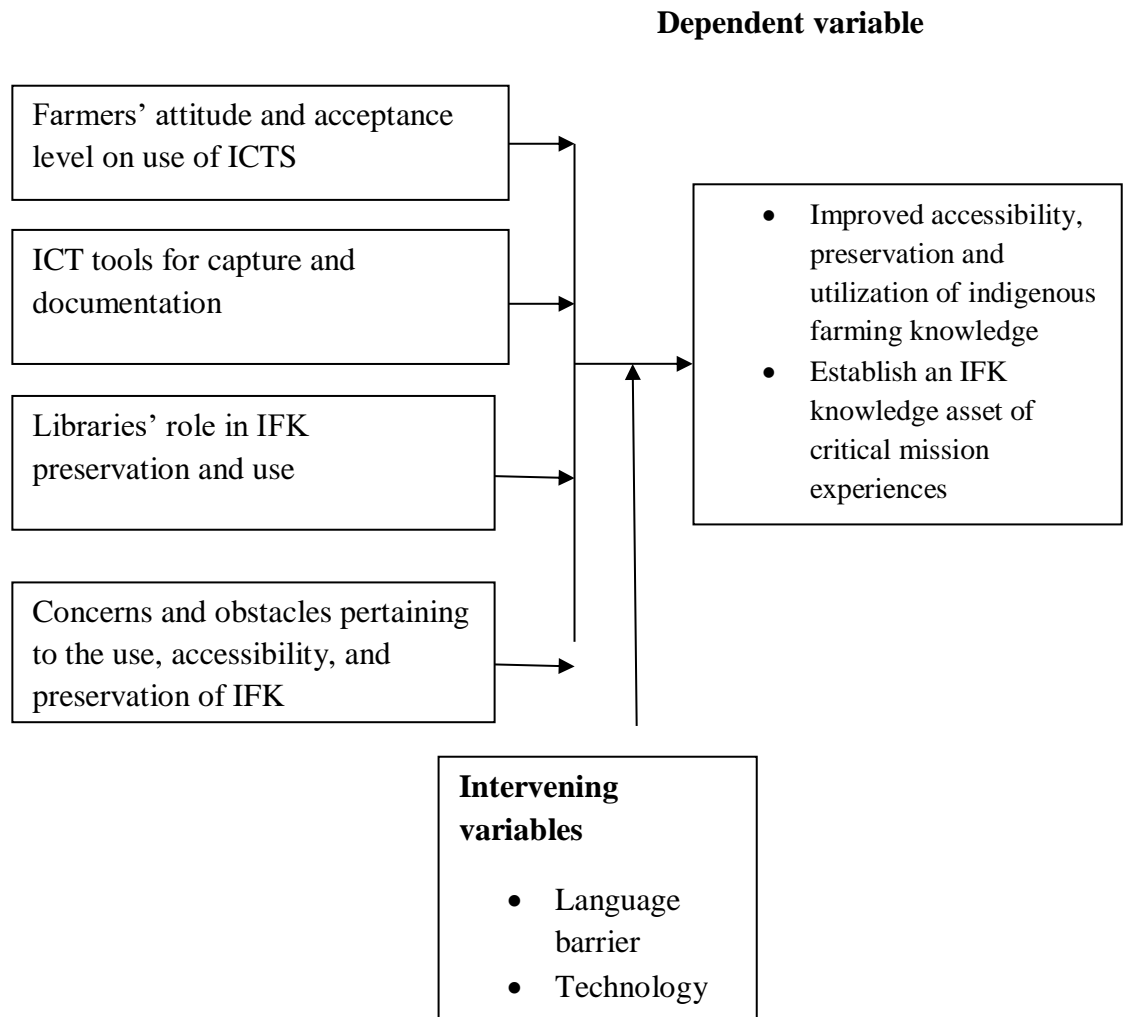
Social learning is participatory by nature and can take place in both formal and informal settings, such as learning through collective labor groups in which knowledgeable individuals or hosting farmers show the implementation of new

technology or best practices through quick inductions. The developed knowledge asset such as videos on indigenous farming knowledge maybe disseminated through social media to farmers. Similarly, farmers can informally learn on their own from friends and experienced individuals how to use indigenous farming knowledge to scale up food production.

Social Cognitive Theory has been applied in a variety of contexts, including education and learning (Zimmerman, B.J. 2000), aggression and violence (Bandura, A., Ross, D. & Ross, S.A. 1961), and health behavior change, specifically in altering risk behaviors and adopting health behaviors (Schwarzer, R. & Fuchs, R (1995). This theory aptly offers a basis for this study since agricultural indigenous knowledge resides in the social context of individuals and has been suppressed by emerging knowledge. Mainstreaming for the improvement of agriculture production and food security can be achieved if knowledge management processes can be used to consolidate it.

## 1.6.2 Conceptual framework

### Independent variables



**Figure 1.1: Conceptual Framework**

**Source: Researcher, 2023**

Information and communication technologies (ICTs) were used to capture indigenous farming practices farmers use in their agricultural production. This knowledge was identified, documented, preserved as an explicit knowledge asset in a repository that will be embedded in the County Library which is internet enabled to allow access and dissemination of this indigenous farming knowledge

to farmers through internet enabled smart phones; computers and seminars organized Agricultural Extension Workers.

## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

#### **2.1 Introduction**

Related literature in the field of study is discussed in this chapter. It was structured around the study thematic areas which included awareness of ICTs tools and technologies in indigenous farming knowledge preservation, digital preservation and accessibility of indigenous farming knowledge, indigenous knowledge management systems and cultural heritage and preservation.

#### **2.2 Awareness of ICT Tools And Technologies in Indigenous Farming**

##### **Knowledge Preservation.**

Data collection, creation, dissemination, storage, and management are all done using ICTs, a wide group of technological tools and resources that are a variety of information technology tools, including computers, combined with communication tools, such the phone and telecommunications network (Guemide, 2019). They allow for real-time world wide information and knowledge exchange as well as interactive and simple information exchange that can boost agricultural competitiveness by lowering production costs, increasing production efficiencies and increasing farm incomes as well as conserving natural resources (Rao, 2006). They offer a unique platform for creating progress and creation of wealth by enhancing the use of natural resources and enabling equitable access to basic public services including health and education (Naanyu, 2013). When compared to conventional agricultural knowledge transfer methods, ICT tools provide a more economical way to share information and expertise with rural farmers.

Additionally, through facilitating smallholder farmers' access to agricultural funding and markets, they can offer farmers educational and training materials, give farmers the power to bargain for better prices, and foster and develop smallholder farmers' networking (Okello et al, 2014).

Web-linked interactive databases in industrialized countries provide access to weather, natural resources, product demand volumes, credit, technical expertise, and government programs. Farmers in India generally employ ICTs, such as radio and television broadcasts by specialists and professionals, as sources of local information for small farmers. Other ICT initiatives include websites in local languages, tele-centers that act as one-stop shops for the delivery of a range of deliverables, including telemedicine, tele-education, natural resource data for local planning and development, interactive vocational training for alternative livelihoods is offered, as well as interactive advisories on livestock management, fisheries, agriculture, and the management of land and water resources, and e-government (Srivastava, 2012). Mobile smart phones are used in India to track and capture for documentation indigenous knowledge. Research teams have set up dynamic and real-time databases that address critical gaps in information empowerment, where video conferencing is used to affect social and human capital development, information democracy, field level advisories training for alternative livelihoods, as well as e-government. ICTs afford a possibility for sharing of indigenous farming knowledge through set databases where farmers can get information to improve their access to markets for their products.

At the Obafemi Alowolowo University in Nigeria, actions in traditional medicine are identified, recorded, and preserved for use in a database where local content

and methodology, as well as contemporary knowledge, are taken into account (Moahi, 2012). Radio and television are the conventional ICTs that have been utilized for decades to provide advice services to farmers in the form of updated menus of pre-recorded agricultural information or short segment audio programs. Additionally, voice-based information delivery services, such as information services provided over the phone offering farming techniques and market access in Africa are employed by farmers. Few farmers in Kilosa in Tanzania used ICTs to combine and create new knowledge and acquire indigenous farming knowledge although person to person communication was still the most predominant method for communicating indigenous farming knowledge (Lwoga 2011). In Tanzania and Uganda ICTs tools including radio, cell phones, television, audio cassettes, email, internet, video cassettes and film shows were used by farmers for acquiring indigenous knowledge (Lwoga 2011).

In Kenya, majority of youthful farmers own modern phones that they use to access information about the animals they keep and crops they grow and follow markets and farming trends. ICTs tools highly used include sms, voice messages, radio and social media including Facebook, Whatsup, Ms Office and Spreadsheets as well as platforms such as M-Farm and iCowth at provide extension services and assist them increase their yields (Irungu, 2015). The most commonly employed ICT tools in Bungoma, Kirinyaga, and Migori in Kenya include mobile phones, internet/web-based platforms, interactive video, CD-ROM, radio, and television (Okello et al 2014).

In the past ten years, there has been a notable surge in the use of networked technologies, which comprise resource indexes for indigenous knowledge,

websites, portals, networks, databases, registers, inventories, and case studies. This demonstrates the degree to which indigenous knowledge is acknowledged as a distinct, legitimate, practical, and vulnerable knowledge system. Awareness of ICT based management information systems (MIS) in Kenya is influenced by literacy levels, household asset, and endowment and farm level characteristics such as distance from the main market. Attitude towards ICT usage by smallholder farmers in rural areas signifies a new technological change where mostly used media for farming purposes includes radio programmes, the mobile-call up, television and the mobile short messages services (sms) (Adegbidi, 2012). There is a very high awareness level of the radio, television and mobile phones although it is possible for a farmer to have access to ICT without using it due to low education, low knowledge of use and fear of trying (Osundu, 2015).

Advanced aged smallholder farmers mostly exhibit a negative relationship with access to ICTs. The target population of this research study will be elderly smallholder farmers who are the owners of indigenous farming knowledge. This study purposes to investigate librarians' knowledge and attitudes about using ICT tools to preserve and manage traditional farming expertise.

ICTs has the potential to significantly increase the application of indigenous farming expertise, promote cooperation and knowledge sharing, empower farmers, and advance sustainable agriculture and food security. It can empower farmers to advocate for policies that support the preservation and revitalization of indigenous farming knowledge. Online advocacy campaigns, social media activism and virtual networking platforms enable farmers to voice their concerns, share their perspectives with policy makers and mobilize support for initiatives that promote

traditional farming practices, agroecology and food sovereignty. However, the study's community educational and socio-economic levels may hinder them from taking advantage of these technologies to improve their food sovereignty status.

### **2.3 ICTs for Digital Preservation and Dissemination Of Indigenous Farming Knowledge**

The increased recognition of indigenous knowledge as a contributor of indigenous peoples' creativity in a given locality, innovativeness and development as well as human progress has resulted in the need for its collection, preservation and dissemination, promotion of its significance, contribution and need to both those who are native and those who are not (Maina, 2012). IK is however facing threats to its survival as a result of its oral and rural nature as well as lack of systematic documentation. Indigenous knowledge is implicit and therefore it can be challenging to recognize it, identify it, authenticate it (by examining its relevance and applicability for problem-solving), and assess its trustworthiness and quality before it can be used in the development process. It can be recorded and conserved, then added to current knowledge as explicit information that communities can use to raise their standard of living. It should also be kept on retrievable media, such recordings, movies, stories, gene banks, etc (World Bank, 1998).

Information and communication technologies (ICTs) are knowledge, satellite connectivity, software, computers and other systems that allow accessibility, generation, sharing, and utilization of data, information, and knowledge by end users (Dlamini, 2012). A variety of strategies can be used to capture experiential knowledge and lessons learnt. To maintain the richness of oral traditions and capture the subtleties of spoken languages, audio recordings of oral traditions,

songs, chants, and storytelling are a great way to preserve oral traditions and capture the nuances of spoken languages. It is possible to film cultural rites and celebrations, customs, and the passing down of traditional knowledge down the generations on video and images can capture the landscape and provide a visual depiction of the heritage of indigenous knowledge (Chigwada and Ngulube, 2023). The methods selected will depend on a variety of things, with some of them standing out including organizational policies, the availability of technologies, support tools, personal preferences as well as the staff's expertise.

Capturing operational experiences and lessons learned can be done either by an individual or carried out collaboratively. While capturing activities can be done in person, they are also increasingly taking place online. Whichever method of capturing activities are conducted, they all ultimately provide the foundation for the compilation of knowledge assets complete with a story of important experiences and lessons learned (Janus,2017).There are many methods of capturing indigenous knowledge ranging from interviews, storytelling, and observation, focus groups and brainstorming sessions among others.

A number of ICT tools could be used for this purpose including digital filming and video Cameras which can chronicle Indigenous peoples' rites and activities such as storytelling, gaming, healing, and agriculture. A collection of quotations that aptly illustrate the lesson, in addition to an open-ended interview or story-telling session, may be taken into consideration for utilization (Taliyason, 2010). Videos are tools for capturing knowledge and disseminating of lessons learnt. Capturing, storing and preserving indigenous farming knowledge for posterity can be

facilitated by camcorder, mobile phone filming, tape/sound recording, and video capturing. Capturing and/or recording IK in Kwazulu Natal, South Africa, and ensuring its accessibility on ICT tools are film/video cameras. They are viewed as most efficient ICTs tools (Dlamini and Ocholla, 2018).

Additionally, mobile phones which are wireless handheld devices can enable users to place and receive calls. Due to its integration with computers and the addition of previously unconnected functionality like an operating system, online browsing, and the capacity to run software programs, smartphones are now referred to as "smart phones." Mobile phones can be used to record or capture indigenous knowledge, store it, and transmit it using either audio or video. Mobile phones can be used to capture information on indigenous knowledge, to locate people, to take images, and even to make movies. They may document information as it is being developed, and having both audio and video gives a visual layer to the information. The geo-location feature in mobile devices can be used for identifying and describing significant geographical features which are particularly useful for retaining indigenous knowledge. Applications that are linguistic tools that are helpful in retaining indigenous knowledge can be developed for mobile phones that make them more culturally appropriate to specific indigenous communities. The internet, community radio, mobile phones, and participatory video production are examples of potential instruments that could be used to record and share indigenous farming knowledge. They can be used to document indigenous knowledge activities such as agriculture, food preparation, and healing (Janus, 2017). In developing countries, mobile phones are ubiquitous because they provide users with mobility, personal control, and flexibility, as well as the ability to establish

connections with people who have similar interests, circumstances, and experiences (Owiny, Mehta and Marezki, 2014). They have potential for fostering inclusiveness and participation in the design of media carrier for dissemination of agro-indigenous knowledge (Dlamini and Ocholla (2018).

Others are flip cameras. These are small video cameras that record high definition (HD) into an internal hard disk. Indigenous knowledge must be documented and transmitted in the local, cultural context, and using the media that the communities deem most appropriate. The flip camera is portable and easy to use. Indigenous knowledge holders can be taught how to record indigenous farming knowledge experiences. Dlamini and Ocholla (2018) claim that IK holders in Kwa-Zulu Natal, South Africa, primarily use mobile phones and digital cameras to document and capture their indigenous knowledge, tape/sound recording which are devices using magnetic tape to record or playback audio, video, or data. When played back to an audience, tape/voice recorders are useful for both preserving and transmitting indigenous farming knowledge.

Indigenous knowledge preservation and distribution have the potential to benefit greatly from modern information and communication technology (ICT). ICT tools can be employed to create audio recordings of endangered languages, ceremonial ceremonies video archives, digital herbariums of indigenous peoples' flora , mp3s and mp4s, flash drives, hard disks, smart phones ,CD ROMs and computer hard disks.

ICTs tools for preserving and disseminating IFK include the radio which is an electronic gadget that broadcasts two-way communications using electromagnetic

waves in the radio frequency band. For spreading recorded knowledge on indigenous farming practices, community radio, websites, and television programs might be used. Radio is a very effective Information and Communication Technology tool in disseminating indigenous farming knowledge to individuals or communities that are scattered far and wide. Additionally, the television is a device or process for projecting a sequence of transient visible pictures on a distant screen, usually with a sound signal and a powerful tool for preserving and dissemination IFK. Television broadcasting in local languages is appropriate channel for disseminating indigenous farming knowledge practices (Dlamini, 2016). It is very popular with cross generational audience. However, since modern technology such as radio and television are influenced by commerce and are more likely to be influenced by advertisers in their choice of programmes to disseminate and their exploitation by multinational companies for financial gains mostly due to their communally owned and not being patented, the use of a variety of other ICTs could ensure provisions of balanced reporting to many farmers (Lwoga, Ngulube and Stilwel, 2011).

The internet which was developed through the Advanced Research Project Agency Network (ARPANET) project tasked with creating a national computer network and received support from the US government in 1969 is also an ICT tool for preserving and disseminating IFK. It is a sizable network that connects numerous smaller networks around the globe. Kenya has a 28 percent internet penetration rate, compared to Africa's 15.6 percent. Locals can watch videos of indigenous knowledge (music, dance, agricultural technique) in a library setting by uploading

them to social media and mobile platforms like Youtube, Facebook, GoogleDocs, and Twitter (Owiny, Mehta and Maretzki, 2014).

World Wide Web was introduced in 1992 to enable the internet to provide a multimedia interface which includes graphics, animations and sound (O’Leary, 2005.). The World Wide Web is a tool for disseminating and transmitting information to a larger audience. Social Media Technologies are other ICT tool for preserving and disseminating IFK. These are electronic communication channels that facilitate interaction between content producers and end users while also enabling the creation and distribution of content. Any content may be preserved and shared through social media platforms like Twitter, Facebook, Google Docs, YouTube, and Facebook thanks to the World Wide Web. Adolescents can exercise their creative muscles by using social media platforms, (Owiny, Mehta and Maretzki, 2014) and therefore forms the best platform for the younger generation to access indigenous knowledge. ICTs tools are enablers for digital preservation and accessibility of indigenous farming knowledge. This accords for the documentation of IFK which enable the continuity of cultural traditions and sustainable agricultural practices for future generations, knowledge preservation, training and education, knowledge exchange and empowerment and advocacy.

ICTs play a major role in dissemination of farming knowledge such as use of television programmes and local radio stations. Effective ways to promote Indigenous Farming Knowledge exchange include the utilization of digital repositories, online archives and innovative technologies including ticktock, facebook, whatsapp and instagram to extend beyond geographical boundaries. It is

critical that the infrastructure to facilitate ICTs effectiveness in preserving and sharing indigenous farming knowledge is enhanced. A process to change the negative attitude towards indigenous farming knowledge must be initiated by availing it through the desired technologies.

Many communities with ingrained agricultural traditions and knowledge systems can be found in Kilifi County. These people have created sustainable farming methods that are tailored to the agro-ecological circumstances of the area. These methods include customary crop types, agro-forestry techniques, water and soil conservation measures, and native insect management methods. Modernization, urbanization, and globalization pose threats to the transmission and preservation of IFK. These factors have caused IFK practices to erode as newer generations migrate to metropolitan areas or adopt modern agricultural equipment and techniques. Furthermore, IFK and the knowledge it is associated with are threatened by environmental degradation, climate change, land tenure concerns, and socioeconomic.

Modern technology such as radio and television that are influenced by commerce are more likely to be influenced by advertisers in their choice of programmes to disseminate and the exploitation by multinational companies for financial gains due to its being communally owned not being patented. Use of a variety of other ICTs could ensure provisions to balanced reporting to many farmers (Lwoga, Ngulube and Stilwel, 2011). If action to document, preserve and avail it for use is not taken, eradication of this all important knowledge is imminent. Raising awareness, gathering resources, putting sustainable development practices into practice, encouraging community-based conservation efforts, and incorporating

cultural heritage preservation into larger regional development plans are some of the strategies that Kilifi County can use to preserve and make IFK accessible. This research study captured and documented ICTs tools that could be used for preservation and dissemination of indigenous farming knowledge experiences for uploading as a knowledge asset in the Kilifi Public Library for accessibility and use.

#### **2.4 Public Libraries' Role in IFK Management, Preservation and Documentation**

The high value attached to indigenous knowledge by local people, its vulnerability and threats to extinction is increasingly transforming indigenous knowledge into a great asset to libraries. Its mode of transmission and dissemination in restricted ways and the disappearing of cultures due to globalization make it an intangible commodity (Cox, 2020). However, indigenous knowledge is poorly documented by most developing countries. Tjiek (2013) gives an example of how digitizing indigenous knowledge and putting it on a digital library in Indonesia has tremendously added its appeal to the resources which initially were viewed as mediocre in quality. Petra Christian University has facilitated an Information Village concept (DesaInformasi) which identifies, collects, digitizes, catalogues, and disseminates indigenous knowledge. In India, The Council of Scientific and Industrial Research has produced a Traditional Knowledge Digital Library, a collaborative effort that incorporates pharmaceutical formulas from historic writings on Indian medical systems. Among other languages, it has been translated into English, French, German, Japanese, and Spanish strengthening their creative muscles through the use of social media. The transition from industrial to

knowledge economy where knowledge is seen as a resource to be used for growth and prosperity offers opportunities for Africans to participate in this economy by leveraging indigenous knowledge for some benefit. Organizations from outside of Africa, like the Center for International Research and Advisory Networks (CIRAN), have spearheaded numerous attempts to document indigenous knowledge in Africa. These efforts have had varying degrees of success, including the selection of IK's best applications for inclusion in UNESCO-MOST databases. The World Bank and Local and Indigenous Knowledge Systems in a Global Society (LINKS). Several African nations have made additional efforts to highlight IK through their universities, including the University of KwaZulu Natal, the University of Limpopo, the University of Botswana, and the Obafemi Awolowo University in Nigeria.

Storage and dissemination of indigenous and local knowledge including its promotion of its significance, contribution and importance and involvement of elders and communities in its creation is advanced to Public and national libraries by the IFLA (Moahi, 2019).

Libraries need to establish a mechanism of ensuring indigenous knowledge is accessible through different formats. Public and national libraries are required by IFLA to collect, store, and distribute indigenous and local knowledge and promote its usefulness, benefaction (Sarkhel, 2016).

It is important that libraries consider establishing strategies for indigenous knowledge systems including preparation of inventories and registers taking into account intellectual property implications. This will require the development of

collection development policies for indigenous knowledge that encompass storage media for its preservation and development of standard tools for indexing and cataloguing as well as bibliographies of IFK resources, with the goal of making IFK more accessible to the community, particularly the youth.

As building blocks of local information and infrastructure, libraries are duty bound to identify, collect, codify, document, organize, preserve, transfer, link, share for application of indigenous knowledge for long-term development, awareness of indigenous community livelihoods is essential. A library with locally relevant information might encourage communities to use library services, especially if the community is given the opportunity to contribute to the content's development. Anyira (2010) avers that channels of communicating indigenous knowledge such as storytelling and experiential instruction. Indigenous peoples, particularly young people, have become inaccessible due to modern emphasis on the written word and a lack of proficiency in indigenous languages. Although libraries may assist indigenous people in maintenance and preservation of IK by offering resources and expertise in gathering, organizing, storing, and retrieving, they have not concentrated on doing so. Developing IK collection development policies while taking storage media for its preservation, developing standardized tools for its indexing and cataloging, enabling its access to the community, especially young people, and compiling bibliographies, preparing inventories and registers of IK systems while taking intellectual property implications into consideration could be measures libraries can apply to ensure its preservation for posterity. .

Public libraries should preserve record of study in areas such as local languages, agricultural methods, herbal medicine, and traditional birth traditions, where they will serve as a link between indigenous knowledge and the general public. Callison, (2016) avers that a culturally responsible library has a duty to keep materials for their neighborhood that are both in the community's original language and included in the catalog used to find those materials in order to reflect the local culture. Farmers should be enabled by creating a conducive environment to create and justify their true beliefs by encouraging them to use indigenous communication channels and structures by knowledge intermediaries (extension services, research education, cooperative unions, NGOs, tele-centers and rural libraries). According to Owiny, Mehta and Marezki (2014), IK database may be under the custody and moderation of libraries including instruction of community members on collection and documentation of oral and visual resources based on community needs and uploading information to social media platforms that can reach a wider audience (Lwoga 2010). This research study will use ICT tools to document indigenous farming knowledge and come up with an explicit knowledge asset consisting of text documents, audio, audio-visual, oral narratives, stories and upload it to an internet enabled repository anchored by the Kilifi County Library for improved preservation, accessibility and use by policy makers, farmers and researchers.

A knowledge asset on indigenous farming knowledge is the study's suggested outcome. A knowledge asset is organized and easily accessible information on the linked areas of a business operation (Owen, 2002). Knowledge assets are knowledge and skills that raise a person's comprehension to solve issues and make

decisions more skillfully (Freeze, 2007). Fernandes (2017) agrees that knowledge assets are the intellectual capital or knowledge resources of an organization.

Knowledge assets include the experiences individuals have accumulated over time (experiential-skills and know how), the concepts that guide in solving problems and making decision (conceptual- concepts, designs and methods), the systems that individuals follow when solving problems and making decisions (systematic- technological platforms, manuals and patents and licenses) and daily activities individuals undertake when doing their day to day work (routine -know how in daily operations). Knowledge creation processes is facilitated by these key elements (Lwoga, 2010).

The outcome of this research study will be a proposal to County Government of Kilifi to support public libraries to incorporate IK as a key resource in all formats and local language including workshops, visits to farmers and in all formats not only limited to text, video and audio visual indigenous farming knowledge asset of text, audio and audio-visual that are used to preserve and manage indigenous farming knowledge, concerns related to indigenous farming preservation, accessibility and use. To develop a system that will also contain information and communication technology tools that could be applied to capture and document IFK experiences for improved preservation and accessibility as well as play the library's role in the storage, management, sharing and distribution of IFK for improved production.

Uploaded and captured for posterity in the existing databases and in text environment into the Kilifi County Library repository for preservation, accessibility and use will be the information gathered in this research. The local

community will use the library as a great asset in accessing farming knowledge that would otherwise disappear as carriers exit. Any new breakthrough in new farming will also be uploaded to grow the asset for future food security in their county.

Indigenous knowledge is preserved through a variety of media, including films, pictures, graphics, paintings, and three-dimensional artifacts, as well as textual documents like reports, manuscripts, and field notes. The public libraries must therefore make it their responsibility as examples of cultural heritage institutions to serve as repositories of this all important heritage.

### **2.5 Barriers and Concerns Related To IFK Preservation, Accessibility And Use**

Indigenous farming knowledge is prone to distortion and alteration since instead of being preserved in written form, it is primarily stored in people's brains and passed down through generations orally (Chiwanza, 2013). Since indigenous farming knowledge is typically passed down through demonstration rather than description, it is impossible to describe or articulate. Since it has been preserved in the collective memory of indigenous peoples for millennia, the passing of knowledge carriers also denotes the passing of vital knowledge. Most IK is location specific because there are no indigenous knowledge records and no village journalists to broadcast farmers' issues to the outside world (Lwoga, Ngulube and Stilwel, 2011).

Another notable barrier to preservation, farming knowledge accessibility and use of indigenous concerns changes to population structures caused by epidemics,

famine, war and displacements that interfere with people's cultural existence. Such social factors affect normal co-existence of societies and can sometimes wipe out the old and vulnerable members of the society who are mostly holders of indigenous knowledge.

The challenge of identifying and reaching IFK carriers is not simple. IFK carriers are mostly elders persons who live in isolated rural villages lacking motivation or skills to document their proficiencies for future generations. Any abrupt development rendering these elderly folks permanently disabled or even passing away could irreversibly lose the extensive reservoir of diverse experiences possessed guardians.

It is oral, transmitted only after a lengthy time of internship, as well as expressed in peoples' daily acts making it vulnerable to distortion. It has been preserved and transmitted orally through cultural activities (Kuhnlein, 2013). This complicates its preservation, accessibility and use due to selfishness of the owners in not sharing their knowledge, as well as socio-cultural practices.

Documentation of the same will lead into enhanced access and use of indigenous farming knowledge as well as regard, identification and compensation of the indigenous knowledge holders. Munyaradzi (2014) defines IFK as verbally transmitted, imitated and implicit knowledge that cannot be codified in media including recordings, movies, stories and gene banks to prevent the loss of its properties. It is a severely threatened resource due to its continuous marginalization as a result of its implicit character. Other people think its knowledge of the uneducated and underprivileged, which makes it seem less helpful (Ochola, 2007).

Indigenous knowledge is primarily oral in form making replication difficult. As a result, it has not been properly documented increasing the risk of loss and preventing sharing (Jain, 2006). Due to its lack of documentation, character and the disintegration of oral pathways, such as situation may be an allusion to a situation in which many crucial lessons could be lost.

If action to document, preserve and avail it for use is not taken, eradication of this all important knowledge is imminent. Raising awareness, gathering resources, putting sustainable development practices into practice, encouraging community based conservation efforts and incorporating cultural heritage preservation into larger regional development plans are some of the strategies that Kilifi County can use to preserve and make IFK accessible.

## **2.6 Summary of Literature Review**

Information and Communication Technology tools mostly used by rural farmers include cell phones, online-based platforms and immersive video environment, CD-ROM, radio and television (Okello et al, 2014), (Lwoga, 2010),(Irungu (2015),and audio cassettes, internet, email, video cassettes and film(Srivastava, 2012). Others include tele-centers, video-conferencing, social media technologies including Facebook, Whatsup, Ms Office and Spreadsheets (Owiny, Mehta, Marezki, 2014).

With availability of diverse ICTs tools, documenting IK will not be great issue. With proper guidance and support by professionals and county government. Tools for its capture include video camera, video recording/filming, tape/sound recording and mobile phone (Taliyason, 2010), tape voice recorder and video-digital cameras

while those for preservation and communication are computers, internet (Facebook, Youtube, Google Docs, Twitter etc), USB, DVDs, E-mail, CD, Cell phone, tape voice recorder and video digital camera (Facebook, Youtube, Google Docs, Twitter etc), mobile phone, DVDs, CD, telephone, computer, radio, television and e-mails (Dlamini & Ochola (2018). Other tools are mobile phones, the internet, community radio and participatory video production avers (Janus, 2017).

Public libraries are supposed to be knowledge management assets that incorporate indigenous knowledge in all formats as key resource as advocated by Callison (2016) that any accountable library has a responsibility to store materials for the local community as advocated by IFLA which states that the mandate of public and national libraries according to International Federation of Library Association (IFLA) includes collection, preservation and dissemination of indigenous and local knowledge, promoting the value, benefaction and significance, libraries in Africa continue to ignore the documentation and preservation of this important developmental information.

This research will therefore act as a clarion call to Kilifi County and indeed Kenya for using ICT tools to recording IFK to enhance its preservation, accessibility and utilization.

In conclusion, numerous indigenous tribes with ingrained agricultural practices and knowledge systems are found in Kilifi County. These people have created sustainable farming methods that are tailored to the agro-ecological circumstances of the area. These methods include customary crop types, agro-forestry techniques,

and water and soil conservation. Kilifi County's indigenous farming knowledge management is defined by the intricate interactions between long-standing customs, contemporary issues, and continuous initiatives to protect, advance, and modify indigenous knowledge systems in response to shifting environmental and socioeconomic circumstances. In Kilifi County, utilizing the potential of traditional farming knowledge for sustainable agriculture and rural development requires cooperation, creativity, and community involvement.

### **2.7 Research Gap**

There has never been any research done on librarians' use of ICT tools for recording traditional farming knowledge in Kilifi County, Kenya, for better accessibility and preservation. The usefulness of particular ICT tools, including mobile apps, GIS technologies, or participatory mapping platforms, in documenting IFK in Kilifi County has not received much attention and public libraries must seize this opportunity.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 Introduction**

The research design, study area, target population, sampling strategies, research instruments, data processing methods, data presentation, and the crucial methodology to be used in conducting the intended research and or data collection are all covered in this chapter.

#### **3.2 Research Design**

This study applied descriptive research design which relies on quality of the description which describes systematically and accurately the details and traits of a specific population or geographic area. A thorough understanding of a certain population or phenomenon can be obtained through descriptive study design, which lays the groundwork for additional investigation and decision-making. This research design was appropriate for this study because it characterizes a population's traits, actions, attitudes, or circumstances, occurs in unaltered environments, where researchers watch and document behaviors as they naturally arise, is non-manipulative since it depends on seeing and recording traits or behaviors without changing them. It can also include participant observation, open-ended inquiries, interviews, surveys, questionnaires, or organized observations. In addition to guaranteeing that the results are representative of the population under study, it enables the researcher to gather data over an extended period of time, track changes over time, and use descriptive statistics to compile and evaluate the data.

The phenomena seen in descriptive research are already available, and all that is required is for the researcher to collect the data using research instruments with the goal of systematically summarizing the phenomena under investigation. Indigenous Farming Knowledge already exists amongst the Mijikenda Community of Kilifi County and this research design is therefore well suited for this study.

### **3.2.1 Variables**

A variable is any measurable aspect of behavior or influence on behavior that may change. It is the pre-existing condition that the subjects bring into the experiment and the variable that the researcher thinks the independent variable will affect is the dependent variable.

Farmers' awareness and perception on use of ICTS can influence farmers to use this technology to capture and preserve their indigenous farming knowledge, ICTs tools capable of capturing and documenting indigenous farming experiences can stimulate indigenous farming knowledge preservation and management, the role of the as a repository of knowledge was an important variable for investigation as an instrument of capture, preservation and dissemination of knowledge. The dependent variable for this study was improved capture, accessibility, preservation and utilization of indigenous farming knowledge through knowledge centralization in a public library database in Kilifi County.

The intervening variables include language barrier due to educational levels of the respondents which was counteracted by hiring language interpreters, use of technology for later transcription used to make accessible the indigenous farming knowledge.

### **3.3 Research Methodology and Specific Data Collection Methods**

The study of a field's overall approach to inquiry is known as methodology. It is concerned with the tactics, instruments, or procedures used to accomplish a specific goal. The research methodology identified for this research was survey for primary data collection where interview schedules, focus group discussions, observation and questionnaires were used to collect data. In addition, library and archival research was applied for secondary data collection and Statistical Package for Social Sciences (SPSS) and thematic content analysis was used for data interpretation, analysis and presentation.

### **3.4 Location of the Study**

Seven Kilifi County Sub-Counties namely Malindi, Kilifi North, Kilifi South, Ganze, Magarini, Kaloleni, and Rabai Sub-Counties were the sites of the research. Indigenous farming expertise, particularly with regard to biodiversity conservation, is still used in all seven Sub-Counties.

### **3.5 Target Population**

As per Bryman, 2016, the population refers to the entirety of units from which a sample is chosen. The complete set of people or things to which the researcher generalized the study's findings is referred to as the target population. The target population for this study was the indigenous/local knowledge gatekeepers in Kilifi County. These comprised the Kaya elders. Each Mijikenda tribe has its own Kaya where elderly people who are knowledgeable about their indigenous farming knowledge and still practice their knowledge are members of the council of Kaya elders. Every clan in Mijikenda community is represented in the council of Kayas

in its Kaya. Each Mijikenda sub-tribe has approximately ten clans. This means that each Kaya has around ten male representatives and ten female representatives. The target population comprised seven Kayas namely Kayafungo (Giriama), KayaChonyi (Chonyi), Kaya Rabai (Rabai), Kaya Jibana (Jibana), Kaya Ribe (Ribe), Kaya Kauma (Kauma) and Kaya Kambe (Kambe) because the elderly and experts in Mijikenda traditions and customs are usually inducted into Kayas. The target population was twenty elders from each Kaya totaling one hundred and forty (140) Kaya Elders.

Kaya elders are predominantly farmers and are recognized globally as custodians of indigenous knowledge and they registered the Kaya Elders Association in 2014 to ensure this knowledge is passed over to the next generation. Kaya Elders among the Mijikenda Community of Coastal Kenya are regarded as indigenous knowledge custodians. For a member of the Mijikenda Community to be recognized as a Kaya Elder, s/he must undergo a vetting process and should have ascended to a leadership position in the community's hierarchy structures. This qualified them as the target respondents in this research due to their status as indigenous knowledge custodians.

Other respondents were the librarians working in public libraries in Kilifi, Malindi and Dzitsoni. Three (3) Librarians and twelve (12) Heads of sections were targeted in this research study. In the information profession, it falls upon librarians to obtain, organize, and distribute information and knowledge. To accomplish this task effectively, they must collaborate closely with indigenous populations to understand their information sharing preferences, cultural norms, and knowledge

requirements. Information and communication technologies (ICTs) are a skill that librarians use to gather, organize, and disseminate knowledge. With the use of these competences, indigenous knowledge can be preserved and shared in a variety of media, including films, photos, audio and video recordings, and three-dimensional artifacts.

Another category of respondents included the seven (7) Sub County Agricultural Officers. The Sub County Agricultural Officers articulate government agricultural policy in their Sub Counties. They interact directly with Kaya Elders whenever they attend elders' meeting to communicate agricultural government policies to the community. In most cases, the Sub County Agricultural Officers (SCAOs) know all the Kaya Elders residing in his/her Sub County. The SCAOs held vital agricultural policy information on indigenous farming knowledge, possess deep understanding of the cultural setting of the indigenous knowledge practiced within their jurisdiction and had knowledge of the owners indigenous knowledge.

The Ministry of Agriculture approves the use and acknowledges the importance of IFK in sustainable agriculture and food security.

**Table 3.1: Target population**

<b>Respondents Category</b>	<b>Ganze (A)</b>	<b>Kaloleni (B)</b>	<b>Kilifi South (C)</b>	<b>Kilifi North (D)</b>	<b>Magarini (E)</b>	<b>Malindi (F)</b>	<b>Rabai (G)</b>	<b>Total</b>
Kaya Elders	20	20	20	20	20	20	20	140
Sub County Agricultural Officers	1	1	1	1	1	1	1	7
Library staff	0	2	5	3	0	5	0	15
<b>Total</b>	<b>21</b>	<b>23</b>	<b>26</b>	<b>24</b>	<b>21</b>	<b>26</b>	<b>21</b>	<b>162</b>

**Source:** GOK (2013).

### 3.6 Sampling Techniques and Sample Size

#### 3.6.1 Sampling Techniques

The practice of choosing a group of people for a research to represent the wider population from which they were selected is specified as sampling. Sampling is necessary for gathering data about a population in order to draw conclusions that may be applied to the entire population. Respondents were identified through snowball technique which entailed that one known respondent directed the researcher to those s/he knows until all have been reached.

#### 3.6.2 Sample Size

The sample size was calculated using the formulae for calculating sample sizes selected from small populations as below:

$$n = \frac{Nz^2pq}{(E^2(N-1) + Z^2pq)} \text{ where:}$$

n= is the required sample size

N= is the population size

P and q are the population proportion (If not known, they are to be set at 0.5)

z= is the value that specifies the level of confidence needed in the confidence level when analyzing that data which is set at 95 percent for surveys in which case z=1.96

E=sets the accuracy of the sample proportions which is set at plus or negative 3 percent which is 0.03

$$n = \frac{Nz^2 pq}{E^2} = \frac{140 \times 1.96^2 \times 0.25}{0.03^2} = 76$$

$$E = 0.03 \times 0.03$$

**Table 3.2: Sample Size**

S/No	PROPOSED RESPONDENTS	N	S
1	Kaya Elders (Farmers)	140	76
3	Sub County Agricultural Officers	7	7
3	Library staff	15	15
	<b>TOTAL</b>	<b>162</b>	<b>98</b>

The Kaya Elders sample size of seventy six (76) respondents was found to be adequate since given the advanced age of this category, targeting all the one hundred and forty (140) respondents would have posed risks of finding out that others had passed on or migrated to far off locations due to their security status.

### 3.7 Research Instruments

#### 3.7.1 Questionnaires

In order to obtain relevant information for the study, questionnaires containing relevant questions were prepared. In order to obtain respondents' thoughts, the questionnaires will generally contain structured questions. The open-ended

questions provided responders with an objective perspective and the opportunity to comment on their responses. These questionnaires were left with the respondents for them to respond within one week after administration. Questionnaires will be administered to the librarians. The questionnaires captured demographic data, attitudinal data, behavioral data, opinion data, knowledge data, experience data, perceptual data, qualitative data, temporal data and contextual data from respondents.

In order to collect data, questionnaires were used to assess the study community's understanding and recognition of utilization of ICTs in managing and preserving Indigenous Farming Knowledge (IFK), identify ICT tools that can be used to record and capture IFK experiences, acknowledge the important role that libraries participate in the administration, conservation, storing, and distribution of IFK, and pinpoint obstacles and issues related to IFK preservation, accessibility, and use.

### **3.7.2 Observation checklist**

Personal visits to farmers in their own environ and, interacting with them assisted in gathering data for this research. This enabled the researcher to get close enough to the farms to observe and record specific indigenous farming activities being practiced. The observations were captured via writing, photos and audio-visual.

The observation checklist captured behavioral data, environmental data, task performance data, social interaction data, categorical data, frequency and duration data, compliance data and temporal data. This method was used to assess the study community's knowledge and perception of ICT tools for managing and preserving IFK as well as tools for recording and preserving IFK experiences.

### **3.7.3 Interview Guide**

Interviews were conducted to targeted one hundred and forty (140) Kaya Elders (Farmers) who are key stakeholders involved in indigenous farming as well as the owners of IFK. Interview is a direct way of finding out what someone knows. The interview involved asking questions that elicited facts, experience, opinion, feelings, knowledge and reflections from the respondent. The Kaya Elders were engaged about indigenous farming knowledge practices while recording them using Information, Communication and Technologies (ICTs) such as video recording, audio-tapes and cell phones to capture real life experiences on indigenous farming experiences and practices. Indigenous farming knowledge experiences including land preparation, planting, methods, control of pesticides, use of ICT tools for capture and preservation of indigenous farming knowledge experiences and challenges in capture, preservation and access of indigenous farming knowledge stories were captured and processed to form a knowledge asset for uploading into Kilifi County Library repository.

### **3.7.4 Focus Group Discussion Guide**

This is a group of deliberately selected people who participate in a facilitated discussion. The researcher with the help of Agricultural Extension Workers identified Kaya elders who are also farmers and facilitated them in a discussion on indigenous farming knowledge. Guided questions were prepared and the focused and interactive sessions with the group of five Kaya Elders enabled a chance for every individual to talk. This activity was recorded using video recording and/or taking photographs using a smart phone. The data collected was qualitative data

### **3.8 Piloting Study**

This is a cut-down version of an extensive study or a test run undertaken in advance of the major study. Short open ended questions on role of a library repository to the preservation, management and dissemination of IFK and use of ICTs tools to build a repository of recorded traditional agricultural practices, procedures, and insights was administered to selected Kenya National Library Services, Kilifi Branch and Kilifi Sub-County Agricultural Officer and interview schedule on sample group of five Kaya Elders in Malindi in order to have a feasibility assessment along with preliminary testing of tools, questionnaires and interview schedules. The pilot studies that were undertaken at Kenya Agricultural and Livestock Research Organization coupled with the Cronbach's alpha determined the reliability level of the research instruments.

#### **3.8.1 Validity**

The consistency with which the instrument measures the phenomenon for which it is intended (Hermmersley, 1987). This degree serves as the foundation for both theoretical justifications and empirical data demonstrating the suitability and appropriateness of interpreters and actions based on test results. This study's credibility was determined by questionnaires through use of Cronbach's alpha and by testing the instruments on a similar group of individuals under a similar environment for the interview. There is an established shelter for abandoned old people at Gongoni in Malindi. The researcher simulated the intended Focus Group Discussion for testing validity of the interviews. Review of the knowledge asset was done by an experienced and revered indigenous knowledge holder, the supervisor and the researcher.

### **3.8.2 Reliability**

The consistency, stability, or dependability of data is referred to as reliability. When responders don't grasp the inquiry, reliability issues are typical. It refers to the likelihood that a repeat of the study will yield the same results and conclusions (Hammersley, 1987).

The instruments' reliability was determined from the pilot study by evaluating the framing of the questions and the replies collected. Reconstruction was carried to ensure the data's veracity. Cronbach's alpha was also used to assess the instruments' dependability.

### **3.9 Data Collection Techniques**

The researcher physically visited the respondents in their places of operation and administered the instruments. Snowball sampling techniques was applied. Kaya Elders are usually known in their communities and was therefore easier to identify the first custodian of indigenous farming knowledge who then identified another until that stratum was exhausted. This method was also used for the Focus Group Discussion whereby the identified group was arranged in a circle and the researcher used a set of guiding questions to solicit responses while the recording of the session using video-recording using smart phones and video recorders, flip camera for photographing and tape recorders for capturing audio. The researcher used an observation sheet to identify indigenous farming knowledge being applied by the identified farmers. Also cameras to take photographs of ongoing sessions and audio-visual recording of the sessions were undertaken.

### **3.10 Data Analysis**

Utilizing the Statistical Package for the Social Sciences (SPSS), descriptive statistics were used to analyze the data. Analysis of the audios was recorded guided by questionnaire templates in order to match what was explained with what was in the objectives. Interview data, focus group discussions data was transcribed; familiarized, coded, patterns identified, interpreted and reported using quotes and excerpts from the interviews to illustrate key points. Data presentation was by tables of means and standard deviation. The methodology involved the use of inferential statistics using statistical package for social sciences (SPSS) package and excel.

Quantitative data from questionnaires and observation schedule was computed to mean and standard deviation while texts, images and audio (qualitative) data was examined and interpreted by coding it, code organization, developing and grouping it into themes, triangulating and interpretation.

### **3.11 Logistical and Ethical Considerations**

#### **3.11.1 Logistical Consideration**

The researcher obtained an introduction letter from the School of Post Graduate Studies at Kenyatta University that was presented to the Director of Agriculture County Government of Kilifi who then informed the seven Sub County Agricultural Officers at the Sub County level. A schedule indicating the date and time for visiting each Sub County was made and followed to the letter. Sub County Agricultural Officers introduced the researcher to their extension workers who then identified the farmers to be included in the research. For focus groups, the

agricultural extension workers organized for the date and venue where the meetings were held and for the farm visits to observe the farming practices, the same procedure was applied.

### **3.11.2 Ethical Considerations**

The researcher adhered to ethical considerations by ensuring that research principles such as informed consent, applying zero pressure on individuals to participate, respecting individuals' autonomy while maintaining anonymity and confidentiality as well as objectivity were upheld. The reasons for undertaking the research were explained to the respondents before actual data collection was done. In the case of recording the activities, consent was sought first before any recording was undertaken.

## **CHAPTER FOUR**

### **PRESENTATION OF FINDINGS, INTERPRETATION AND DISCUSSION**

#### **4.1 Introduction**

This chapter presents the results, analyses, and discussions derived from surveys administered to Sub County Agricultural Officers, Public Library personnel in Kilifi County and recorded interviews with Kaya Elders who hold invaluable Indigenous Farming Knowledge. The findings, interpretations and discussions are according to thematic areas covered including to analyze the study community's understanding and perception of the use of ICT tools for IFK management and preservation. establish the ICT tools currently in use that can be used to record and preserve indigenous farming experiences for better accessibility and preservation, establish the significant role a library repository could undertake in preserving, managing, storing and disseminating IFK, to determine obstacles and issues pertaining to the preservation, accessibility and utilization of IFK.

#### **4.2 General and Demographic Information**

Demographic data was essential because it accorded the researcher an insight into the features of the respondents and this resulted into a more precise result interpretation and analysis. The examination of the data centered on the replies provided by 55(100%) Kaya Elders (Farmers), 7(100%) Sub County Agricultural Officers and 15(100%) library staff serving in public libraries in Kilifi County. The researcher had targeted a total of ninety eight (98) respondents of which seventy seven (77) responded (See Table 4.1 below). This corresponds to a reply rate of

79% which according to Babbice (2010) is considered significant enough to provide a foundation for valid inferences with regard to the research.

**Table 4.1: Response Rate of Respondents**

<b>Respondents</b>	<b>Targeted</b>	<b>Frequency</b>	<b>Percentage</b>
Kaya Elders (Farmers)	76	55	72
Sub County Agricultural Officers (SAOs)	7	7	100
Library Staff	15	15	100
<b>Total</b>	<b>98</b>	<b>77</b>	<b>79</b>

#### 4.2.1 Gender

Gender information was essential because it highlighted disparities and variations on opinions on the study variables. Surveys and interview schedules were used to collect the data, and participants' audio and video responses were recorded. The Statistical Package for the Social Sciences (SPSS) program was then used to evaluate the results. Gender factor has a significant relationship with adoption of technology. A question to establish the gender factor was asked across all respondents. The findings established that there were more men 35(64%) than women 20(36%).

**Table 4.2: Gender for Librarians**

<b>Respondent's age</b>	<b>Targeted</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Male</b>	15	10	67
<b>Female</b>	15	5	33
<b>Total</b>	<b>15</b>	<b>15</b>	<b>100</b>

All of the Sub County Agricultural Officials were males. Only among the librarians did the females 10(67%) exceed the male gender 5(33%) (See Table 4.2 above).

This finding is not very surprising bearing in mind the nature of work involved. More work in farming is tedious and hence prevalence of men.

#### **4.2.2 Age**

Age is a significant demographic variable because it provides insight into developmental differences. In addition, it accounts for different age cohorts due to the fact that different age cohorts may have experienced distinct historical, social or cultural events that influenced their perspectives, behaviors and attitudes. This helps determine whether research findings are applicable to different age groups. Questionnaires were distributed, and interviews were conducted with respondents while they were being audio and video recorded. Following that, the Statistical Package for Social Sciences (SPSS) was used to analyze and tabulate the data for presentation.

Indigenous farming knowledge is typically acquired through a combination of intensive practical agricultural experience and ongoing interactions between the knowledge keepers and their natural surroundings. The indigenous knowledge custodians should be the very old citizens who have acquired this knowledge from their parents and grandparents through apprenticeship and or songs, stories, observation and personal experience.

IFK is usually transmitted from one generation to the next. The custodians of IFK are usually then the old. The age and gender of the respondents were among the notable details requested. A question to determine the age of respondents was found imperative. Table 4.3 portrays the findings vividly.

**Table 4.3: Age of Kaya Elders (Farmers)**

<b>Respondent's age</b>	<b>Targeted</b>	<b>Frequency</b>	<b>Percentage</b>
<b>60-65</b>	55	0	0
<b>66-70</b>	55	6	11
<b>71-75</b>	55	19	34
<b>76-80</b>	55	21	38
<b>Above 80</b>	55	9	16
<b>Total</b>	<b>55</b>	<b>55</b>	<b>100</b>

General findings reveal the age group for most Kaya Elders (farmers) was 76-80 years old 21(38%) followed by 71-75 years old 19(34%) and above 80 years old 9(16%). Only a small group 6(11%) were of ages 66-70 years old. The dominant age bracket for the Kaya Elders was found to be 76-80 years of age 21(38%). No elders' 60-65 age bracket was present (See Table 4.3 above). This collaborated (Tang's and Gavin's, 2016) observation that the carriers of indigenous knowledge are normally old people. This being the case, a real need to document this knowledge for posterity is imperative. On the other hand, the age range for Librarians and Sub County Agricultural Officers provides a different scenario.

**Table 4.4: Age of Librarians**

<b>Respondent's age</b>	<b>Targeted</b>	<b>Frequency</b>	<b>Percentage</b>
<b>25-35</b>	15	0	0
<b>36-45</b>	15	12	80
<b>46-55</b>	15	3	20
<b>56-65</b>	15	0	0
<b>Total</b>	<b>15</b>	<b>15</b>	<b>100</b>

Majority of the Librarians were youthful 12(80%) were of ages 36-45 years of age and 3(20%) of age between 46-55 years age. None of the librarians was beyond 50 years of age (See Table 4.4 above). Youthful information professionals could be a real good asset in matters ICT adoption and usage. Indeed Lwoga, (2010) is of the view that public libraries in the rural areas could be useful in identification, documentation and diffusion of indigenous knowledge so that it's made accessible to scientists and local communities for upcoming initiatives on agricultural development as well as training local farmers to document their local practices while adopting ICTs to store and disseminate indigenous knowledge to others. Moahi, (2019) avers that public and national libraries have a mandate to collect, preserve and disseminate indigenous knowledge. This is supported by Owiny, Mehta and Marezki (2014) who agreed that libraries serve as moderators of indigenous knowledge databases as well as instruct community members on how to gather and record visual and spoken materials according to community needs.

**Table 4.5: Age of Sub-County Agricultural Officers**

<b>Respondent's age</b>	<b>Targeted</b>	<b>Frequency</b>	<b>Percentage</b>
<b>25-35</b>	7	0	0
<b>36-45</b>	7	5	71
<b>46-55</b>	7	1	14
<b>56-65</b>	7	1	14
<b>Total</b>	<b>7</b>	<b>7</b>	<b>100</b>

The Kilifi Sub County Agricultural Officers were found to be youthful too and the dominant age bracket 36-45 years 5(71%).The Kilifi Sub County Agricultural Officers were found to be youthful too with the dominant age bracket of 5(71%)

36-45 (See Table 4.5 above). With such youthful agricultural officers, it could be rightly assumed that with proper strategies, good will and apt ICT devices, the rich IFK in Kilifi County could be captured and stored for current and future generations.

### **4.2.3 Educational Background**

Educational background was important because it reflected the respondents' knowledge, skills, socioeconomic status, cultural contexts and their lifelong learning experiences. Formal education in any community fosters creative and critical thinking in the society as people are capable of formulating fixes for every challenge encountered. Education is therefore is an enabler for positive development in diverse spheres of community development. Without academic qualifications capturing knowledge for posterity could be a huge risk. The knowledge acquired over time requires literacy to extematize and capture for future support with international knowledge structures. This was critical for the research topic covered due to the diversity of the information required. Education level was a significant factor in the study and a question to establish education level of respondents were imperative.

Interview schedules and questionnaires were utilized to gather data, and interviewee replies were captured on audio and video recording devices. After the data was analyzed using the Statistical Package for Social Sciences, the findings were presented using tables and thematic content analysis. The researcher wanted to know how much education each respondent had. The interview respondents all attested they had no formal academic qualification. The Kaya Elders (Farmers) lacked formal education as none had an academic qualification. The respondents

were in agreement that formal education was not available to them as their main business from an early age was farming. One respondent summed up this way

“everyone in the Mijikenda community was involved in agricultural tasks from very early in life such as taking care of goats, accompanying parents to shambas, chicken keeping and did not attend school” (Respondent 6, 28.01.2023).

**Table 4.6: Educational Levels of Sub County Agricultural Officers**

<b>Qualification</b>	<b>Targeted</b>	<b>Frequency</b>	<b>Percentage</b>
<b>PhD</b>	7	0	0
<b>Masters</b>	7	0	0
<b>Degree</b>	7	2	29
<b>Higher Diploma</b>	7	0	0
<b>Diploma</b>	7	2	29
<b>Certificate</b>	7	3	42
<b>Other</b>	7	0	0
<b>Total</b>	<b>7</b>	<b>7</b>	<b>100</b>

Majority 3(42%) of the Sub County Agricultural Officers had acquired an educational level of a college certificate and the rest 2(29%) processed an educational level of a Bachelor Degree and a Diploma respectively (See Table 4.6 above). According to Gwenzi et al.'s (2015) alludes to the fact that old farmers know about matters relating to IFK which they use to gather and compile information to be used in enhancing their agriculture, the Sub County Agricultural Officers had academic qualifications that equipped them with the necessary skills to initiate programmes that use ICTs to document IFK for improved storage, accessibility, and use.

**Table 4.7: Educational Levels of Librarians**

<b>Qualification</b>	<b>Targeted</b>	<b>Frequency</b>	<b>Percentage</b>
<b>PhD</b>	15	0	0
<b>Masters</b>	15	1	7
<b>Degree</b>	15	4	27
<b>Higher Diploma</b>	15	0	0
<b>Diploma</b>	15	8	53
<b>Certificate</b>	15	2	13
<b>Other</b>	15	0	0
<b>Total</b>	<b>15</b>	<b>15</b>	<b>100</b>

Majority 8(53%) of the Librarians had acquired an academic qualification of Diploma while 3(27%) had a Bachelor Degree. The remaining Librarians 2(13%) and 1(8%) had an academic qualification of Certificate and Masters respectively (See Table 4.7 above).

Librarians possess the necessary educational credentials and expertise to work in tandem with indigenous knowledge keepers. Through this partnership, they are able to create initiatives that record traditional farming knowledge in order to improve its use, accessibility, and preservation.

#### **4.2.4 Working Experience**

This leads into obtaining a thorough grasp of an individual's labor market, engagement, career trajectories, socioeconomic status and wellbeing within different population groups. This data is crucial for guiding initiatives and policies meant to advance fair chances and enhance general societal outcomes. Information

was gathered through the administration of questionnaires and interview schedules, analyzed using the Statistical Package for Social Sciences (SPSS) and results subsequently presented through tables and thematic content analysis.

A question that sought to know the work experience of the Librarians and Sub County Agricultural Officers revealed most of these officers had good work experience in their respective positions. Indeed all of the Agricultural Officers had over six years of experience. This scenario is replicated among the librarians as Table 4.8 and Table 4.9 portrays. The general findings for the working experience for both the Sub County Agricultural Officers and the Librarians report that they all possessed five and more years of service.

**Table 4.8: Sub County Agricultural Officers work experience**

<b>Period of service in years served</b>	<b>Targeted</b>	<b>Frequency</b>	<b>Percentage</b>
<b>1-5</b>	7	0	0
<b>6-10</b>	7	2	29
<b>11-15</b>	7	2	29
<b>16-21</b>	7	1	13
<b>Above 30 years</b>	7	2	29
<b>Total</b>	<b>7</b>	<b>7</b>	<b>100</b>

Most of the Sub County Agricultural Officers 2(29%) had a working experience of 6-11, 11-15 and above 30 years of working experience respectively while only 1(13%) had 16-21 years working experience (See Table 4.8 above).

**Table 4.9: Librarians Work Experience**

<b>Period of service in years served</b>	<b>Targeted</b>	<b>Frequency</b>	<b>Percentage</b>
<b>1-5</b>	15	0	0
<b>6-10</b>	15	4	27
<b>11-15</b>	15	2	13
<b>16-21</b>	15	5	33
<b>Above 30 years</b>	15	4	27
<b>Total</b>	<b>15</b>	<b>15</b>	<b>100</b>

Working experience for the targeted Librarians serving in Public Libraries in Kilifi County was over 5 years' experience. Majority of the Librarians 5(33%) had a working experience of 16-21. Other targeted Librarians 4(27%) had a working experience of 6-10 and above 30 years of service respectively. Only a few 2(13%) of the targeted Librarians had a professional tenure ranging from 11-15 years of service (See Table 4.9 above). The Librarians working experience equips them to identify indigenous farming knowledge, capture it using ICTs, organize it, store and disseminate using Information, Communication and Technologies for posterity.

The findings depict that the Kaya Elders (Farmers) who are the indigenous knowledge custodians are very old and illiterate whilst the Sub County Agricultural Officers are mostly youthful and experienced males. The Librarians possess good experience of service. ICTs could be easily adopted by the youthful and experienced Sub County Agricultural Officers and Librarians to document

indigenous knowledge held by the old Kaya Elders (Farmers) which is faced with threats of loss if not captured.

### **4.3 Farmers' awareness of ICTs Tools And Technologies in Indigenous Farming Knowledge Preservation and Management**

The introduction of ICTs has been found to be a panacea of preservation and custody of valuable information. A question to the Kaya Elders (Farmers) whether they were privy that ICTs tools were important in preserving their IK put to them. There was a general consensus among the Kaya Elders (Farmers) that the introduction of ICTs had positively impacted various activities of their lives. One participant had this to say

#### **4.3.1 Awareness of the Importance of ICTs Tools in Preservation and Management of IFK**

The data captured included verbal responses from the Kaya Elders (Farmers) on their knowledge of the importance of ICTs tools in preserving their IFK. The IFK custodians were video recorded and the recording saved in a flash disk and a personal computer. Here are the findings according to one Kaya Elder (Farmer) who summed up the perception of ICTs tools in preservation and management of IFK thus: Technology came to assist people solve their problems. There is a time when you had to travel a long distance to convey a message but now you can do it while sitting down in your veranda. Technology must be embraced for the documentation of our indigenous knowledge least we die with this knowledge (Respondent 7, 28.01.2023).

It was generally acknowledged by the Kaya Elders (Farmers) that ICT tools are essential for managing and conserving traditional farming knowledge. Their understanding of how crucial it is to use ICTs to protect their indigenous farming knowledge (See Kaya Elder's response above) is very similar to what (Dlamini, 2012) and (Chigwada and Ngulube, 2023) averred that ICTs tools can provide a visual depiction of IFK heritage. It also means that the IFK custodians will consent to work with the librarians and Sub County Agricultural Officers (SCAOs) in capturing and documenting their IFK. This was in agreement with Ocholla (2007), who pointed out that indigenous knowledge is a highly endangered resource because of its tacit character as the custodians are primarily older people and pass it forward until they pass away. Some individuals believe that it is only known by the illiterate and impoverished, which lessens its usefulness.

A question to establish from the Sub County Agricultural Officers if Kaya Elders (Farmers) were aware of the importance of adopting ICTs tools in preservation of Indigenous Farming Knowledge for posterity. In a scale of 1 to 5 (where 1= very low and 5= very high) SCAOs were asked about Kaya Elders (farmers) level of awareness of IK captured in ICTs. The data captured in this inquiry was descriptive data explaining the IFK custodians awareness of IFK captured in ICTs. This data was important for the study because it informed on the IFK custodian's attitude towards using ICTs to capture and document their IFK. The data was computed to mean and standard deviation (See Table 4.10 below). The descriptive results obtained are presented in Table 10 as follows:

**Table 4.10: Awareness of The Kaya Elders (Farmers) On Adopting ICT****Tools For Preservation And Management Of IFK According To Sub County****Agricultural Officers**

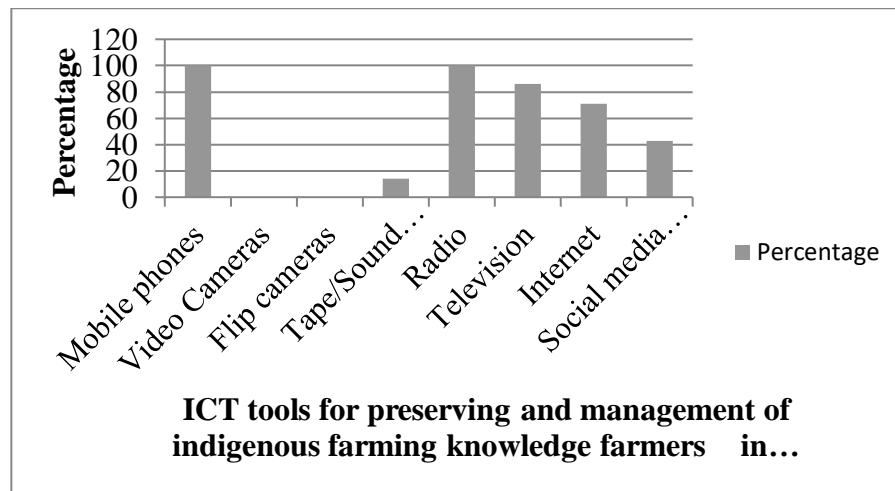
<b>Awareness level</b>	Very high	High	Uncertain	Low	Very Low	Mean	Standard deviation
<b>Percentage of awareness of IK captured in ICTs</b>	5.5%	10.6%	19%	38%	26.9%	3.012	0.8485

The general findings were that SCAOs had an opinion that majority of the farmers had low level of awareness of IK captured in ICTs (38%) with an overall mean of 3.012 and a standard deviation of 0.8485 (See Table 4.10 above). The results revealed a minor agreement with Okello et al, (2014), findings, demonstrating that mobile devices, CD-ROM, radio, television, interactive video, and the internet/web-based platforms are most often used ICT tools in Bungoma, Kirinyaga and Migori, Kenya. Those Kaya Elders (Farmers) who are aware of ICT tools can be incorporated with the others who are not aware so that they share their knowledge of IFK preservation and management and stimulate interest on need to use ICTs tools to preserve and manage their IFK.

**4.4 ICTs Tools For Preservation and Management of IFK**

Acknowledging the value of ICTs in gathering, recording, and sharing indigenous farming knowledge for better preservation and accessibility may prompt farmers to utilize libraries to access this indigenous knowledge. As a way of determining how knowledgeable the Kaya Elders (Farmers) are on ICTs tools, a question was put to the Sub County Agricultural Officers on the ICTs tools that can be adopted for IFK preservation Kaya Elders (Farmers) were familiar with. Quantitative

textual data was collected using questionnaires with a view to gathering knowledge from SCAOs on the ICTs tools Kaya Elders were familiar with. The data is useful for identification of ICTs tools that can be used in the capture and documentation of IFK. The qualitative data was analyzed using thematic content analysis and SPSS software and presented as graph illustrated in Fig. 4.1 below:



**Figure.4.1: ICT Tools for Preserving and Managing Indigenous Farming Knowledge Farmers In Kilifi County are Familiar With**

The Sub County Agricultural Officers identified a number of ICT tools that Kaya Elders were familiar with notable among them being cell phones, radios, television, internet, and social media platforms. All of the Sub County Agricultural Officers 7(100%) was in agreement that Kaya Elders (farmers) were familiar with mobile phones and radios. A big number 6(86%) also indicated familiarity with television and 5(71%) internet. Social media technologies 3(43%) as well as tape/sound recording 1(43%) was also identified (See Fig.4.1 above). This was collaborated by Derso, D., & Ejiro, Ekuogbe who described the emphasis on the internet and associated technologies shifting interest away from radio and television to cell phones, computers and the internet as forms of ICTs in agriculture and DVDs that

store films with video and audio effects and smart phone technology (Kaddu, S. & Haumba, E.N., 2016). The wide acceptance, familiarity and usage of ICTs tools in mostly all spheres of human endeavor qualifies them as appropriate for capturing and managing IFK for enhancement of agricultural production.

An inquiry to the Kaya Elders (Farmers) to identify any ICTs tools that may be used for the preservation and management of indigenous farming knowledge that they were familiar with revealed radio, television and tape sound recorders. One participant averred that “ICTs for preservation and management of knowledge that I am familiar with are mobile phones, radios, television, video cameras, tape sound recorders and computers” (Respondent 6, 28.01.2023).

This collaborated Owiny, Mehta and Marezki, (2014) who asserted that in developing countries, cell phones are ubiquitous because they provide users with mobility, personal control, and flexibility, as well as the ability to interact. Smart phones are manufactured with powerful cameras and video recorders that can be used to record indigenous farming knowledge experiences by farmers for radio programmes by popular radio and television stations such as Radio Kaya, record audio cassettes, use email, internet, video cassettes and film shows or documentaries that can be shared through internet/web-based platforms and social media technologies including facebook, whatsapp, tiktok (Dlamini and Ocholla, (2018) who identified tools that have been used for capturing, storing and preserving IFK for posterity video camera, video recording/filming, tape/sound recording and mobile phones. The familiarity with these ICTs tools will make it easier for Librarians and Sub County Agricultural Officers to collaborate with the Kaya Elders (Farmers) to create indigenous knowledge content for preservation

and management. ICTs tools are usable in capturing and documenting IFK that is remaining in the few Kaya Elders (Farmers) still living in Kilifi County as they are already familiar with them and preserve and management for accessibility and use to improve agriculture production.

A question to the Sub County Agricultural Officers on the Kaya Elders' (Farmers) level of familiarity of ICTs tools that can be used for preservation and management of IFK revealed as illustrated in Table 4.11 below: In a scale of 1 to 3 (where 1= not familiar and 3= very familiar) SCAOs were asked about Kaya Elders' familiarity level of ICTs on preservation and management of IK. The results obtained are given by Table 11 below:

**Table 4.11: Kaya Elders (Farmers) Level of Familiarity on ICTs**

<b>Familiarity level</b>	Very familiar	Familiar	Not familiar	Mean	Standard deviation
	26.67	73.33	0	1.627	0.6714
<b>Percentage of familiarity level of Kaya Elders on ICTs</b>	26.67%	73.33%	0%	1.627	0.6714

Majority of the Kaya Elders (farmers) were familiar (73.33%) with ICTs tools on preservation and management of IFK with an overall mean of 1.627 and a standard deviation of 0.6714 as acknowledged by the Sub County Agricultural Officers (See Table 4.11 above).

The Kaya Elders' (Farmers) familiarity of ICTs tools on preservation and management of IFK will enable librarians to easily convince these IFK custodians

to let their IFK be captured and documented for preservation and use as advocated by IFLA.

A question to establish whether the Kaya Elders (Farmers) had ever used any of the identified ICTs tools revealed that albeit their familiarity with ICTs tools for preservation and management of IFK, none of the Kaya Elders (Farmers) had ever used any of the ICTs tools. One Kaya Elder (Farmer) succinctly put it thus “I have never used any of the identified ICTs tools to preserve and manage indigenous farming knowledge” (Respondent 7, 28.01.2023).

This collaborated Osundu, (2015) who asserted that there is a very high awareness level of the radio, television and mobile phones although it is possible for a farmer to have access to ICT without using it due to low education, low knowledge of use and fear of trying. If the Kaya Elders (Farmers) are oriented on the use of ICTs there is a high possibility that they can use it to capture indigenous farming knowledge experiences and preserve it for transmission to the younger generation who are more likely to embrace it because it will have come from their favorable channel of communication.

This was an agreement to Lwoga, Ngulube and Stilwel, (2011) assertion that the present generation is mostly attracted to listening to music and tales from television and radio than attending the traditional folklore activities and therefore denying them an opportunity to acquire, preserve, access and use indigenous farming knowledge. Knowledge of ICTs tools use has a great significant in agricultural development including providing extension services and assisting farmers to increase their yields. A similar question to the Sub County Agricultural Officers

(SCAOs), Librarians and Kaya Elders (Farmers) on issue based on question asked regarding awareness of these ICTs tools in the preservation and management of IFK in Kilifi County revealed that ICTs tools need to be promoted as a way of preserving and managing IFK. All SCAOs and Librarians agreed ICTs tools need to be promoted as a way of preserving and managing IFK. One Kaya Elder (Farmer) opined as thus;

“Technology is a contribution to the world by all mankind and should be used positively to advance indigenous farming knowledge and culture, and its use must be promoted, it can be used to propagate indigenous farming knowledge. We need to just know the ICTs tools which are popular with our youths and include our indigenous farming knowledge in them” (Respondent 6, 28.01.2023).

This concurred with Lwoga, (2012) who revealed that a few farmers in Kilosa in Tanzania used ICTs to combine and create new knowledge and acquire indigenous farming knowledge although person to person communication was still the most predominant method for communicating indigenous farming knowledge. The Kaya Elders’ (Farmers) perception of use of ICTs tools is healthy and can lead to possibilities of using ICTs tools to document, preserve and disseminate IFK using ICTs. Knowledge of the perception of Kaya Elders (Farmers) about ICTs tools in regard to preservation and management of IFK is very valuable because it can stimulate the need for documenting indigenous farming knowledge for succeeding generations. A question to the Sub County Agricultural Officers on how they perceived ICTs tools in regard to preservation and management of IK was put to them. There was a general view among the Sub County Agricultural Officers that they perceived ICTs tools as being expensive to purchase and maintain and that they required to be promoted.

**Table 4.12: Perception of the Sub County Agricultural Officers on ICT tools in regard to Preservation and Management Of Indigenous Farming**

**Knowledge in Kilifi County**

<b>Perception of SCAOs on ICTs in regard to preservation</b>	<b>Targeted</b>	<b>Frequency</b>	<b>Percentage</b>
Require skills to access	7	3	43
Need to be promoted	7	2	29
Expensive to purchase and maintain	7	2	29
<b>Total</b>	<b>7</b>	<b>7</b>	<b>100</b>

However, majority 3(43%) of the Sub County Agricultural Officers perceive ICTs tools in regard to preservation and management of IFK as requiring skills to access while 2(29%) perceive ICTs tools in regard to preservation and management as requiring promotion and expensive to purchase and maintain respectively (See Table 4.12 above). Improving the knowledge of farmers on relevance and benefits of ICTs in agriculture should be prioritized since its contribution towards documenting indigenous experiences can never be overlooked. The researcher further sought the opinion of Kaya Elders (Farmers) in regard to technology assisting in the preservation of indigenous farming knowledge. The general opinion of the Kaya Elders was that technology could assist in the preservation and management of IFK. One Kaya Elder (Farmer) had this to say:

“This technology can assist us preserve our indigenous knowledge by creating content that will assist us have our own television channel that can ran the whole day broadcasting indigenous knowledge content. We can then direct our children to watch this channel but it requires effort from scholars educated by the community” (Respondent 6, 28.01.2023).

This was a confirmation of Okelo et al, 2014, who identified mobile phones, internet/web based platforms, interactive video, CD-ROMS, radio and television ICTs tools frequently used for agricultural information in Bungoma, Kirinyaga and Migori; Kenya. This offers an insight on how indigenous farming knowledge that resides in the memories of elderly people should be documented while they are still alive and willing to share it before the little that remains is totally lost.

The researcher sought to find out from the librarians whether farmers were aware of IFK captured in ICTs. Tabulated in Table 4.13 below are findings of the inquiry:

**Table 4.13: Awareness of the Kaya Elders (Farmers) of Indigenous Knowledge Captured In ICTS**

<b>Responses</b>	<b>Targeted</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Yes</b>	15	0	0
<b>No</b>	15	15	100
<b>Total</b>	<b>15</b>	<b>15</b>	<b>100</b>

The general finding is that no Librarian was aware of any Kaya Elder (Farmers) who had knowledge of any indigenous knowledge captured in ICTs tools. All 15(100%) of the Librarians concurred that farmers in Kilifi County are not aware of IK captured in ICTs. This signifies that if there is any indigenous knowledge resources that are preserved and managed by ICTs, these resources are not accessed by the users for lack of knowledge on their availability. There is need for an attempt

to improve accessibility and use of these IK resources by the farmers so as to scale up their farming production. The presence of ICTs tools to support preservation, management and dissemination of IK just required the initiation of IFK documentation for diffusion to the intended users. In an attempt to rate the ICTs tools in their support for preservation, management and diffusion of IK, Librarians were requested to rate their ICTs tools. Fig. 4.2 below reveals:

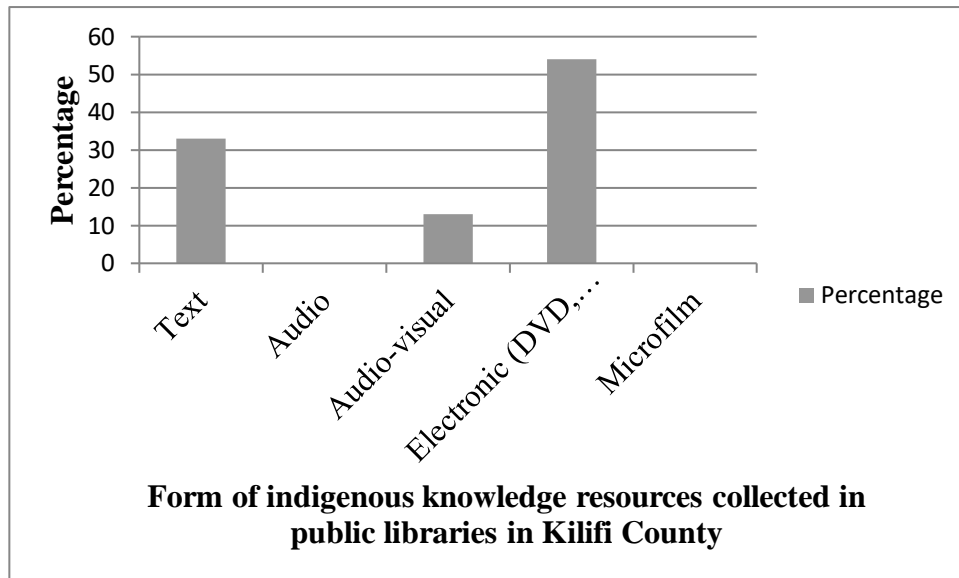
In a scale of 1 to 5 (where 1= strongly disagree and 5= strongly agree) Librarians were asked about ICTs capacity to preserve, manage and disseminate IFK. The results obtained are presented in Table 4.14.

**Table 4.14: ICTs Tools Capacity in Preservation, Management And Dissemination of IFK**

<b>Capacity of ICTs tools to preserve, manage and disseminate IFK</b>	Strongly disagree	disagree	Not sure	Agree	Strongly agree	Mean	Standard deviation
<b>Percentage</b>	6.667%	13.333%	6.667%	40%	33.333%	3.812	0.7652

Majority of the Librarians agreed that ICTs have the capacity to preserve, manage and disseminate indigenous farming knowledge (40%) with a mean of 3.812 and standard deviation of 0.7652. This is a positive indication on the aspect of librarians using ICTs tools to capture and record IFK for conservation and use.

The researcher sought to determine from the Librarians the form of indigenous resources kept in the libraries. The findings are illustrated in Fig.4.2 below:



**Figure. 4.2: Form of Indigenous Farming Resources in Libraries**

Majority 8(54%) of Librarians identified Electronic (DVD, CD, Databases) as the form indigenous farming resources in the library are in and 5(33%) identified text as the form indigenous farming resources are in. Other form of indigenous farming resources in the public library is Audio-visual 3(13%) (See Fig. 4.2 above). These forms of IK resources in Kilifi County's public libraries agree with the suggested ICTs tools for preservation and management of indigenous knowledge. These tools could be utilized to document and preserve IFK for posterity.

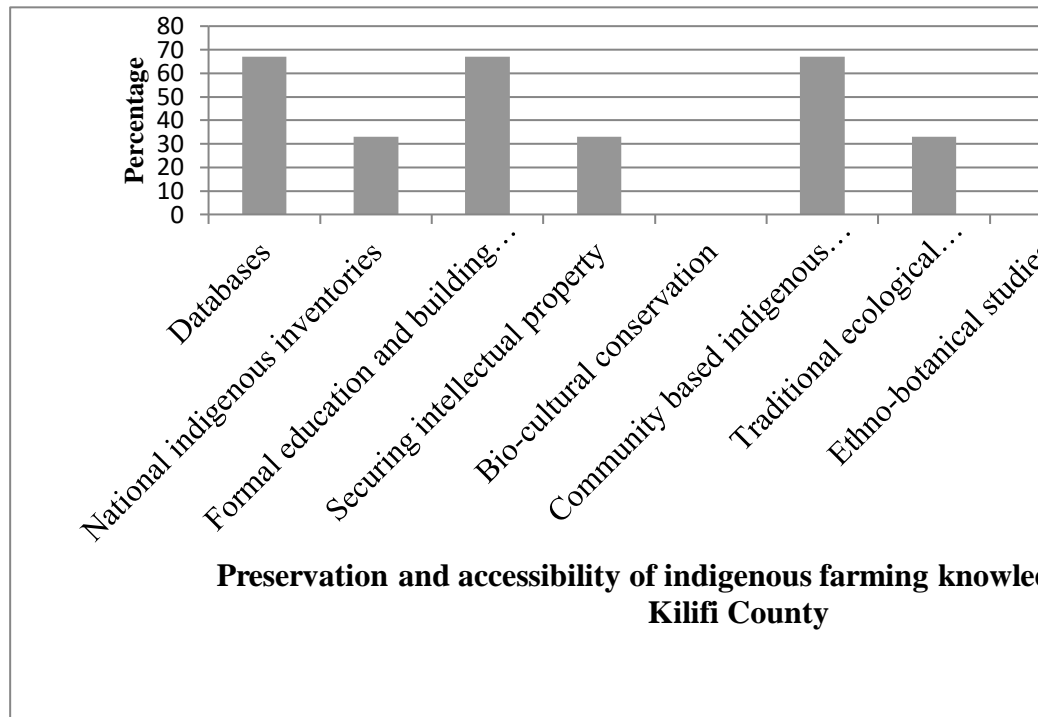
Successful initiatives in utilizing ICTs tools to record IFK must be supported by the Librarians' knowledge about their capacity to preserve and manage IFK and their skills set in their ability to work with IFK owners in capturing IFK.

An inquiry to the Librarians to establish if there were any initiatives for preservation and accessibility of indigenous farming knowledge in Kilifi County revealed that Librarians generally agreed that there were no indigenous knowledge preservation and accessibility initiatives taking place in the County.

**Table 4.15: Initiatives for Preservation And Accessibility Of Indigenous Farming Knowledge**

<b>Responses</b>	<b>Targeted</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Yes</b>	15	3	20
<b>No</b>	15	12	80
<b>Total</b>	<b>15</b>	<b>15</b>	<b>100</b>

Majority (15(80%)) of the Librarians were of the view that there weren't any indigenous farming knowledge preservation and accessibility initiatives while 3(20%) opined that there were (See Table 4.15 above). Librarians' lack of information on the IFK preservation and management signify a lack of interest on their part to include IFK among their collection. This goes against the IFLA/UNESCO mandate that amongst the public libraries' roles is collection, preservation and dissemination of indigenous and local knowledge. A further attempt to identify the preservation and accessibility initiatives opined by the three Librarians revealed as illustrated in Fig.4.3 below:



**Figure. 4.3: Preservation and Accessibility of IFK Initiatives**

Majority 2(67%) of the three Librarians were of the view that databases, formal education and building awareness and community based indigenous knowledge maintenance as IFK preservation and accessibility initiatives. Others 1(33%) identified national IK inventories, securing intellectual property and traditional ecological knowledge conservation actions (See Fig.4.3 above). This knowledge can be instrumental to the application of ICTs in documenting IFK for improved preservation, accessibility and use.

#### **4.4.1 ICTs for Digital Preservation and Dissemination Of Indigenous Farming Knowledge**

ICTs play a crucial role in capturing, identifying, documenting, and preserving knowledge for posterity as well as dissemination of the same.

##### **ICT tools for preservation and management of IFK in libraries**

Qualitative data on the presence of ICTs tools for preservation and management of IFK in libraries as well as the ICTs tools was collected. This was critical for the research because libraries are mandated by IFLA (2010) to preserve indigenous knowledge due to its important role in sustainable development. Data collected was analyzed using SPSS software and presented in the form of graphs and tables. A question to establish from the Librarians whether there are any ICTs tools in their libraries revealed:

**Table 4.16: Presence of ICT Tools in Public Libraries in Kilifi County**

<b>Response</b>	<b>Target</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Yes</b>	15	15	100
<b>No</b>	15	0	0
<b>Total</b>	<b>15</b>	<b>15</b>	<b>100</b>

The Librarians generally agreed that there were ICTs tools in their libraries. All 15(100%) of the Librarians agreed that there were ICTs tools in their libraries (See Table 4.16 above). This agrees with the IFLA/UNESCO manifesto that outlines the services of public libraries as services that should be physically accessible to all members of the community which requires among others relevant technologies.

The presence of ICTs tools in the public libraries in Kilifi County signify that any indigenous farming knowledge available would be accessible to a wider clientele as well as be preserved for posterity. A question to the Librarians to determine whether these ICTs tools in their libraries could support preservation, management and diffusion of IFK revealed as illustrated in Table 4.17 below:

**Table 4.17: ICT Tools Supporting Preservation, Management and Dissemination Of Indigenous Knowledge**

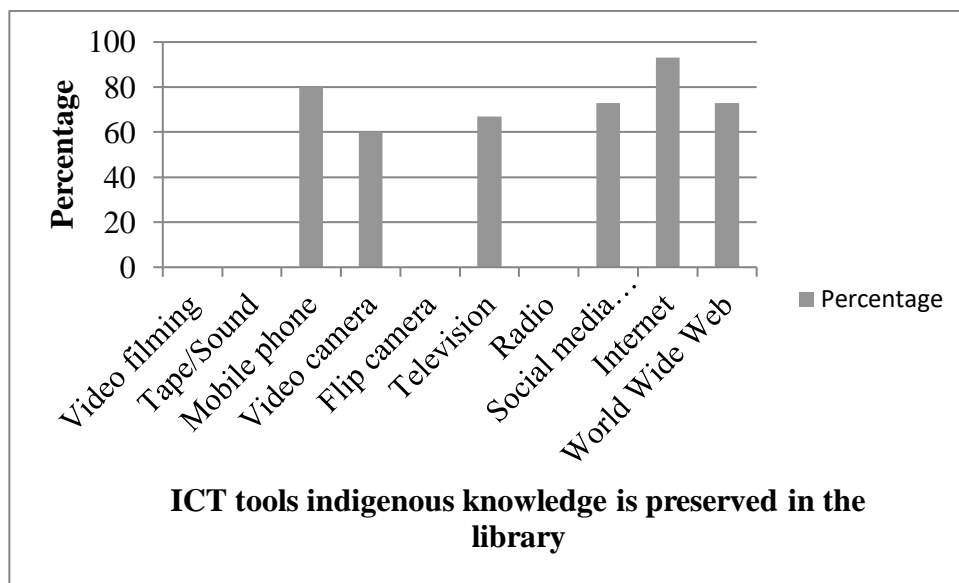
<b>Response</b>	<b>Target</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Yes</b>	15	10	67
<b>No</b>	15	5	33
<b>Total</b>	<b>15</b>	<b>15</b>	<b>100</b>

The findings were that Librarians agreed that ICTs tools could support preservation, management and dissemination of IK. Majority 10(67%) of the Librarians were of the view that the ICTs tools in their libraries could support preservation, management and dissemination of indigenous knowledge while 5(33%) were contrary to this view (See Table 4.17 above). The presence of ICTs tools that can support preservation, management and dissemination of indigenous knowledge signify the capability for the public libraries in Kilifi County preserve, manage and disseminate IFK if it could be included amongst their collection.

However, the preservation of IK should not be limited to just text or electronic media. It is necessary to create meta-information to improve retrieval's usability.

As a result, it should also incorporate other kinds of retrievable information repositories, such recordings, movies, stories, gene banks, etc.

A question to the Librarians to find out the ICTs tools indigenous knowledge is preserved in the library. The findings are illustrated in Fig. 4.4 below:



**Figure. 4.4: ICT Tools Indigenous Knowledge Is Preserved in The Library**

The general findings were that indigenous knowledge preserved in the libraries was preserved in mobile phones, and internet technologies. Majority 14(93%) of the Librarians identified the internet as the ICTs tool for indigenous knowledge preservation in the library. The other ICTs tools for indigenous knowledge preservation identified included 12(80%) mobile phone, 11(73%) social media technologies and the World Wide Web, 10(67%) television and 9(60%) video camera respectively (See Fig. 4.4 above). This collaborated with Lwoga (2011) who averred that in Tanzania and Uganda ICTs tools including radio, cell phones, television, audio cassettes, email, internet, video cassettes and film shows were used by farmers for acquiring and preserving indigenous knowledge. The use of

ICTs tools to document indigenous farming knowledge in Kaya Elders' (Farmers) memories by capturing their indigenous farming knowledge experiences and preserving them for improvement management can become a reality if the Librarians could take it up with the relevant authorities including the Department of Agriculture of Kilifi County Government.

Librarians' conversant on ICTs tools for preservation of indigenous knowledge can ensure enhanced access of this knowledge through many platforms. A question to establish whether Librarians were conversant on the operations of ICTs tools in their libraries was asked. The findings are shown on Table 4.18 below:

**Table 4.18: Librarians' Conversant On The Operation of ICTs**

<b>Response</b>	<b>Target</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Yes</b>	15	12	80
<b>No</b>	15	3	20
<b>Total</b>	<b>15</b>	<b>15</b>	<b>100</b>

There was a general consensus that Librarians were conversant on the operation of ICTs. Indeed a majority 13(80%) of the Librarians agreed that they were conversant with the operation of ICTs tools used for capturing indigenous knowledge in their library while 3(20%) of the librarians were not conversant with the ICTs tools used for capturing indigenous knowledge (See Table 4.18 above). Public libraries have a duty to document indigenous knowledge and improve its accessibility through their resources by ensuring that users have various access options including digital platforms as well as manual so that they improve their

farming productivity. The public libraries that do not collect local knowledge deny their users of a very crucial resource in their socioeconomic development. The knowledge on the ICTs tools for capture of indigenous knowledge must be utilized to ensure indigenous knowledge is documented before its custodians die of old age.

A question to find out what needs to be done in order to preserve, manage and disseminate IFK in Public Libraries in Kilifi County was posed to the Librarians.

The findings are shown in Table 4.19 below:

**Table 4.19: What Needs To Be Done In Order To Preserve, Manage And Disseminate IFK In Public Libraries In Kilifi County**

<b>What needs to be done in order to preserve, manage and disseminate IFK in Public Libraries in Kilifi County</b>	<b>Frequency</b>	<b>Number</b>	<b>Percentage</b>
Intentional legislation	9	15	60
Not sure	6	15	40
<b>Total</b>	<b>15</b>	<b>15</b>	<b>100</b>

The general findings on what needs to be done in order to preserve, manage and disseminate IFK was the government to enact an intentional legislation to govern this activity. Most of the Librarians 9(60%) agreed that preservation, management and dissemination of IFK in Kilifi County must be supported by intentional legislation while 6(40%) were not sure of what needs to be done in order to preserve, manage and disseminate of IFK in Kilifi County (See Table 4.19 above).

The Kenya Library Services Act Cap Laws of Kenya advocates for national and public libraries to acquire all types of information for continuous learning as well

as supporting literary activities for all types of users. This legislation needs to be enforced and indigenous farming knowledge will form part of the national and public libraries.

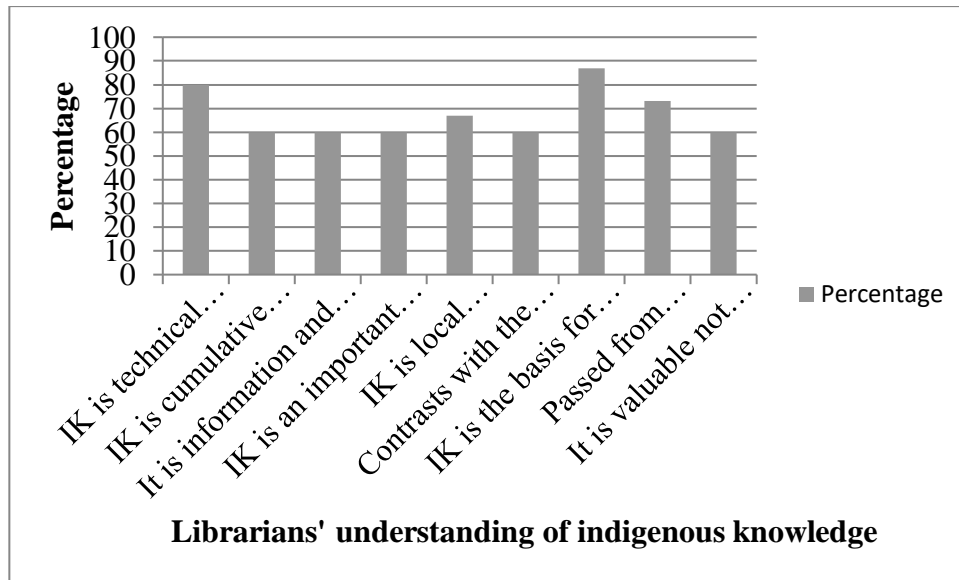
#### **4.5 Role of Public Library Repository As An Agent Of Indigenous Farming Knowledge Preservation**

Libraries should be at the forefront in documenting, preserving and disseminating indigenous farming knowledge in Sub Sahara Africa considering that most of the economies in this region are agriculture based. Since the public library serves as the area's main repository for knowledge and information and is a vital part of knowledge societies, it must constantly adapt to new forms of communication in order to carry out its mission of ensuring that everyone has access to and can meaningfully use information.

##### **4.5.1 Librarians' Understanding of Indigenous Knowledge**

Librarians' understanding of their role in the procurement, preservation, and distribution of native can only be influenced by their understanding of what it is and its contribution towards sustainable development. This premise informed the capturing through of data concerning librarians' understanding of indigenous knowledge and analyzed using SPSS software.

The researcher sought to find out from the Librarians what their understanding of indigenous knowledge entailed: Fig. 4.5 below illustrates their understanding:



**Figure. 4.5: Librarians' Understanding of Indigenous Knowledge**

The findings brought to the fore that indigenous knowledge is not easy to define. Hence different levels of understanding of indigenous knowledge were promulgated. The Librarians were of the view that they understood indigenous knowledge to be technical insights or insight acquired and cultivated by individuals within a specific community, and knowledge that is inherent and distinctive to a particular culture or society. Majority 13(87%) of the Librarians understood IK to be serving as the foundation for local decision-making about food preparation, healthcare, and agriculture, and the management of natural resources while 12(80%) understood it to be the technical insights or insight acquired and cultivated by individuals within a specific community, and another 11(73%) understood it as that information transmitted orally from one generation to another in numerous societies and 10(67%) understood it as that knowledge which is local and unique to a given culture or society. Other 9(60%) Librarians understood it as that knowledge which is a cumulative body of knowledge generated and evolved

overtime, knowledge which is information and know how on variety of matters, knowledge that is an important resource, contrasts with the international knowledge system generated by universities, research institutions and private firms and that knowledge which is valuable not only for the culture in which it evolves but also for scientists and planners striving to improve conditions in rural localities respectively (See Fig. 4.5 above). This seemingly diverse understanding of indigenous knowledge concurs with Lwoga, Ngulube and Stilwel, (2011) who asserted that indigenous knowledge is impossible to explain or convey since it is typically communicated through illustration as opposed to explanation.

Indigenous knowledge has not been considered as important and is viewed as knowledge of the poor and illiterate which undermines indigenous knowledge making it seem less useful. According to Masenya, (2023), indigenous knowledge has always been seen as archaic, backward, uncivilized, superstitious, savage, irrelevant to progress, and more of a barrier than a catalyst for change. This perception led into the researcher to further seek to ascertain from the Librarians whether they considered indigenous knowledge as important to the library. Table 4.19 below illustrates the responses of the question on importance of indigenous knowledge to the library:

**Table 4.20: Importance of Indigenous Farming Knowledge to A Library**

<b>Response</b>	<b>Target</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Yes</b>	15	9	60
<b>No</b>	15	3	20
<b>Not sure</b>	15	3	20
<b>Total</b>	<b>15</b>	<b>15</b>	<b>100</b>

Librarians agreed that they regard indigenous knowledge as important to a library. Majority 9(60%) of the Librarians regard indigenous knowledge as important to a library while only 3(20%) of Librarians do not regard so. Other 3(20%) Librarians were not sure of the importance of indigenous knowledge to a library (See Table 4.20 above). This concurs with Maina, (2012) who avers that increased recognition of indigenous knowledge as a contributor of indigenous peoples' creativity in a given locality, innovativeness and development as well as human progress has resulted in the need for its collection, preservation and dissemination, publicizing of its significance, worth, and contribution to both native and non-native people. This calls for protection of indigenous knowledge by documenting and preserving it in repositories in public libraries and making it accessible to the community for improved agricultural production.

A question to establish whether the library acquires IK for her users revealed that the activity is normally carried out.

**Table 4.21: Acquisition Of Indigenous Farming Resources**

<b>Response</b>	<b>Target</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Yes</b>	15	8	54
<b>No</b>	15	5	33
<b>Not sure</b>	15	2	13
<b>Total</b>	<b>15</b>	<b>15</b>	<b>100</b>

The Librarians were of a general opinion that indigenous resources were acquired in their libraries. Majority 8(54%) of Librarians were positive in their response while 2(13%) of the Librarians were not sure if such activities are in place. A substantial number 5(33%) disagreed (See Table 4.21 above). This is in agreement with IFLA/UNESCO manifesto that public and national libraries have a mandate to gather, maintain, and share local and indigenous knowledge.

This is encouraging because public libraries' recognition of indigenous knowledge will lead into government sponsored initiatives to document, preserve and disseminate it for improved agricultural production.

### **IFK Capture and documentation**

Knowledge capture is a knowledge management practice that involves the key inputs/outputs of knowledge. Several mechanisms are deployed for this so as to extract valuable knowledge for documentation for posterity.

A question to the Librarians on indigenous farming knowledge capture established that IFK is captured through apprenticeship, verbal and audio-visual media. Capture involves process of codifying knowledge such as in reports, documenting

manuals and packaging it in computer systems. These methods agree with Ocholla, (2007) who identified oral storytelling, songs, folklore, proverbs, dances, myths, cultural values, beliefs, and rituals as the traditional methods of capturing, processing, preserving, and transmitting indigenous knowledge. Instead of an indigenous knowledge owner's death signifying the extinction of his or her knowledge since that person dies along with the knowledge, ICTs can record these and develop indigenous farming repositories for future generations.

A question to the Librarians to determine the role public libraries play in the preservation and use of indigenous knowledge revealed that all Librarians generally agreed that public libraries play a significant role in the preservation and use of indigenous knowledge including provision of access of IK resources to researchers.

The librarians agreed with Sarkhel, 2016, who shared IFLA's requirement for public and national libraries to collect, store and distribute indigenous and local and promote its usefulness and benefaction. Librarians in Kilifi County can therefore establish strategies to collaborate with SCAOs and capture, preserve and manage IFK. This resonates well with the research study and the interest on IK for sustainable development.

### **Resources farmers seek in Kilifi County libraries**

Data on Kaya Elders' (Farmers') visits to libraries and the information resources they seek was of importance in the research because it led into knowledge of whether the librarians acquired, preserved and managed IK resources. The data collected was analyzed using SPSS software and presented in tables and graphs.

The researcher sought to establish whether farmers in Kilifi County visit the library to seek for indigenous resources.

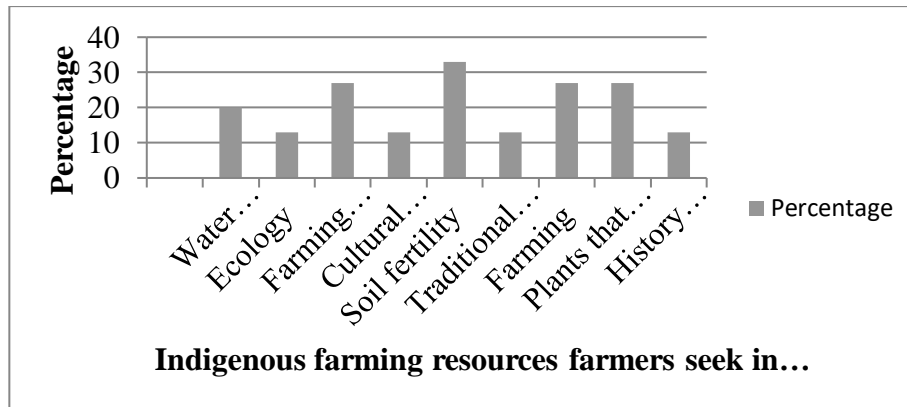
A question to the Librarians to find out if farmers visit the libraries to seek for indigenous resources revealed:

**Table 4.22: Farmers visiting the libraries to seek for indigenous resources**

<b>Responses</b>	<b>Target</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Yes</b>	15	9	60
<b>No</b>	15	6	40
<b>Total</b>	<b>15</b>	<b>15</b>	<b>100</b>

The Librarians had a general view that farmers visited the library to seek for indigenous resources. Indeed most of the Librarian 9(60%) agreed that farmers visited the library to seek for indigenous resources while 6(40%) disagreed (See Table 4.22 above). This is encouraging since there is potential for maximum use of indigenous farming knowledge by the intended users who are the farmers themselves. These visits by farmers to the library prompted the researcher to seek to know the indigenous materials farmers seek in Public Libraries in Kilifi County.

A question to determine the type of indigenous knowledge information resources these farmers sought revealed:



**Figure. 4.6: Indigenous knowledge resources farmers seek in public libraries in Kilifi County**

Librarians considered soil fertility, farming, farming methods using locally available resources and plants that can withstand dry weather as indigenous knowledge resources farmers seek in public libraries. Majority 5(33%) of the farmers who visit public libraries in Kilifi County seek indigenous knowledge on soil fertility while 4(27%) of the farmers seek resources on farming, plants that can withstand dry weather and farming methods using locally available resources. Other 3(20%) farmers seek indigenous knowledge resources on water harvesting. The rest 2(13%) farmers seek indigenous information resources on ecology and cultural services to humankind, traditional food preservation methods and history and culture of Coastal people respectively (See Fig. 4.6 above). This is in line with the 2010 declaration on the mandate of public libraries by the International Federation of Library Associations (IFLA), which states that public and national libraries have a duty to gather, preserve, and share indigenous and local knowledge as well as to educate the public about the worth, significance, and contribution of indigenous knowledge to both non-indigenous and indigenous peoples. It also raises awareness about the need to protect indigenous knowledge from exploitation

and involves elders and communities in the process of producing indigenous knowledge (Moahi, 2019). If public libraries follow this proclamation, documenting indigenous farming knowledge for better preservation, accessibility, and usage can be accomplished. It will result into capturing, preserving and managing indigenous farming knowledge in indigenous knowledge repositories that will scale up the use and application of indigenous knowledge for improved agricultural production.

Library, well-constructed and financed can become a great knowledge asset for indigenous knowledge. An appropriate anchor partner in the indigenous knowledge management system is the library especially public libraries, which enjoy a stable position within the community and is made possible by government operations.

A question to find out why the Kaya Elders (Farmers) in Kilifi County do not seek for indigenous knowledge resources in Kilifi County Public Libraries revealed:

**Table 4.23: Reasons as to why farmers in Kilifi County do not seek for indigenous farming resources in Public Libraries**

Reasons	Target	Frequency	Percentage
Libraries lack indigenous information resources	15	7	47
Distance between farmers and libraries	15	8	53
<b>Total</b>	<b>15</b>	<b>15</b>	<b>100</b>

Librarians had a general opinion that lack of indigenous information resources was the reason as to why farmers did not seek for IFK resources in Public Libraries in Kilifi County. Majority 8(53%) of the Librarians identified distance between

farmers and libraries as a reason as to why farmers in Kilifi County do not seek indigenous knowledge resources in libraries while 7(43%) identified lack of indigenous knowledge information resources in public libraries in Kilifi County as the reason as to why farmers in Kilifi County do not seek indigenous knowledge information resources in libraries (See Table 4.23 above). This is exactly an opposite to what is expected of public libraries as Callison, (2016) avers that a culturally responsible library has an obligation to house materials for their local community in which both the materials collected and the catalogue used to find those materials are in the community's traditional language so as to reflect the native culture. Documenting indigenous farming knowledge and preserving it for improved access and use through various platforms by the community will enhance the community's interest in the library and improve their visits either through accessing the websites or physical visits. This will enhance the profile of the library.

A proposal to develop a knowledge asset that could increase information and expertise that improves the level of an individual understanding to more effective problem solving and enhance decision making is the genesis of this research study. Knowledge assets enhance visibility of the library and improve its recognition and respect amongst its user community. In this open access age, a knowledge asset can attract experts who can utilize the resources therein to solve a myriad of problems. The IFK asset could enhance user engagements by training them to record their indigenous knowledge experiences that this could ensure that indigenous knowledge mined from Kaya Elders (Farmers) is documented and preserved for posterity.

#### **4.6 IFK Preservation, Accessibility and Use Barriers And Concerns**

IFK is faced with the possibility of disappearance due to various factors. The Kaya Elders (Farmers) were asked to establish threats to IFK in the modern world. There was a general opinion amongst the Kaya Elders (Farmers) that IFK was faced with the threat of extinction due to none documentation, dying of vernacular language and parents not allowing their children to spend time with their grandparents.

##### **Threats and challenges to IFK preservation, accessibility and use**

By use of an interview schedule, qualitative data was collected and analyzed using thematic content analysis. Indigenous farming knowledge gatekeepers are highly an endangered lot in Kilifi County due the peoples' perception that they are sorcerers as narrated by one Kaya Elder (Farmer) who had this to say

“I just saw a group of youths coming to my homestead armed with machetes. They descended on me and ambushed me and left me thinking I was dead. I was rescued by the area Assistant Chief who called the police who took me to Malindi Sub County Hospital”  
(Respondent 9, 28. 01. 2023).

The threat faced by Kaya Elders (Farmers) is also a threat to the existence of IFK.

If prompt action to document IFK for improved preservation, accessibility and use, is not taken the Kaya Elders (Farmers) will die with their important knowledge without bequeathing it to the younger generation. This underscores the urgent need for using ICTs to document IFK for improved preservation, accessibility and use.

This One Kaya Elder (Farmer) summed it as:

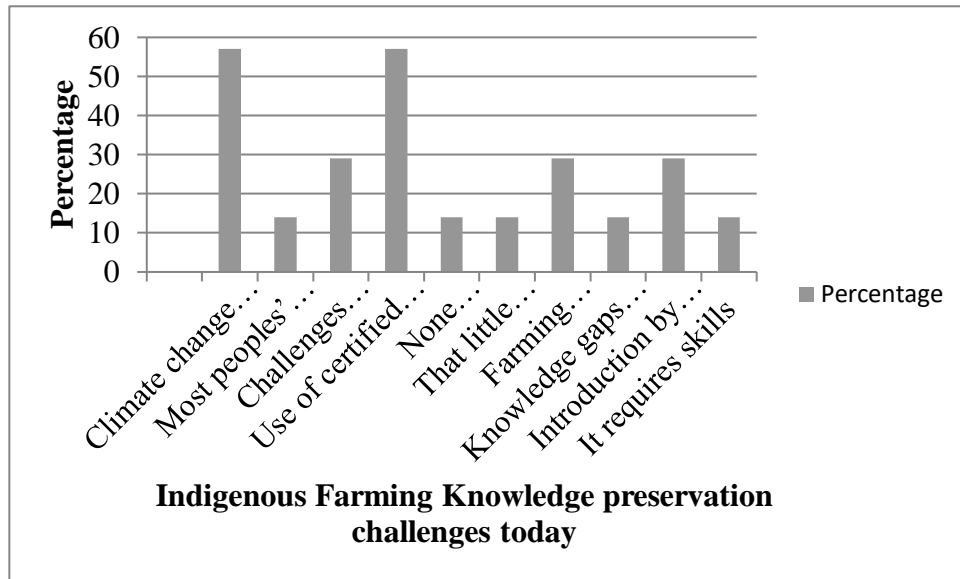
“Dying of vernacular language which is IFK communication medium, consideration of IFK as primitive and backward mode of agriculture by the younger generation, none documentation of IFK, inaccessibility of that little which is documented, inability of parents to allow their children to spend time with their grandparents, western education not encouraging passing on of IFK due to its mode of study, contempt of IFK due to changing lifestyles, stifling use of indigenous knowledge due to propaganda and lies, and IFK owners dying with their knowledge due to old age, modern technology and science not encouraging IFK preservation, IFK as not being accessible anywhere” (Respondent 7, 28.01.2023).

These worries echo those raised by Tang and Gavin (2016), who identified threats to indigenous knowledge as the disappearance of IK transmission pathways caused by young indigenous people's frequent absences from their communities due to academics and employment, lifestyle changes, alteration of traditional religion and beliefs, and disappearance of traditional institutions and rights. Threats to IFK owners require that efforts to preserve; avail for its access and use must be done to save it from extinction. These threats to IFK are real due to emerging socio-economic factors and technological advances both internationally and regionally and if not reversed by its documentation, maintenance, preservation and use, it will soon be extinct.

A question to the Librarians and Sub County Agricultural Officers to identify threats to IK resulted in the following responses:

There was a general view amongst the Librarians and Sub County agricultural Officers that the emerging ICTs technologies such as social media platforms, urbanization and adoption of foreign languages were the biggest threats to indigenous knowledge. Other threats that were identified include IK being associated with witchcraft, the younger generation not spending time with their grandparents, religion and migration.

The researcher inquired from the Sub County Agricultural Officers whether there were any challenges in the preservation of IFK today. There was a general view amongst all 7(100%) Sub County Agricultural Officers that IFK faced challenges in its preservation today. Fig.4.7 presents the findings clearly.



**Figure. 4.7: Indigenous Farming Knowledge Preservation Challenges Today**

It was generally accepted that climate change, use of certified seeds instead of indigenous seeds were the biggest IFK preservation challenges today. Most 4(57%) of the Sub County Agricultural Officers identified climate change (environmental factors) and use of certified seeds instead of indigenous seeds. Also identified challenges of IFK preservation include farming challenges concerned with indigenous knowledge accessibility and introduction to farmers by government of early maturing crops due to prolonged drought 2(29%) respectively. Other identified preservation challenges faced by indigenous farming knowledge today that were identified by the Sub County Agricultural Officers in Kilifi County included attitude of most people towards Indigenous Farming Knowledge being

primitive knowledge, none documentary evidence of Indigenous Farming Knowledge, that little documented Indigenous Farming Knowledge not well preserved, knowledge gaps left by Indigenous Farming Knowledge Owners when they die and that it requires skills to access Indigenous Farming Knowledge 1(14%). Measures to safeguard IFK from threats of extinction must be undertaken soonest by using ICTs tools to document and preserve it for posterity (See Fig. 4.7 above).

### **IFK preservation, accessibility and use barriers**

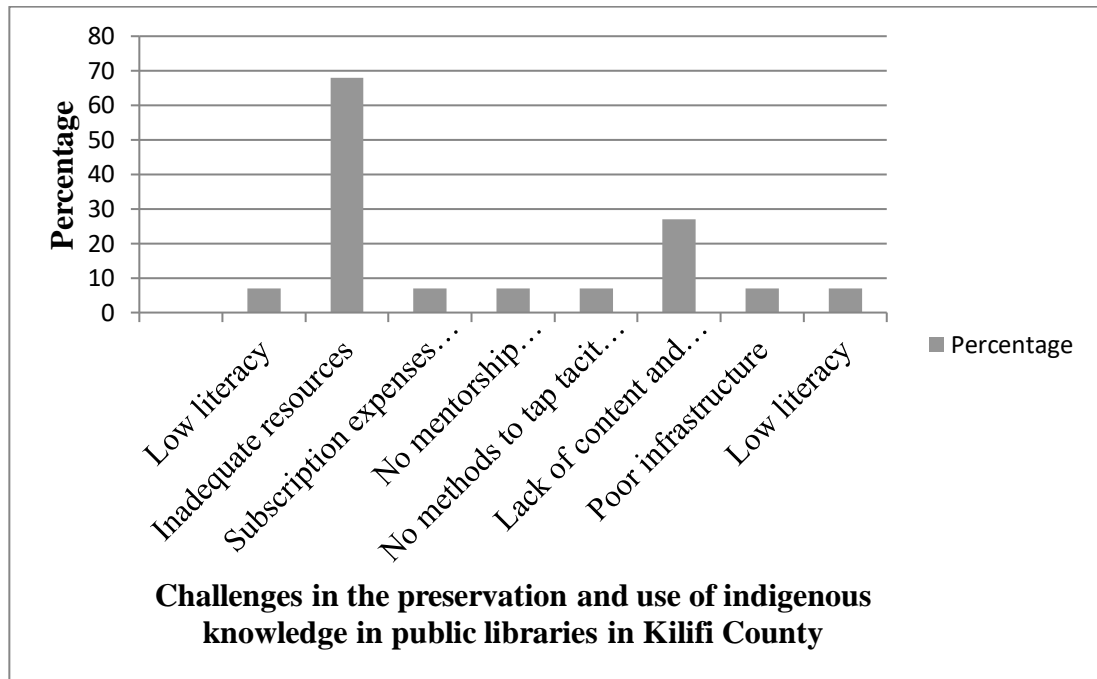
Qualitative data was collected using an interview schedule. It is important to know the barriers that hinder indigenous knowledge preservation so that measures can be taken to preserve to make it accessible for use. Thematic content analysis was used to analyze data.

A question to establish whether there are any barriers or concerns relating to IFK preservation, accessibility and use in Kilifi County was put to the Kaya Elders (Farmers), Sub County Agricultural Officers and Librarians to. All the respondents generally agreed that there are barriers relating to preservation, accessibility and use of Indigenous Farming Knowledge in Kilifi County. One Kaya Elder (Farmer) voiced his concern as:

“Our children and grandchildren don’t speak our language anymore, our grandchildren view us as old and primitive and perceive us as sorcerers and this makes us fear to practice their IFK knowledge, we never spend time with our grand children these days and people have adopted modern methods of farming instead of the traditional methods”(Respondent 8, 28.01.2023).

This agreed with Ochola, (2007), Lwoga, Ngulube and Stilwel, (2011), and Lwoga, Ngulube and Stilwel, (2011). Acknowledgement of barriers in

preservation, accessibility and use of indigenous farming knowledge renders it as a useless resource because it cannot be used nor handed over to the next generation. The researcher further sought to establish from Librarians what challenges the libraries encountered in the preservation and use of indigenous knowledge:



**Figure. 4.8: Challenges Encountered By The Libraries In The Preservation And Use Of Indigenous Knowledge**

The Librarians generally agreed that inadequate IK resources are a challenge encountered by libraries in the preservation and use of indigenous knowledge in Kilifi County. Most of the Librarians 10(68%) identified inadequate indigenous knowledge resources as a challenge encountered by libraries in the preservation and use of indigenous knowledge and 4(27%) stated lack of content and content creators as a challenge in the preservation and use of indigenous knowledge. Other challenges that stated were low literacy, no methods to tap tacit knowledge and subscription expenses to such e-resources and 1(7%) stated no mentorship

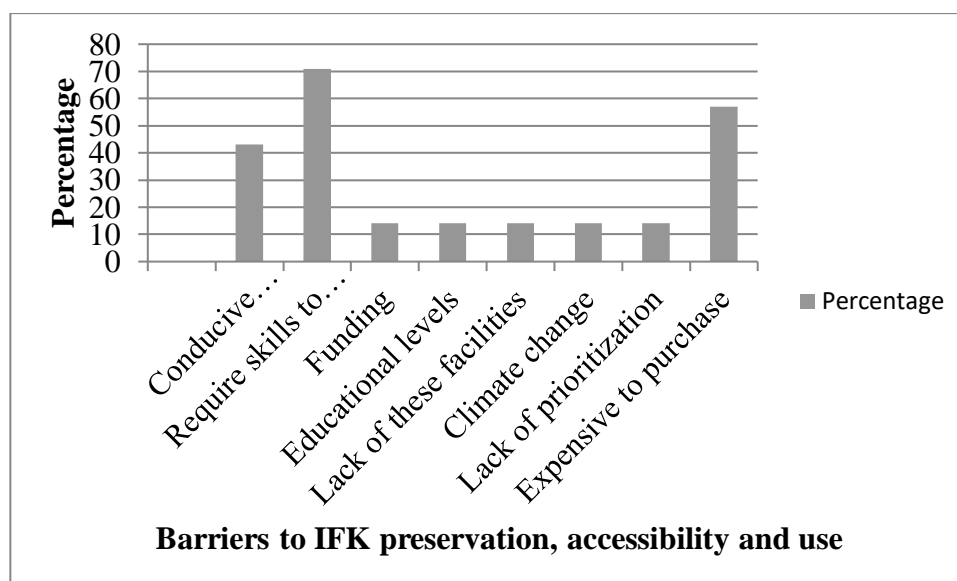
programme and poor ICTs infrastructure as challenge encountered by libraries in the preservation and use of indigenous knowledge (See Table 4.8 above).

Despite the fact that IFK has played an important role in agriculture, there are barriers to its preservation, accessibility and use. These barriers render this knowledge inaccessible and unusable thereby making it not to have any visible effect on agricultural production in Kilifi County.

A question to the Kaya Elders (Farmers) establish the barriers and concerns related to IFK preservation, accessibility and use revealed that generally all respondents agreed that foreign religions, foreign languages and shunning their culture were the biggest barriers and concerns related to IFK preservation, accessibility and use. Of course this was summed up by one Kaya Elder saying “ today’s youths have no time at all with their grandparents, they do not speak their mother tongue, have forsaken their culture for other religions and call our traditions primitive” (Respondent 9, 28.01.2003).

This narration agreed with Ochola, (2007), Lwoga, Ngulube and Stilwel, (2011), and Lwoga, Ngulube and Stilwel, who stated that the barriers to IFK were location specific, disappearance of vernacular languages and loss of pathways due to young indigenous people's frequent absence from communities for education or job, IK transmission paths have been created. None documentation of IFK and the lack of the youths to acknowledge and embrace it threatens IFK with extinction.

A question to the Sub County Agricultural Officers to state barriers and concerns farmers encountered revealed:



**Figure. 4.9: Barriers to IFK Preservation, Accessibility And Use**

It was generally agreed by the Sub County Agricultural Officers that the barriers to IFK preservation, accessibility and use were that ICTs tools required skills to operate, they were expensive to operate and they required a conducive environment such as availability of internet. Majority of the Sub County Agricultural Officers 5(71%) identified such barriers as ICTs require skills to operate while 4(57%) identified expensive to purchase and maintain as a barrier to IFK preservation, access and use. Other barriers were conducive environmental requirement such as availability of internet 3(43%) and 1(14%) were funding, educational levels, lack of facilities, climate change and lack of prioritization by concerned departments respectively (See Fig. 4.9 above).

A question to the Kaya Elders (Farmers) to establish whether they are concerned about the indigenous farming knowledge preservation, accessibility and use led to all respondents unanimously agreeing that they were concerned. One Kaya Elder (Farmer) asserted “yes; I fear that the attitude displayed towards us old people and

our knowledge affects its preservation, accessibility and its use” (Respondent 6, 28.01.2023). This was echoed by Ochola (2007) who affirmed that indigenous knowledge is made to appear less valuable because some people regard it as illiterate and impoverished people's information.

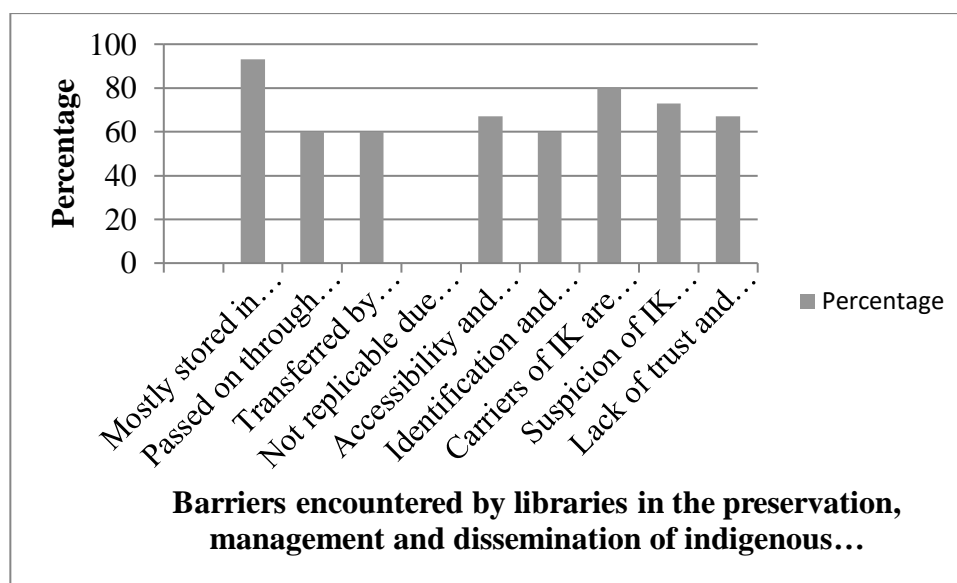
Another Kaya Elder (Farmer) said:

“Our language is disappearing very fast. Our grandchildren call us babuu these days, we are being hunted and killed in the name of sorcery, our culture has been ignored for preference of foreign religions, our channels of communication such as cultural dances and festivals have altogether disappeared, school curriculum does not favor teaching of indigenous languages, Government thinks culture is dances and songs only which is a gross misinterpretation of culture, our grandchildren never spend time with us to learn about indigenous knowledge and today’s youths are not concerned with extended family ties (some don’t even know their family trees” (Respondents 10, 28.01.2023)

These narrations display the concerns about indigenous knowledge preservation, accessibility and use. It is evident that the IFK carriers are more than willing to ensure their knowledge is captured and preserved for posterity.

The fragility of indigenous farming knowledge can suggest a scenario in which many crucial lessons could be lost because it is not recorded and oral transmission systems have broken down.

A question to determine the barriers encountered by libraries in the preservation, management and dissemination of indigenous knowledge revealed:



**Figure. 4.10: Preservation, Management and Dissemination Barriers To IK In Libraries**

The majority of librarians concurred that obstacles confronting libraries in the preservation, management, and dissemination of IFK include the fact that IFK is primarily stored in peoples' minds, IK custodians are normally older individuals who live in remote rural communities and lack motivation, drive or expertise to record their proficiencies for posterity. Majority of the Librarians 14(93%) agreed that IFK being mostly stored in peoples' minds, 12(80%) IK custodians are normally older individuals who live in remote rural communities and lack motivation, drive or expertise to record their experiences for posterity, 11(73%) suspicion of IK being linked to witchcraft instills fear in the knowledge holders, and 10(67%) accessibility and use of indigenous farming knowledge and lack of trust and jealousy among the holders of indigenous knowledge respectively as barriers encountered by libraries in the preservation, management and dissemination of indigenous knowledge. Other identified barriers were that IK is

transmitted orally generations instead of in recorded form, transferred by demonstration rather than description and the identification and accessibility of carriers of indigenous knowledge 9(60%) are barriers encountered by libraries in the preservation, management and dissemination of indigenous knowledge (See Fig. 4.10 above). This collaborates Ocholla's (2007) that indigenous knowledge's persistent marginalization is a result of its tacit character, form of storage which endangers it the caretakers are generally older individuals who pass away with it as well as people regard it as illiterate and impoverished people's information, making it appear less valuable.

Overcoming these challenges would enhance access and use of IK in the library. This can enhance the libraries appeal to the community and improve its patronage. A question to the respondents to establish the methods that can be applied to overcome the barriers and concerns to IFK preservation, accessibility and use were as described below. One Kaya Elder had this say:

“There is need to set up cultural days to discuss matters of our disappearing culture and preservation, accessibility and use of IFK, establish IFK channels on national television radio stations that will discuss traditional methods of not only farming but also other areas of interest, regulate time for use and watching of television and mobile phones by children and promote use of indigenous language (mother tongue) in our homesteads and learning institutions, reviving of Mijikenda stories, riddles and poems and mainstream IFK with school curriculum to attract the younger generation” (Respondent 20, 28.01.2023).

The Sub County Agricultural Officers responses on the same issue are captured on revealed as in Table 4.24 below:

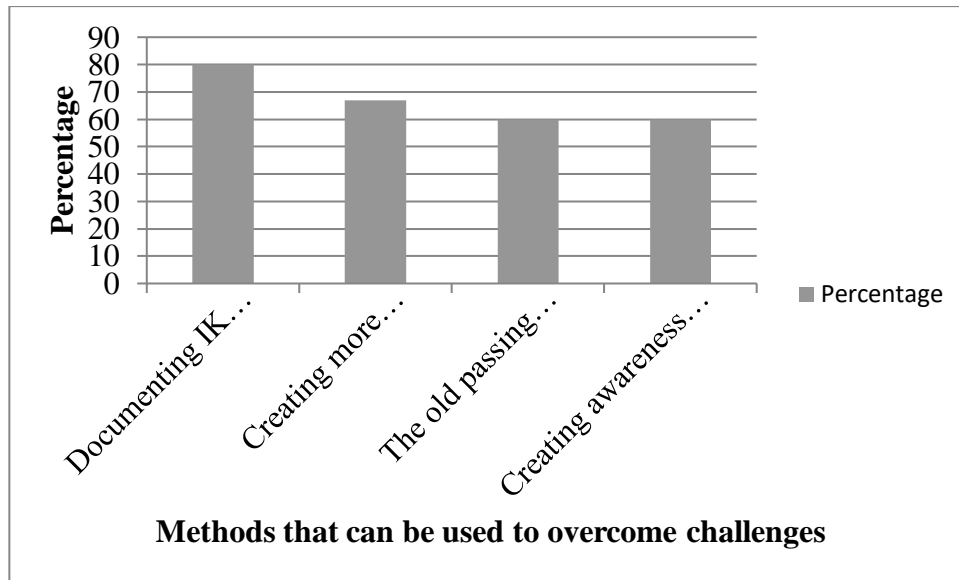
**Table 4.24: Methods that can be applied to overcome barriers to preservation, accessibility and use of IFK**

<b>Methods that can be applied to overcome barriers</b>	<b>Target</b>	<b>Frequency</b>	<b>Percentage</b>
Promoting use of IFK by responsible organizations in government such as Department of Agriculture	7	3	42
Developing policies	7	1	14
Allocation of adequate funding	7	1	14
Sensitization of farmers on use of ICT	7	4	57
Through open public barazas	7	2	29

The Sub County Agricultural Officers were of the general view that promoting use of IFK by responsible Government Departments and sensitization of farmers on use of ICTs can overcome IFK preservation, accessibility and use. Most of the respondents 4(57%) identified sensitization of farmers on use of ICTs and 3(42%) identified promoting use of IFK by responsible organizations in government. Others 2(29%) identified open barazas and 1(14%) identified developing policies and allocation of adequate funding respectively (See Table 4.23 above).

Efforts to overcome the stated barriers could ensure that documentation, preservation and dissemination of IFK is realized. IFK is a valuable resource could enhance farming production when integrated with international agricultural knowledge.

An inquiry to the Librarians on how to overcome the identified challenges revealed as illustrated in Fig.4.11 below:



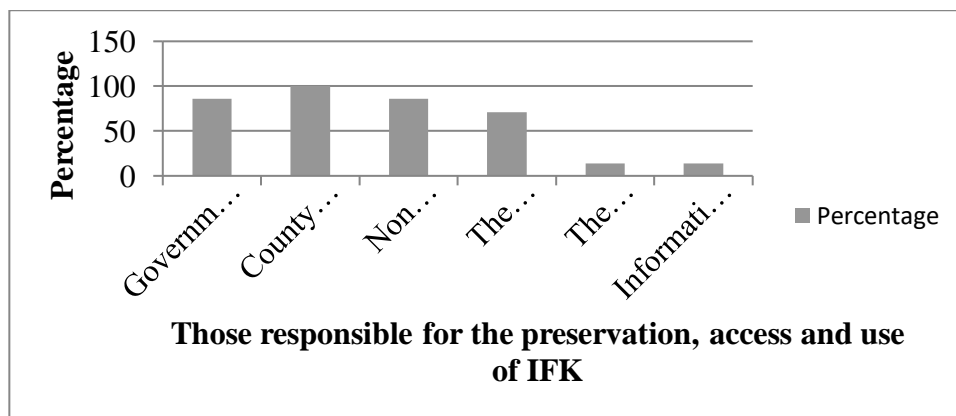
**Figure.4.11: Methods That Can Be Used to Overcome Challenges**

There was a general agreement among Librarians that documentation of IK, raising awareness of the availability of indigenous knowledge resources and the elderly imparting information to the younger generation (mentorship) could succeed in overcoming the barriers that Kaya Elders (Farmers) experience in accessing indigenous knowledge in the library. Most of the Librarians identified 12(80%) documentation IK practices and creating awareness on indigenous knowledge resources 10(67%). Other methods identified by the Librarians working in Public Libraries are 9(60%) the elderly mentoring the younger generation and expanding the channels through which indigenous knowledge can be accessed respectively (see Fig. 4.11 above). This concurs with IFLA/UNESCO Public Library Manifesto which states amongst the mission of public libraries must be ensuring access to citizens of all sorts of community information. Community information can include the communities' indigenous knowledge that is well documented and

preserved for use. This concurs with this study’s theme of using ICTs to document IFK for improved preservation, accessibility and use.

In a bid to establish who is responsible for overcoming the obstacles and issues of IFK preservation, accessibility and use, an inquiry to Kaya Elders (Farmers) and Sub County Agricultural Officers to ascertain who is responsible for its preservation, accessibility and use divulged the following. All respondents generally agreed that the Government of Kenya and County Government are responsible for the preservation, accessibility and use of IFK. One Kaya Elder (Farmer) summed it up saying “the government holds the sole responsibility through their Culture and Social Services department for the preservation, accessibility and use of IFK” (Respondent 6, 28.01.2023).

The responses of the Sub County Agricultural Officers are illustrated in Fig.4.12 below:



**Figure.4.12: Those Responsible for The Preservation, Access And Use Of IFK**

All 7(100%) of the Sub County Agricultural Officers identified the County Government of Kilifi as having sole responsibility for the preservation,

accessibility and use of IFK while 6(86%) identified The Government of Kenya and Non-Governmental Organizations such as Food Agricultural Organization as those responsible for preservation, accessibility and use of IFK. Other entities identified as having responsibility for the preservation, accessibility and use of IFK are the Kaya Elders (Farmers) 5(71%) and 1(14%) who identified the community and Information, Communication and Technology sector respectively as having responsibility for preservation, accessibility and use of IFK (See Fig.12 above).

Preservation, access and use of indigenous knowledge should not be left to individuals but it should be a collective responsibility due to its importance in the improvement of agricultural production.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter provides a thorough summary of the main findings from the study, which are the result of the well-defined objectives and the researcher's careful examination of the data that was gathered and combined. The results of this study are compared with those of previous pertinent studies in order to get the findings. Building on these findings, the researcher suggests future directions for the use of ICTs in documenting traditional farming knowledge in Kilifi County, Kenya, with the goal of improving preservation, accessibility, and use. As a result, suggestions are given outlining topics for more research in later studies.

#### **5.2 Summary**

This chapter is based on objectives which included evaluation of the awareness and perception of the study community regarding use of ICT tools in preservation and management of IFK, establishing the existing ICT tools capable of capturing and documenting indigenous farming experiences for improved preservation and accessibility, examining the significant role a library repository could undertake in preserving, managing, storing and disseminating IFK and determining obstacles and issues pertaining to the preservation, accessibility and utilization of IFK.

Due to oral transmission routes breaking down, non-recording forms of capture and transfer, and globalization effects on our way of life; indigenous farming knowledge is in danger of extinction. This study aimed exploring the possibilities of librarians using available ICTs to capture the critical indigenous farming

knowledge as a mechanism of facilitating access and preservation and utilization of indigenous knowledge for posterity. Through a descriptive research design approach combining survey data with qualitative interviews, the study explored experiences of fifty five (55) Kaya Elders (Farmers), fifteen (15) Librarians and seven (7) Sub County Agricultural Officers.

### **5.2.1 Awareness and Perception of The Study Community Regarding Use of ICT Tools In Preservation and Management of IFK**

The study revealed that most of the indigenous farming knowledge custodians in Kilifi County were men aged seventy six to above eighty years of age, had no formal education and had practiced farming all of their lives. The Kaya Elders (Farmers) had practiced farming mostly growing a variety of crops including and not limited to food and cash crops including maize, chickenpeas, cashew nuts, coconuts, peas, pawpaw, mangoes, oranges, lime, lemons and cassava, rice, pineapples, okra and watermelons millet, sorghum, wheat, black beans, soybeans, pinto beans, white beans, black-eyed beans, simsim, caster, pumpkins, squarsh, brinjals, sugarcane, cotton and potatoes using traditional forms of farming. Their knowledge of seed selection, communal planting, weeding harvesting, conservation, prediction of seasons and preservation had sustained their community in food security for a long time.

The farmers' understanding and assessment of the significance of ICTs in preservation of IFK was good and were in agreement that if the IFK they knew is not recorded, it may perish when they died. Indeed, they lamented that failure to document IFK would mean an end to what was local and working. None of the

farmers were aware of any IFK captured in ICTs tools. Although they were aware of existing ICT tools, their knowledge on which tools they could use for preservation was limited. With their healthy perception of ICTs tools, support of the Agricultural Officers and library professionals, capturing IFK for posterity can easily be achieved.

### **5.2.2 Existing ICT Tools Capable of Capturing And Documenting Indigenous Farming Experiences For Improved Preservation And Accessibility**

The available ICTs tools for preservation and management of IFK that respondents were familiar with included radios, TVs, laptops, internet, memory cards, social media, iPads, and flash drives, World Wide Web and internet. ICTs tools for IFK capture that respondents identified were video cameras, tape sound and video filming. Although the respondents are familiar with ICTs tools for capture, preservation and use of IFK, they have never used these tools to document IFK for preservation, accessibility and use.

### **5.2.3 Significant Role A Library Repository Could Undertake In Preserving, Managing, Storing And Disseminating IFK**

Librarians regard indigenous knowledge as important to the library but lack of indigenous knowledge resources in the library is a reason for farmers not visiting the library. However, its none documentation, being mostly tacit and not systematically documented in written form, having it mostly embedded in practice and experiences and its non-validation renders it inaccessible for use by farmers. Librarians believe that ICTs tools through initiatives such as creating IFK

databases, formal education and building awareness, communal IK maintenance, national inventories of indigenous knowledge, securing intellectual property and community based indigenous knowledge maintenance could be used to support preservation, management and dissemination of IFK in the libraries. These initiatives can be supported by Government of Kenya, and County Government as well as the State Department of Culture and Heritage, indigenous knowledge holders, all stakeholders, Agri-based Non-Governmental Organizations and Librarians and must be backed by policy that promotes more investments in more indigenous knowledge resources and more food security programmes and engage in advocacy and lobbying in order to create awareness of the importance of ICTs in conservation and maintenance of IK. A proposal to use the Library as a knowledge asset of IFK in Kilifi County for training adult learners, transferring indigenous knowledge and information to users and disseminating tacit knowledge in book form, technical skills, human skills, display garden, audiovisual resources, and adult education students could make IFK more appealing to young users.

#### **5.2.4 Managing, Storing and Disseminating IFK And To Determine Obstacles and Issues Pertaining To The Preservation, Accessibility And Utilization Of IFK**

Several obstacles and issues pertaining to IFK maintenance, availability, and application were noted by all respondents. Most common barriers noted were climate change (environmental factors), ratified seeds use in lieu of indigenous seeds, indigenous farming knowledge availability, planting of crops with early maturation introduction by the government due to prolonged drought, attitude of most people regarding indigenous knowledge as primitive knowledge, indigenous

farming knowledge's none documentation and the inaccessibility of that little documented, poor preservation of the little documented indigenous farming knowledge, knowledge gaps left indigenous farming knowledge owners when they die, and that indigenous farming knowledge requires skills to access. The Kaya Elders (Farmers) particularly felt the perception of users to IFK as primitive by new generation, its non-documentation, dying of apprenticeship to young generation, western education, death of IFK carriers, ICTs tools not created to capture IFK and the absence of expertise were the hindrances to IFK preservation, accessibility and use.

Documentation of indigenous knowledge practices, creating more awareness about the value of indigenous knowledge, creating more platforms to allow access to indigenous knowledge and more information resources on indigenous knowledge is the methodologies that can be applied to overcome the stated challenges.

### **5.3 Conclusions**

This study has resulted in five main conclusions as follows:

The age and farming experience of the study community qualifies them as owners of indigenous farming knowledge and their community highly regards them as its custodians. The Sub County Agricultural Officers and majority 13(87%) of the librarians believed that indigenous knowledge served as the foundation for local decision-making in the areas of healthcare, agriculture, food preparation, and natural resource management. Twelve (80%) believed that indigenous knowledge represented the technical know-how or wisdom acquired and developed by people in a particular locality. Eleven (73%) thought of it as knowledge that is passed

down orally from one generation to the next in many societies. Ten (67%) thought of it as knowledge that is specific to a given culture or society. Other 9(60%) Librarians understood it as that knowledge which is a cumulative body of knowledge generated and evolved overtime, knowledge which is information and know how on variety of matters, knowledge that is an important resource, contrasts with the global knowledge system produced by academic institutions, research centers, and commercial enterprises; this knowledge is valuable not just for the culture in which it originates but also for planners and scientists working to improve conditions in rural areas, respectively. This seemingly diverse understanding of indigenous knowledge concurs with Lwoga, Ngulube and Stilwel, (2011) who asserted that indigenous knowledge is impossible to depict or convey something as it is typically communicated through demonstration rather than verbal explanation.

The Kaya Elders (farmers) acknowledge and comprehend the significance of using ICTs administering and conserving IFK. For purposes of recording, maintaining, managing, and disseminating traditional farming knowledge for upcoming generations, they see these technology tools as extremely valuable. Since this knowledge is currently in danger of disappearing, it must be preserved. This comprehension can be tapped by the librarians and initiate collaborations with appropriate government agencies to capture, preserve and manage IFK in their libraries.

The majority of librarians concurred that one of the biggest challenges libraries confront in conserving, organizing, and sharing Indigenous Farming Knowledge

(IFK) is that most of it exists only in people's imaginations. Furthermore, the keepers of Indigenous Knowledge (IK) are frequently elderly people living in isolated traditional societies who do not have the inclination or knowledge to document their knowledge for future generations. The Librarians are conversant with the operation of these ICTs tools and government needs to only enact intentional legislation for IFK capture, documentation, preservation and made accessibility and use. Before the IFK goes extinct, they can use their understanding of how ICT technologies work to maintain and document what is now there in their library repositories.

There are varied definitions of indigenous knowledge according to librarians including a knowledge that has been created and refined over time; knowledge that is a valuable resource and is significant not only for the culture from which it originates but also for scientists and planners who strive to enhance rural communities. Indigenous knowledge (IK) is vital to libraries, and the indigenous knowledge resources in Kilifi County's public libraries were obtained since these institutions are crucial to the preservation and application of indigenous knowledge, as well as giving researchers access to IK resources. Farmers seek for indigenous knowledge resources including soil fertility, farming, farming methods using locally available resources and plants that can withstand dry weather, water harvesting, ecology and cultural services to humankind, traditional food preservation methods and history and culture of Coastal in libraries but lack of these resources and the distance between farmers and libraries discourage farmers from visiting libraries. A proposal to transform the public library repository into a priceless knowledge asset has been made by librarians. This proposal purposes to

improve Indigenous Farming Knowledge (IFK) management, distribution, and conservation. It aims to record experiences, procedures, and insights related to indigenous farming knowledge in order to add to an extensive collection of IFK for education, conservation, and general public use.

Several obstacles and issues concerned with IFK preservation accessibility and use that were noted by all respondents included none documentation of indigenous farming knowledge, farming knowledge stored in peoples' minds, suspicion of indigenous knowledge being linked to witchcraft instills fear in the knowledge holders, lack of trust and jealousy among the holders, transferred by demonstration rather than description and the identification and accessibility of carriers of indigenous knowledge. The Kaya Elders (Farmers) particularly felt the perception of IFK by new generation as primitive, its non-documentation, dying of apprenticeship to young generation, western education, death of IFK carriers, ICTs not created to capture IFK, lack of skills by carriers to document their IFK experiences, youths abandoning their culture in favor of modern religions, language, grandparents not able to spend time with grandchildren, school curriculum not favoring teaching of indigenous languages, government that thinks culture is dances and songs only as the obstacles and issues concerned with indigenous knowledge management and application. The librarians must exploit the Kaya Elders (Farmers) concerns of their IFK being perceived as primitive, non-documentation and death of its holders to motivate them to establish initiatives for its capture, preservation and use.

Methods that could be used to overcome the identified barriers included documentation of indigenous knowledge experiences, creating more awareness on its significance, creating more platforms to allow IK access, acquiring more indigenous knowledge resources, establishing indigenous knowledge channels on national television and radio stations, promoting use of IFK by government, setting up of cultural days to discuss issues on preservation, accessibility and use of IFK, mainstreaming IFK with school curriculum, promoting use of mother tongue in homes and learning institutions and developing policies that promote preservation, accessibility and use of IFK. The Government of Kenya, Non-Governmental Organizations such as Food Agricultural Organization (F.A.O), Librarians and the IFK custodians should be at the forefront in initiating programmes to overcome these barriers.

#### **5.4. Recommendations**

Based on the findings of this research, the following recommendations are proposed:

##### **5.4.1 Incorporation of Indigenous Farming Knowledge To Scientific Farming Knowledge**

Indigenous farming knowledge that has been captured, documented, preserved and managed for accessibility and use through the public library repository can be integrated in ICT tools including social media platforms and ipads so as to enhance its accessibility and ability to be mainstreamed with scientific farming knowledge.

#### **5.4.2 Educating People on Value Of Indigenous Farming Knowledge**

Public Libraries to create more awareness about the value of indigenous farming knowledge as well as create more platforms including databases, indigenous knowledge YouTube channels and spaces to allow access to indigenous knowledge.

#### **5.4.3 Revampment of Public Libraries To Become Viable Knowledge Assets of IFK**

The Government might fortify the public library repository turning it into an invaluable knowledge asset in charge of gathering, conserving, overseeing and sharing vital data and knowledge resources. These resources come in a variety of forms such as literature, video materials, human capital, technical knowhow, demonstration gardens and adult education initiatives. This can be achieved by the government enacting an intentional legislation that could strengthen the IFLA declaration on the mandate of public libraries on acquisition and management of indigenous knowledge.

#### **5.4.4 The Kenya National Library Services to Take Responsibility In The Capture, Preservation, Management Of Indigenous Farming Knowledge**

The Kenya National Library Services has responsibility to preserve the cultural heritage by collecting and archiving materials of historical and cultural significance. KNLS is therefore mandated to capture and manage indigenous knowledge.

#### **Recommendations for further research**

The knowledge gap that this research has uncovered is that indigenous farming knowledge assets have to be developed, propagated and popularized so that indigenous farming knowledge can be preserved, managed and made accessible for use so as to improve food production and attain food security.

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**APPENDICES**

**APPENDIX I: Introduction Letter**

Anderson Chai

Kenyatta University

School of Education, Department of Library and Information Science

P.O. Box 43844-00100,

Nairobi, Kenya

Dear Respondents,

**REF: INTRODUCTION LETTER**

I am a Master of Library and Information Science student at Kenyatta University.

I am conducting a research on examination of librarians' use of ICT tools for documenting indigenous farming knowledge for improved preservation, accessibility and use in Kilifi County, Kenya.

To enable collect needed data I have identified your institution as a key respondent.

The information provided will be used only for the purpose of the study and treated with the confidentiality it deserves. The findings will go a long way in improving the capture, documentation and dissemination of indigenous farming information for improving food production through improved accessibility and preservation through your library. Kindly fill the attached questionnaire as appropriately as possible.

Thank you

**APPENDIX II: Questionnaire for The Librarians Instructions**

Kindly respond by ticking your answer in the boxes provided. The questions that need suggestions and comments, please write in the provided blank spaces.

**Section A: Demographic information**

1. Indicate your gender

Male  Female

2. Indicate your age bracket

25-35

36-45

46-55

56-65

3. Kindly indicate your educational level

Certificate

Diploma

Degree

Masters

PhD.

Others (Please specify) .....

4. Kindly indicate your working experience

1-5 Years

6-10 Years

11-15 Years

16-21 years

Others (please Specify)

.....

**Section B: Awareness and perception on use of ICT tools for management and preservation of indigenous farming knowledge**

5. (a) Do farmers come to seek for indigenous knowledge resources in the library?

Yes  No

(b) If yes in question 5 (a) above, what type of indigenous knowledge information resources do they seek?

.....  
.....  
.....  
.....

© Do farmers frequent the library in search of indigenous farming knowledge?

Yes No

(d) If yes in question 5 © above, what information do they seek most?

- Ecology
- Farming methods
- Soil fertility
- Plants that can withstand dry weather
- Cultural services to humankind
- Traditional food preservation methods
- Water harvesting
- Culture of Coastal people

(e) In your own opinion are farmers aware of the use of ICTs in capturing and documenting indigenous knowledge?

Yes  No

(d) If yes in question 5(e) above, what is their level of awareness of IK captured in ICTs?

- Very High  
 High  
 Low  
 Very low  
 None of the above

(f) In your own opinion how would you rate the awareness and perception of Kaya Elders on preservation and management of IK?

- Very much aware  
 Aware  
 Not aware  
 None of the above

### **Section C: ICTs to capture and document and disseminate IK**

6. (a) Are there any ICT tools in your library?

Yes  No

(b) Do these ICT tools support the preservation, management and dissemination of Indigenous Farming Knowledge?

Yes  No

(c) If yes in question 6(b) above, how can you rate their capacity to preserve, manage and disseminate indigenous farming knowledge?

- Strongly agree
- Agree
- Not sure
- Disagree
- Strongly disagree

(d) If no in question 7(b) above, what needs to be done in order to preserve, manage and disseminate of Indigenous Farming Knowledge?

(e) What ICT tools are indigenous knowledge preserved in the library?

- (a) Video filming
- (b) Tape sound
- (c) Mobile phone
- (d) Video camera
- (e) Flip camera
- (f) Television
- (g) Radio
- (h) Social media
- (i) Internet
- (j) World Wide Web

(f) Are there any initiatives for preservation and management of indigenous farming knowledge in Kilifi County that you know?

Yes  No

(g) If yes to question 6 (f) above, how would the library be of use in this initiative?

.....  
.....  
.....  
.....

(h) If your response to question 6(g) above is NO, what would you attribute to this?

- The information policy is silent on acquisition of IK
- Lack of incentives to motivate IK holders to share their knowledge
- IK holders are traditionalists who believe that they should not allow anyone to record their voices
- The challenges of changing technologies
- IK holders believe that some things must not be revealed to those who do not know.

(i) If your response to question 6(h) above is 'yes' give examples of these initiatives

- (a) Databases
- (b) National indigenous knowledge inventories
- (c) Formal education and building awareness
- (d) Securing intellectual property
- (e) Bio-cultural conservation
- (f) Community based indigenous knowledge maintenance
- (g) Traditional ecological knowledge conservation actions
- (h) Ethno-botanical studies

(j) Who is responsible for such initiatives?

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.....

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(k) As a librarian what could the library do to participate in IK management and preservation of indigenous knowledge?

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.....

**Section C: Role of Library in preservation, management and dissemination of Indigenous Farming Knowledge**

7. (a) What is your understanding of indigenous knowledge?

- IK is technical insights or wisdom gained and developed by people
- in a particular locality

IK is a cumulative body of knowledge generated and evolved over time

- It is information and know-how on a variety of matters
- IK is an important natural resource
-

IK is local knowledge and unique to given culture or society

- Contrasts with the international knowledge system generated by  
 universities, research institutions and private firms

- Basis for local decision making in agriculture, healthcare, food  
 preparation and natural resource management

- Passed from generation to generation by word of mouth in many  
 societies It is important for the culture in which it develops as well  
 as for researchers and planners working to better rural areas.

(b) Is there any form of indigenous knowledge that is preserved in your library?

- Yes  No

© If yes in question 7 (b) above, in what form is IK preserved in your library?

Apprenticeship

Songs

Proverbs

Riddles

Dance

(d) How is above knowledge captured?

(e) How is it shared?

(f) As an information professional, are you aware of ICT tools that IK could  
 be captured and stored?

Yes

No

(g) If yes, indicate from the list of tools below which one could be used for capturing and preservation of IK.

Video filming

(b) Tape sound

(c) Mobile phone

(d) Video camera

(e) Flip camera

(f) Television

(g) Radio

(h) Social media

(i) Internet

(j) World Wide Web

(h) Are you conversant on the operation of above tools?

Yes

No

(i) Is indigenous knowledge important to a library?

Yes

No

(j) Does your library collect indigenous farming resources?

Yes

No

(k) If your response to question 7(j) above is yes, in what form are these resources?

- Text
- Audio
- Audio-visual
- Electronic (DVD, CD, Databases)
- Microfilm

(l) How is IK captured, managed, preserved?

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(m) What role does your library play in the preservation and use of indigenous knowledge?

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(n) Does the library encounter any challenges in the preservation and use of indigenous knowledge?

Yes  No

(o) If yes in question 7(n) above, kindly state the challenges encountered.

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.....  
.....

(p) What can be done to overcome these challenges?

.....  
.....  
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.....

(q) Does your library serve as a repository for indigenous farming knowledge?

Yes  No

(r) If yes in question 7(q) above, what are the contents of this knowledge asset?

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.....  
.....

(s) If no to question 7(s) above, what steps could you take to develop a library repository as an indigenous farming knowledge asset?

.....  
.....

.....  
.....

**SECTION E: Barriers and concerns related to IFK preservation, accessibility and use**

(f)What challenges do farmers experience in accessing indigenous knowledge in the library?

- IK is mostly tacit
- IK is not documented
- IK is mostly ingrained in behaviors and encounters.
- IK is not scientifically validated
- IK is rooted in oral traditions
- IK is not systematically documented in written form
- Not all aspects of living traditions of IK can be captured as artifacts

using technology

(g)In your own opinion, how can these challenges be overcome?

.....  
.....  
.....  
.....

8. (a)Are there any barriers in the preservation, management and dissemination of Indigenous Farming Knowledge?

(b)If yes in question 8 (a), what are these barriers?

- Mostly stored in peoples' minds
- Passed on through generations by word of mouth instead of written form

- Transferred by demonstration rather than description
- It's oral character renders it non-replicable.
- Accessibility and use of indigenous farming knowledge
- Identification and accessibility of carriers of IK
- Elderly residents of isolated rural villages who lack the will, drive, or ability to document their experiences for future generations are typically the carriers of IK.
- Suspicion of IK being linked to witchcraft instills fear in the knowledge holders
- Lack of trust and jealousy among the holders of indigenous knowledge

**APPENDIX III: Questionnaire for Sub-County Agricultural Officers**

**Instructions**

Kindly respond by ticking your answer in the boxes provided. The questions that need suggestions and comments, please write in the provided blank spaces.

**Section A: Demographic information**

1. Indicate your gender

Male  Female

2. Indicate your age bracket

25-35

36-45

46-55

56-65

3. Kindly indicate your educational level

Certificate

Diploma

Degree

Masters

PhD.

Others (Please specify) .....

4. Kindly indicate your working experience

1-5 Years

6-10 Years

11-15 Years

16-21 years

Others (please Specify)

.....

**Section B: Awareness and perception regarding use of ICTs in preservation and management of Indigenous Farming Knowledge**

5. (a) In your own view how knowledgeable are farmers on use of ICT on preservation and management of IFK?

- Very knowledgeable
- Knowledgeable
- Not knowledgeable
- Not sure

**Section C: ICTs tools for capturing and documenting indigenous farming experiences**

6. (a) Are farmers aware of the importance of adopting ICTs in preservation for IFK for posterity?

Yes  No

(b) In your own view which among the following tools are farmers familiar with?

- Mobile phones
- Video cameras
- Flip cameras
- Tape/sound recording
- Radio
- Television
- Internet

Social media technologies

(c) As an Agricultural Officer, are you aware of any ICTs tools used in preservation and management of indigenous farming knowledge?

(d) If yes to question 6(a) above, kindly state.

.....  
.....  
.....  
.....  
.....  
.....  
.....

(e) What is your perception regarding the use of ICTs tools in preservation and management of indigenous farming knowledge?

**Section D: Role of a library repository as a knowledge asset in the preservation, management and dissemination of Indigenous Farming Knowledge**

7. (a) How can public libraries assist in preservation and dissemination of indigenous knowledge?

- Acquire indigenous knowledge
- Preserve indigenous knowledge
- Disseminate indigenous knowledge
- Publicize the value of indigenous knowledge

(b) What role would the public libraries play in the management of indigenous knowledge?

Prepare inventories and registers on indigenous

knowledge

Develop indigenous knowledge collection

development policies

Ensure availability of storage media for

preservation

Index and catalogue indigenous knowledge

resources

Make indigenous knowledge more accessible

**Section E: Barriers and concerns related to IFK preservation, accessibility and use.**

8. (a) How has indigenous farming knowledge been preserved over the years?

.....  
.....  
.....  
.....  
.....

(b) Are there challenges in preservation of indigenous farming knowledge today?

Yes

No

©If yes in question 8(b) above, what preservation challenges is indigenous farming knowledge facing today?

.....  
.....  
.....  
.....  
.....

(d)What indigenous crops has been the mainstay of farmers in Kilifi?

.....  
.....  
.....  
.....  
.....

(e)Are they still grown using the traditional forms of farming?

Yes  No

(f)If your response to question 5 (e)is 'no' what would you attribute to this?

- Economic factors
- Land size
- Gender factors
- Lack of knowledge of the importance these indigenous

crops

(g)Has production remained the same or has it dropped?

- Extremely improved
- Improved
- Remained the same
-

Deteriorated

(h) Are there any barriers in the preservation and management of indigenous farming knowledge?

Yes

No

(i) If yes in question 6 (a) above, kindly state these barriers

.....  
.....  
.....  
.....

(j) What can be done to overcome these barriers?

.....  
.....  
.....  
.....

(k) Who is responsible for the overcoming of these barriers?

**APPENDIX IV: Interview Schedule for Kaya Elders Instructions**

Interviewer: (Mr. Edward Karisa Pwani F.M)

Interviewee: (Kaya Elders (Farmers)

Location: (Moi, Sabaki; Malindi Sub County, Kilifi County)

**9.00am – 9.30am**

**Introductions and welcome**

4 Self-introductions

5 The researcher introduced the research topic to the interviewees highlighting the reasons that informed the choice of the topic and interviewees. He emphasized that the research was for the award of Degree of Master of Library and Information Science.

He assured the interviewees that ethical considerations such as disclosing information would be adhered to.

**9.30 am – 10.30pm**

**Section A: Demographic information**

1. Indicate your gender

Male  Female

2. Indicate your age bracket

60-65

66-70

71-75

76-80

Above 80

3. Kindly indicate your educational level

Certificate

Diploma

Degree

Masters

PhD.

Others (Please specify) .....

4. Kindly indicate the period you have been practicing agriculture

1-5 Years

6-10 Years

11-15 Years

16-21 years

Others (please Specify)

.....

**10.30 am – 12.30 pm**

**Background and experience**

1. How long have you practiced farming?
2. Which crops have you been consistently growing?
3. Are you regarded as a knowledge gatekeeper by your community?
4. How has IFK helped your community in food security?
5. What IFK would you wish to hand down to the younger generations?

**12.30pm -3.30 pm**

**Awareness of ICT tools and technologies that can be used for the preservation and management of Indigenous Farming Knowledge**

6. Are you aware of any ICTs tools that can be used for the preservation and management of Indigenous Farming Knowledge?

(a) Video filming

(b) Tape sound

(c) Mobile phone

(d) Video camera

(e) Flip camera

(f) Television

- (g) Radio
- (h) Social media
- (i) Internet
- (j) World Wide Web

7. From the list of the available tools which ones are you familiar with?
8. Have you ever used any of these ICTs tools to capture and preserve indigenous farming knowledge?
9. Can they be an alternative to preservation of indigenous farming knowledge?
10. In your own opinion would technology assist in the preservation of indigenous farming knowledge?
11. If so, kindly enumerate how this can assist.
12. In your own view, what role could technology play in management and preservation of indigenous knowledge?
13. What is your perception of these ICTs tools in regard to the preservation and management of Indigenous Farming Knowledge?

**3.30 am – 5.30 Barriers and concerns related to IFK preservation, accessibility and use**

14. What are the likely threats to IFK in the modern world?
15. What barriers are hindering maintenance and preservation, accessibility and use of indigenous farming knowledge?
16. Do you have any concerns related to indigenous farming knowledge preservation, accessibility and use?

17. What are these concerns related to indigenous farming knowledge preservation, accessibility and use?

18. What can be done to allay these concerns

**5.30 pm – 6.00pm**

Questions from the interviewees

**6.00pm - 6.15 pm**

Closing

## APPENDIX V; Research Letter



KENYATTA UNIVERSITY  
GRADUATE SCHOOL

E-mail: [dean-graduate@ku.ac.ke](mailto:dean-graduate@ku.ac.ke)

P.O. Box 43844, 00100  
NAIROBI, KENYA  
Tel. 810901 Ext. 4150

Website: [www.ku.ac.ke](http://www.ku.ac.ke)

Internal Memo

FROM: Dean, Graduate School

DATE: 31<sup>st</sup> May, 2022

TO: Anderson Kahindi Chai  
C/o Library and Information Sci. Dept.

REF: E65/OL/MSA/24521/2013

SUBJECT: APPROVAL OF RESEARCH PROJECT PROPOSAL

This is to inform you that Graduate School Board at its meeting of 25<sup>th</sup> May, 2022 approved your Research Project Proposal for the M.LIS Degree Entitled, "Use of Information Communication Technologies for Documenting Indigenous Farming Knowledge for Improved Preservation, Accessibility and Use of Kilifi County, Kenya".

You may now proceed with your Data Collection, Subject to Clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking and Progress Report Forms per semester. The forms are available at the University's Website under Graduate School webpage downloads.

Thank you.

  
JACKSON LUVUSI  
FOR: DEAN, GRADUATE SCHOOL

c.c. Chairman, Library and Information Science Department.

Supervisor:

I. Dr. Zipporah Gichuhi  
C/o Department of Library and Information Science  
**Kenyatta University**

JL/emj

## APPENDIX VI: Research Authorization



**KENYATTA UNIVERSITY  
GRADUATE SCHOOL**

E-mail: [dean-graduate@ku.ac.ke](mailto:dean-graduate@ku.ac.ke)

Website: [www.ku.ac.ke](http://www.ku.ac.ke)

P.O. Box 43844, 00100

NAIROBI, KENYA

Tel. 8710901 Ext. 57530

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Our Ref: E65/MSA/24521/2013

DATE: 31<sup>st</sup> May, 2022

Director General,  
National Commission for Science, Technology  
and Innovation  
P.O. Box 30623-00100  
**NAIROBI**

Dear Sir/Madam,

SUBJECT: RESEARCH AUTHORIZATION FOR ANDERSON KAHINDI CHAI- REG. NO. E65/MSA/24521/2013

I write to introduce Mr. Anderson Kahindi Chai who is a Postgraduate Student of this University. He is registered for M.LIS degree programme in the **Department of Library and Information Science**.

Mr. Kahindi intends to conduct research for a M.LIS Project Proposal entitled, "Use of Information Communication Technologies for Documenting Indigenous Farming Knowledge for Improved Preservation, Accessibility and Use of Kilifi County, Kenya".

Any assistance given will be highly appreciated.

Yours faithfully,

  
**PROF. ELISHBA KIMANI  
DEAN, GRADUATE SCHOOL**

DK/eqj



**APPENDIX VIII: Research Photographs**

Researcher with respondents (Kaya Elders) Access more information on my



YouTube channel:[https://youtu.be/cmjv7CfJgws?si=JKjoKnv\\_sB5xZ-Y3](https://youtu.be/cmjv7CfJgws?si=JKjoKnv_sB5xZ-Y3)



Traditional seed preservation methods. Access more information on my YouTube channel:[https://youtu.be/cmjv7CfJgws?si=JKjoKnv\\_sB5xZ-Y3](https://youtu.be/cmjv7CfJgws?si=JKjoKnv_sB5xZ-Y3)



Traditional seed preservation methods. Access more information on my YouTube channel: [https://youtu.be/cmjv7CfJgws?si=JKjoKnv\\_sB5xZ-Y3](https://youtu.be/cmjv7CfJgws?si=JKjoKnv_sB5xZ-Y3)



Traditional farming method: communal farming (mwenzya):

[https://youtu.be/cmjv7CfJgws?si=JKjoKnv\\_sB5xZ-Y3](https://youtu.be/cmjv7CfJgws?si=JKjoKnv_sB5xZ-Y3)

APPENDIX IX: County of Kilifi Map

