THE ROLE OF PUBLIC LIBRARIES IN ENHANCING MAIZE PRODUCTION IN LAIKIPIA EAST SUB-COUNTY, LAIKIPIA COUNTY, KENYA

MAINA SUSAIDE WANGARI

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DECLARATION AND RECOMMENDATION

Declaration

This thesis is my original work and has not been submitted for a degree or any other award in any other University.

Signature: ……  …..……..Date…….……

Susaide Wangari Maina

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Kenya Methodist University

Recommendation

We confirm that this thesis has been submitted for examination with our approval as university supervisors.

Signature: ..... Date……

Prof. Paul Maku Gichohi (PhD)

Kenya Methodist University

Signature: ..... Date……

Ms. Winfred Gatimu

Riara University

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DEDICATION

To my father Joseph Maina and my mother Lucy Wangui for providing a firm foundation in my academic life.

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ABSTRACT

Maize is a critical food source in Kenya, with Laikipia East sub-county being a significant contributor. However, low maize production has been reported every year, posing questions not only on production methods, but also on availability and accessibility of information for supporting production activities. This implies that maize farmers require adequate and reliable information to support production activities. Public libraries are accessible to farmers and therefore have the potential to empower maize farmers with knowledge and information to enhance maize production. This research aimed to explore the significant role of public libraries in fostering maize production within the agricultural landscape of Laikipia East Sub-County, Kenya. The objectives of this research was: to ascertain the information requirements of maize farmers in Laikipia East Sub-County; to evaluate the existing information resources within public libraries that support maize production initiatives; to analyze the information services offered by public libraries to promote maize cultivation; and to examine information dissemination channels employed by public libraries in reaching out to maize farmers. The study was grounded on information needs theory, information-seeking behavior theory, community informatics theory. This was cross-sectional survey research, targeting 373 maize farmers from Laikipia East County and 3 library staff members from Nanyuki Public Library. Maize farmers' participants were selected randomly while library staff were selected purposively. Data collection from the respondents was through self-administered questionnaires to the farmers and interview schedules to the librarians. The researcher used questionnaires and interview guides for data collection and analysis. Regarding the kinds of information required for growing maize, respondents were split evenly between those who agreed and those who were neutral (20.74%), and 33.70 percent indicated they had never used the library. Respondents' views on the information resources available at public libraries were viewed as having increased their knowledge and skills in maize production in a neutral to somewhat positive way, with a moderate range of opinions (standard deviation of 1.940). Regarding the impact of library workshops and seminars on maize productivity, respondents' perceptions ranged from neutral to somewhat positive; a substantial standard deviation of 1.977 suggested a wide variety of experiences. Given the divergent views on the significance of the services provided, libraries must regularly assess the effectiveness of their resources and offerings. IT and library personnel should produce, maintain, and optimize digital materials. To promote library materials and services, the management of the library should work with local farming associations and community organizations. The staff of the library ought to better tailor its resources and services to the particular needs of maize producers. The publications are regularly updated and include practical, farmer-focused information on significant topics like seed selection, insect control, and crop management techniques.

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ACCRONYMS AND ABBREVIATIONS

ICM: Information and communication management

GDP: Gross domestic product

KEMRI: Kenya Medical Research Institute

KARI: The Kenya Agriculture Reforms & Innovations

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Public libraries are not just knowledge reservoirs in the contemporary agricultural landscape of Laikipia East Sub-County, Kenya; they can also act as catalysts to improve maize output. The purpose of this background study was to put public libraries' importance in agricultural growth in perspective. It focused specifically on maize production, which is essential to Laikipia County's food security and economic stability. This study aimed to shed light on the complex interaction between maize production and public libraries in order to support community-driven and policy- driven efforts that would increase agricultural output in the area.

Maize production plays a crucial role in agricultural systems, with its importance extending to food security, economic stability, and environmental sustainability (Erenstein et al., 2022). The findings from the cited studies (Adjei & Kyerematen, 2018; Santpoort, 2020) highlight key factors that influence maize yield variability and economic profitability, shedding light on the complexities involved. According to Maitah et al., (2021), the comparison between traditional cultivation methods and improved technologies demonstrates the potential benefits of adopting more efficient practices, such as timely planting and crop rotation (Ten-Berge et al., 2019).

Maize production is determined and measured through various methods, taking into account different yield parameters and agricultural practices (Liliane & Shelton, 2020). Measurements of maize production include quantity of production (yield), quality,

revenue, and cost of production (Ben-Ari et al., 2019). Key methods include farmer estimates, which are quick and cost-effective; crop cuts and whole plot harvest methods for on-station and on-farm trials; and more complex methods such as crop modeling and remote sensing (Lusk et al. 2020).

These advanced methods are more accurate, predicting yields with less deviation from actual harvest figures, but they are more costly and efficient for small plots. Yield estimation encompasses several factors, including plant density, kernel number, and moisture content of the grain, which influence the final yield (Ali et al., 2019).

According to Mwalupaso et al. (2019), significant sustainable maize production does not depend on how accessible and well-used agricultural information is made available to the farmers. Simtowe et al. (2019) argue that information is important in increasing and sustaining agricultural production in each country. In addition, disseminating information to farmers is an important part of embracing innovation and advancing agriculture. This information is majorly available in public libraries. In this case, building public libraries and equipping them with relevant agricultural materials would enhance maize production. Public libraries play a crucial role in disseminating agricultural knowledge to farmers, thereby enhancing maize production (Lusk & Chandra, 2021). As one of the oldest institutions in society, public libraries have traditionally served as repositories of information and sources of education for all individuals (AGOH et al., 2021). According to Parker et al. (2019), in the context of agriculture, public libraries offer access to a wealth of resources, including research papers, technical guides, and expert advice. By providing farmers with the necessary information and tools to improve their farming practices, public

libraries can contribute significantly to the enhancement of maize production (Baer-Nawrocka & Sadowski, 2019).

These libraries, acting as repositories of knowledge and information, play a vital role in disseminating best practices and innovative techniques to farmers, thus contributing to the improvement of maize production at local and regional levels (Grass et al., 2019). By capitalizing on the resources and services provided by public libraries, farmers can access valuable information on optimized production methods, market trends, and agricultural sustainability, ultimately enhancing their maize production outcomes (Baer-Nawrocka & Sadowski, 2019).

Public libraries function as key repositories of published and submitted agricultural research (Feder et al., 2021), making valuable knowledge accessible to farmers, researchers, and the general public. By providing access to scientific and technological information through services like Embrapa Technological Information (SCT) (Bertin et al., 2019), these institutions facilitate the communication of research findings crucial for agricultural development (Cairns & Prasanna, 2019).

Through strategic partnerships with research institutions and organizations, public libraries can bridge the gap between academia and practical farming(Bhat & Huang, 2021), offering resources that contribute to improving maize cultivation techniques and enhancing overall productivity(AGOH et al., 2021). Therefore, public libraries serve not only as knowledge hubs but also as catalysts for innovation and progress in the agricultural sector, playing a vital role in disseminating essential information for maize production advancement (Vaughan et al., 2019).

Public libraries play a crucial role in enhancing maize production by providing access to valuable resources for farmers and researchers (Aldosari et al., 2019). With the challenges facing maize production in regions like West and Central Africa(Ekpa et al., 2019), including drought, diseases, and parasitic weeds, the utilization of public library resources can aid in overcoming these constraints(Tarus, 2019). Modernization efforts within institutions like the International Institute of Tropical Agriculture (IITA) are leveraging innovative tools and genomic advancements to improve maize breeding programs (Yi et al., 2019).

Consequently, by integrating genotypic information with field phenotyping and laboratory analysis, public libraries can facilitate the dissemination of cutting-edge knowledge to enhance genetic gains relating to yield, resilience, and nutritional quality of maize varieties (Bortolaia et al., 2020). Through partnerships with research organizations and capacity-building initiatives, public libraries can serve as hubs for knowledge exchange, providing farmers with the necessary information and technologies to elevate maize production and tackle food security challenges effectively (Bhakta et al., 2019).

Moreover, the impact assessment of public libraries on maize production necessitates a comprehensive understanding of the infrastructure, information services, and institutional capacity within the agricultural sector (Sheng et al., 2019). By evaluating the status of information and communication management (ICM) capacity in institutions involved in agriculture and rural development, key stakeholders can identify knowledge gaps and target areas for improvement (Bailey et al., 2002; Giulivi et al., 2023).

Additionally, potential strategic partnerships with public libraries and other organizations can be crucial in disseminating essential agricultural information to enhance productivity

and sustainability (Aldosari et al., 2019). The baseline data compiled through such assessments serves as a valuable tool for monitoring progress and improving outreach strategies in the agricultural sector, ultimately contributing to the overall goal of increasing maize production and ensuring food security for communities (Van Campenhout et al., 2021).

Apart from the public libraries enhancing maize production by providing farmers with access to information, resources, and training programs (Giulivi et al., 2023). Through the implementation of agricultural extension services, libraries bridge the knowledge gap between researchers and farmers, disseminating valuable insights on best practices and technologies to improve yields (Sheng et al., 2019). The availability of agricultural literature, market trends, and government policies in public libraries enables farmers to make informed decisions and implement sustainable farming practices.

Moreover, the development of community programs and workshops in collaboration with agricultural experts further enhances the knowledge and skills of farmers, ultimately leading to increased maize production (Parker et al., 2019). Public libraries serve as catalysts for innovation and progress in the agriculture sector, empowering farmers to achieve greater efficiency and profitability in maize production (Abdulai, 2023). However, the realization of this potential is not without its challenges.

Public libraries in rural areas often face constraints such as limited funding, outdated infrastructure, and insufficient staffing (Van Campenhout et al., 2021). Consequently, barriers such as low literacy rates, language differences, and cultural norms may hinder farmers' utilization of library resources. Moreover, the digital divide poses a significant challenge(Smith, 2019), as many farmers lack access to the internet and digital

technologies, limiting their ability to benefit from online resources and services offered by libraries (Fathima et al., 2020).

This research study investigated the role of public libraries in the enhancement of maize yield production in Laikipia East Sub-County of the larger Laikipia County in Kenya. It seeked an understanding of how access to can empower farmers and potentially improve their farming practices and hence increase their maize yields.

1.2 Statement of the Problem

In both Africa and Central America, maize serves as a staple food. Additionally, it is grown in most farming communities and is a staple food for the majority of Kenyan homes. Agricultural development policies in Kenya emphasize the use of incentives to increase production and thus, be self-sufficient, for example, maize, and a staple food for most households. Channels used to incentivize maize producers over the years include setting good producer prices; raw material subsidies; provision of agricultural credit, research and advisory services; construction and maintenance of roads, development of irrigation and irrigation systems; legislative, institutional, and macroeconomic reforms (RoK, 2021), provided both governmental and nongovernmental organizations such as the Kenya Ministry of Agriculture, KEMRI, KARI the agricultural extensions officers and the agronomists, and other publicly available organization such as public and community libraries in various counties. The presence and optimal utilization of these systems is expected to support maize production.

Despite these efforts, maize production has remained below the domestic demand for most years, and the country continues to rely on imports to fill the shortfall. The productivity of maize is currently only 1.0 tons per hectare, while the potential that can be achieved is 6 to

8 tons per hectare (Kiboi et al., 2019). The current situation indicates that approximately 1.5 million bags of maize are produced in the county, or 65.2% of the 23 million bags produced nationally. However, the productivity of maize in the County has decreased. The Laikipia County, specifically Laikipia East Sub- County is one of the high maize producing areas in Kenya. Notably, maize farmers in Laikipia East Sub-county have frequently faced a severe crop failure, recording a 12.8% decrease in total maize harvest in 2023 compared to 2022 (GoK, 2022). This raises questions not only on production methods, but also on availability and accessibility of information for supporting production activities. To sustain the required maize production, farmers require adequate and reliable information to support production activities. Notably, public libraries are accessible to farmers and therefore have the potential to empower maize farmers with knowledge and information to enhance maize production. Failure to address this situation is likely to lead to food insecurity, resulting in higher prices which may affect the nutrition and well-being of many Kenyan households. It may also lead to social unrest and farmers' dissatisfaction; hence, posing challenges to political stability.

There have been previous studies such as Nambiro et al. (2021), and Lesaona-Tshabalala (2021) on factors enhancing maize production. According to Nambiro et al. (2021) identified information services that are essential in enhancing farmers' technical efficiency including formal and informal agricultural extension services, cooperation between stakeholders and distribution of soil management inputs. Adejo et al. (2019) highlighted some of the information needs of maize farmers including storage, market, and prices. Lesaona-Tshabalala (2021) pointed to the importance of agricultural information to farmers. Consequently, the study noted that little has been researched on the contributory

role of public libraries in enhancing maize production. The current study will seek to determine the role public libraries can play in enhancing maize production in Laikipia East Sub County, Laikipia County, Kenya.

1.3 Purpose of the Study

This study aimed to assess the role of public libraries in promoting maize production in Laikipia East Sub County, Laikipia County, Kenya to enhance access to maize production information by farmers.

1.4 Research Objectives

The study objectives were:

i. Establish information needs of maize farmers in Laikipia East Sub-County
ii. Examine the information resources available at public libraries to promote maize production in Laikipia East Sub-County
iii. Determine the information services provided by public libraries to promote maize production in Laikipia East Sub-County
iv. Assess the information dissemination channels used by public libraries to avail information to maize farmers in Laikipia East Sub-County

1.5 Research Questions

i. What are the information needs of maize farmers in Laikipia East Sub-County?
ii. What information resources are available at public libraries for promoting maize production in Laikipia East Sub-County?
iii. What information services are provided at public libraries to promote maize production in Laikipia East Sub-County?

iv. What information dissemination channels are used by public libraries to avail information to maize farmers in Laikipia East Sub-County?

1.6 Justification of the Study

The rationale behind doing a research study was the urgent necessity to fill in the knowledge gaps about the precise ways in which public libraries contribute to the growth of agriculture in the area. Research on the role libraries play in promoting agricultural practices and increasing productivity may be lacking, although agriculture particularly the production of maize is essential to the local economy and food security. The goal of the project was to close this knowledge gap and broaden our comprehension of the useful roles that libraries may play in the advancement of agriculture.

Furthermore, the research was consistent with the overarching goals of encouraging sustainable development in rural areas. Laikipia East Sub-County's sustainable development depends on finding ways for public libraries to increase agricultural output, given the important role that maize production has in livelihoods and food security. Knowing how library services affect maize yield would help develop better farming methods, allocate resources more efficiently, and ultimately increase the welfare of farmers and the community.

Additionally, by improving farmers' access to knowledge and information, the project hoped to empower them. Public libraries can be important gathering places for farmers to exchange knowledge and develop their capacities. The study aimed to identify strategies for leveraging these resources to improve decision-making, foster innovation, and enhance the overall resilience of the agricultural sector by examining how libraries can better support farmer empowerment and resilience through access to agricultural information.

The findings can be applied in other agriculture producing regions and agricultural practices like livestock, animal husbandry, and chicken breeding.

1.7 Scope of the Study

The research was focused on Laikipia East Sub-County, within Laikipia County, Kenya. This region was selected due to its agricultural significance and the presence of public libraries that could influence maize production. The study was confined to Laikipia East Sub-County and does not consider the role of public libraries in other regions of Kenya or in different agricultural contexts.

It also centered on maize production, a critical aspect of agricultural output in the region, and the role of public libraries in this context. The study examined how libraries contribute to knowledge dissemination and support maize farmers. The study was delimited to the services and resources provided by public libraries, excluding other sources of agricultural information such as research institutions, extension services, or the Internet. A key delimitation of this study was that it did not involve hypothesis testing. Additionally, the study did not aim to compare outcomes between those who utilize public library services and those who do not.

The data from maize farmers who utilize the library and those who don't weren't compared in the study. The study's main focus is on current practices and information accessible at the time of the research, though it may make reference to past data as well. The study confines itself to modern farming methods and library services; it makes no attempt to explore past data or forecast future trends. The study would look at the accessibility and use of agricultural resources in libraries, how involved farmers are with these establishments, and how library services affect farming results. The sub-county's maize

growers and the library employees who provide agricultural information services are the main players. The study only looks at maize production; it doesn't address other crops that might be produced by the farmers.

1.8 Significance of the Study

The study was significant because it has the potential to have a positive impact on several stakeholders and industries. By investigating how public libraries assist with maize production, better farming methods and higher yields can be developed, which would enhance food security in Laikipia East Sub-County. Public libraries offer valuable agricultural information, and this research would demonstrate this fact, empowering farmers with greater knowledge to make more productive decisions. Policymakers would be able to provide farmers with stronger support systems if they consider the study's findings when developing agricultural growth strategies.

The study holds significant promise for maize farmers in Laikipia East County as a region. By investigating the effectiveness of public libraries as information hubs, the research aimed to address critical challenges farmers face in accessing timely and relevant agricultural knowledge. Through improved access to information on best farming practices, pest management, market trends, and climate-resilient techniques, farmers could make more informed decisions, leading to increased productivity and profitability.

Furthermore, the study's findings could catalyze capacity-building and community engagement efforts. Public libraries could serve as platforms for training programs, workshops, and knowledge- sharing sessions, enhancing farmers' technical and digital literacy skills. By fostering collaboration and networking opportunities, the study might

contribute to creating a supportive ecosystem where farmers can exchange ideas, share experiences, and collectively address common challenges.

1.9 Limitations of the Study

The success of using library resources for maize production was strongly reliant on the engagement and cooperation of local farmers and stakeholders. Awareness of library services, readiness to accept new practices, and cultural perspectives of knowledge transmission may differ between farms. Some farmers were excited about accessing and using library resources, but others were oblivious of their potential benefits. This variance in participation had an impact on the research results because it affected how well library services are used and integrated into farming operations.

Additionally, many rural areas have a technological divide that consequently prevents farmers from accessing crucial tools and resources such as the internet and digital gadgets. While libraries provide digital resources such as online databases, agricultural extension materials, and training programs, farmers without the requisite technology were unable to fully utilize these services. This technological barrier limited the scope and impact of library services on maize production, especially for farmers who wanted assistance and information.

1.10 Assumptions of the Study

The research operated under the presumption that the sample farmers chosen for the study have all the attributes required to fairly represent the total number of maize farmers in Laikipia East Sub-County. This premise was essential since it serves as the foundation for extrapolating the study's conclusions to a larger demographic. However, this assumption carried certain inherent hazards. Additionally, factors such as sampling bias or non-

response bias could further compromise the representativeness of the sample. Therefore, while this assumption simplified the research process, researchers must carefully consider the selection criteria and sampling methods to ensure the sample is as representative as possible.

During the data-gathering process, the study assumed that the respondents would supply accurate and trustworthy information. Since the correctness of the information provided by the respondents determines the quality of the conclusions, this assumption was crucial for getting accurate and reliable data. Nonetheless, several variables might jeopardize the data's dependability and correctness.

To reduce these risks, researchers used a variety of data-gathering strategies, including the use of standardized questionnaires, maintaining anonymity, and carrying out validity tests to improve the data's trustworthiness. However, even if researchers assumed that participants gave truthful information, they still needed to recognize and deal with any sources of bias and mistakes all along the way.

1.11 Definition of Terms

Dissemination channels: Describe how messages are conveyed from information sources to target audiences

Information Resources: All computer-related activities, including any hardware capable of receiving email, browsing websites, storing, managing, or transmitting data, as well as all computer Printouts, online display devices, mass storage media, and other computer-related activities.

Information services: System of keeping records, forms, statistics, and data at a business.

Production : Maize yield per acre of land measured in number of 90kg bags.

Public libraries: Libraries that are available to the general public and are usually funded from public sources such as taxes. Managed by librarians and library assistants who are also civil servants.

Role : The specific function or part played by public libraries in enhancing maize production in Laikipia East Sub-County, Laikipia County, Kenya.

Maize Production: The process of cultivating the maize plant for its grain, which is Known as maize. This process involves various stages, including planting, growing, and harvesting the maize plant.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews previously published studies on the role of public libraries in enhancing maize production. The chapter also presented theories supporting the study. Further, the chapter highlighted the conceptual framework as well as a description of constructs. The empirical literature was organized according to the variables of the study as stipulated below.

2.2 Maize Production

Maize is one of the most widely cultivated cereal crops globally, with production occurring across all continents except Antarctica (Erenstein et al., 2022), with the largest producers of maize globally including the United States, China, Brazil, Argentina, and India (Santpoort, 2020). According to (Grote et al., 2021), countries benefit from advanced agricultural technologies, significant land availability, and favorable climatic conditions for maize cultivation. Moreover, global maize production is driven by various factors including demand for food, animal feed, and industrial use such as biofuels (Cairns & Prasanna, 2019). Additionally, government policies, trade agreements, and international market prices also influence global maize production trends (Jin et al., 2019).

In Sub-Saharan Africa (SSA), maize holds immense importance as a staple food crop, serving as a primary source of calories and nutrition for millions of people (Grote et al., 2021). The region accounts for a significant portion of global maize production, with countries like Nigeria, Tanzania, and South Africa being major producers (Santpoort,

2020). However, maize production in SSA faces several challenges including limited access to modern agricultural inputs such as improved seeds, fertilizers, and mechanization, erratic weather patterns, pest and disease pressure, as well as socio-economic factors like land tenure systems and access to credit (Jin et al., 2019). Despite these challenges, maize remains a crucial crop for food security and livelihoods in many SSA countries (Ten-Berge et al., 2019).

In Kenya, maize production is of paramount importance both economically and culturally (Tarus, 2019). It is a staple food crop for the majority of the population, forming a significant part of their diet. Maize farming is widespread across various agro-ecological zones in Kenya, with major maize-producing regions including the Rift Valley, Western Kenya, and parts of Eastern and Coastal regions (De Groote et al., 2020). Smallholder farmers dominate maize production, with both rained and irrigated farming systems being practiced.

Challenges facing maize production in Kenya include unreliable rainfall patterns leading to drought or floods, prevalence of pests and diseases such as maize stalk borers and aflatoxin contamination, limited access to quality seeds and fertilizers, and post-harvest losses due to inadequate storage facilities and market inefficiencies (Wanyama et al., 2021). Additionally, policy issues such as subsidies, market regulations, and land tenure systems also impact maize production in Kenya (Almekinders et al., 2021).

To achieve sustainable maize production, libraries can play a crucial role to serve as hubs for disseminating agricultural information and resources, which can be particularly beneficial for small-scale farmers (Unver & Koyuncu, 2020). Libraries can provide access to research on best practices in maize cultivation, nutrient management, and advanced

techniques (Abendroth et al., 2022). They can also facilitate learning and knowledge sharing among farmers, potentially partnering with agricultural extension services to deliver training and support programs.

2.2.1 Maize Production in Kenya

In the broader context of agricultural development policies in Kenya, initiatives have focused on incentivizing maize producers to boost self-sufficiency (Nagarajan et al., 2019). Strategies encompass a range of measures, including price subsidies, credit access, infrastructure development, and institutional reforms. However, despite these efforts, challenges persist, such as fluctuating prices, climate variability, and inadequate technology adoption, impacting maize production.

Recent studies highlight the multifaceted nature of factors influencing maize production, emphasizing the interaction between price incentives and non-price factors like agricultural spending, GDP growth, and climatic conditions (Jena et al., 2021). While favorable economic conditions and supportive policies drive production, challenges like high fertilizer prices and adverse weather conditions can impede progress (Nduwimana, 2020). In Kenya, particularly in regions like Laikipia County, maize production stands as a maizeerstone of both the local economy and food security (Leroux et al., 2019). Defined within this study as the continuous cycle of planting, nurturing, and harvesting maize crops within designated areas (Nagarajan et al., 2019), maize production relies heavily on various agricultural operations, from land preparation to irrigation. Despite its pivotal role, current production levels fall short of meeting domestic demands, necessitating significant reliance on imports to bridge the deficit (Munialo et al., 2020).

Acknowledging maize's economic significance, both as a staple food source and a source of income through local markets, underscores its importance for both subsistence and commercial purposes (Nduwimana, 2020). While the community's livelihoods and economic stability are intrinsically linked to successful maize yields, enhancing production through innovative and sustainable agricultural practices becomes imperative for bolstering the local economy and ensuring food security (Munialo et al., 2020; Nagarajan et al., 2019).

In light of these findings, policymakers are urged to prioritize investments in agricultural development, focusing on information dissemination, technology transfer, and skill-building initiatives for farmers (Karanja et al., 2019). By equipping them with the necessary knowledge and resources, interventions can mitigate risks associated with production and enhance overall economic growth (Jena et al., 2021). Additionally, introducing pro-market policies that incentivize maize production can further stimulate growth and reduce reliance on imports, ultimately contributing to long-term food security and economic stability (Nagarajan et al., 2019).

2.3 Information Needs of Maize Farmers

The concept of "Information Needs of Maize Farmers" refers to the specific information and knowledge that maize farmers require to enhance their production practices, improve yields, address challenges, and stay updated on advancements in maize farming techniques, technologies, and market trends (Donatti et al., 2019). The purpose of information needed for farmers' maize production helps in identifying library resources (Phiri & Chawinga, 2019). To ensure that the library effectively serves the local farming community and provides relevant and useful information to support maize production (Harvey et al., 2018).

Though information needs, knowing the specific information gaps that maize farmers face allows researchers and policymakers to prioritize areas for intervention and resource allocation (Chikuni & Kilima, 2019). This can guide the development of targeted initiatives aimed at addressing these gaps and improving farmers' access to pertinent information (Donatti et al., 2019). Other reasons for having information needs are for measuring impact and enhancing collaboration between the library, agricultural extension services, agricultural researchers, and other stakeholders involved in maize production (Van et al., 2021).

Information has become an important and integral part of agriculture, helping to increase agricultural production and productivity. Maize farmers, seeking to enhance their productivity and sustainability, have a diverse set of information needs crucial to their success (Nayal et al., 2021). The identification of information needs among maize farmers involves considering various factors that influence their farming practices and decision-making processes. These are agronomic information, market information, policy and regulation information, climate information, and technological information.

On the global scene, Maize farmers in the United States have a diverse set of information needs, reflecting the advanced nature of American agriculture. They often seek knowledge of cutting- edge farming techniques to enhance efficiency and productivity, such as precision agriculture technologies that utilize GPS-guided equipment and drones for crop monitoring (Harvey et al., 2018).

Additionally, with the widespread adoption of genetically modified maize varieties, farmers require up-to-date information on GMO traits, regulations, and stewardship practices (Donatti et al., 2019). Market information is also crucial for US maize farmers,

who closely monitor commodity prices and export demand to inform their planting decisions and marketing strategies (Seo et al., 2019).

In Israel, maize farmers operate in arid and semi-arid regions characterized by water scarcity, necessitating a focus on efficient water management practices (Bonfante et al., 2019). Farmers seek information on drip irrigation systems, drought-tolerant maize varieties, and soil moisture monitoring technologies to optimize water use efficiency and ensure crop viability (Degani, 2021).

Israel's expertise in agrotechnology and innovation is also reflected in farmers' information needs, with a focus on cutting-edge technologies such as precision irrigation, hydroponics, and vertical farming to maximize yield potential and sustainability (Degani et al., 2022). Furthermore, pest and disease control are crucial considerations, prompting farmers to seek information on integrated pest management strategies to mitigate crop losses and maintain production stability (Orimoloye, 2022).

Regionally, in a study to investigate how rice farmers in Ondo State, Nigeria, use agricultural knowledge and information (Iwuchukwu & Obazi, 2020) selected a sample size of 80 respondents using a multistage random selection technique. An organized interview schedule helped in the collection of primary data. Descriptive and inferential statistics were employed in combination to analyze the collected data. According to the study's findings, rice farmers in the study area have a variety of information needs, including knowing how to control diseases and pests, prepare and plant land mechanically, operate farm equipment, improve storage methods, and apply for loans or credit for agriculture. The radio and the respondents' friends and family served as their main information sources.

The respondents exhibited a typically high level of access to and utilization of agricultural information and expertise regarding better rice production cultural practices. The study identifies a few crucial informational demands for rice growers. However, it ignored maize farmers, and who could require different information. The production of maize will be the primary focus of this study.

Farmers make up a specific user group with very specific information requirements. A study conducted by (Sharma et al., 2021) examined the information requirements of farmers living in rural areas of India. The research was carried out using a survey technique and found that 41% of farmers need information on a daily basis for different agricultural tasks. It was discovered that farmers' top choices for information were their peers in the farming community, with newspapers and Government offices being the next most popular sources.

While the research highlighted the necessity of information for farmers, it did not identify the specific information needed by maize farmers, which will be the focus of the upcoming study. A shortage of agricultural information is highlighted as the main difficulty faced by farmers in the agricultural industry. Wan Mokhtar et al. (2022) examined the agricultural information requirements of Indian farmers. The study included a sample of 90 farmers. Data was examined using statistical methods like basic percentages, scores, and indices, as well as the Chi-square test.

Farmers in the study area had the greatest need for agricultural information concerning government schemes, such as loans and subsidies, as well as market information. As per the study results, Indian farmers seek information on government schemes, loans, subsidies, and market updates. Nevertheless, the research was carried out in India, which

presents a distinct setting compared to Kenya. In this way, the information requirements of farmers could vary between the two nations. Agricultural information is very essential for smallholder farmers to increase farm production and productivity. However, there is no proper access to accurate and adequate agricultural information to smallholder farmers (Feder et al., 2021)) study sought to identify the existing agricultural information source and information need of the smallholder farmers along with usefulness of the provided agricultural information.

Data from households in four wards of Bharatpur metropolitan Chitwan district in Nepal were collected. The study revealed that agro vet shops are the primary source of agricultural information for smallholder farmers. The agricultural information that was most in demand included input, market, and price details, with disease and pest management following closely behind. Smallholder farmers were given somewhat helpful agricultural information. According to the research results, farmers require information on inputs, market conditions, prices, as well as disease and pest management. An equivalent study needs to be conducted in Kenya to identify the information requirements of maize farmers. (Feder et al., 2021)

Information has become a vital and integral part of agriculture which contributes to enhancing agriculture production and productivity. An investigation by (Sharma et al., 2021) assessed the agriculture information needs of farmers in India. A descriptive research design was used for the study. Findings of the study revealed that majority of farmers have information needs mainly on various techniques of organic composting, improved storage techniques, market availability to sell agriculture products and farmers beneficial

government schemes. The study highlights various information needs by farmers; however, it was not specific to maize farmers as it is the case in the current study.

A study to investigate the information needs of maize farmers in Kogi State, Nigeria, with a particular emphasis on postharvest management was conducted by Adejo et al. (2019). Using an interview schedule, data were gathered from 189 randomly selected maize farmers. Descriptive statistics and binary logit regression were used to analyze the gathered data. The findings showed that most maize farmers were interested in learning about how to store their crops and the current market conditions, such as prices.

To address these needs, the study recommended improving the educational background of maize farmers through adult education programs, aiming to enhance their access to essential information regarding advanced postharvest technologies and their effective utilization, thereby adding more value to harvested maize. (Sharma et al., 2021) This research highlights key information requirements of maize farmers in Nigeria, including storage methods, market dynamics, and pricing factors.

Providing information in a productive and successful way is crucial for the prosperity of agriculture. (Rop, 2019) examined the dissemination of information to small-scale vegetable farmers in Laikipia Sub-County, Laikipia County, Kenya. The study employed a methodology based on analyzing a specific case. The study included 75 small-scale vegetable farmers and 13 agricultural and extension officers in the population. Information was gathered from surveys, structured interviews, and secondary sources.

The research discovered that vegetable farmers do not have access to the timely information tailored to their needs. The current information systems and services were insufficient in meeting the information requirements. Moreover, it was found in the study

that insufficient information resources and services hindered access to information. The research focused on the difficulties vegetable farmers face with information, but the current study specifically looks at the information requirements of maize farmers. (Rop, 2019)

2.4 Information resources available at public libraries for enhancing maize production

Information resources is data used by farmers. An example of an information resource is a customer purchasing information database. Information resources for research, teaching, learning, and university public services are obtained, stored, organized, distributed, and managed by public libraries (Wangeci & Njoroge, 2021). According to Mauti et al. (2018), library is for users who are also advertisers and whose main concern is that the desired information material is available when needed and in the appropriate format. Therefore, an effective public library is a gateway to knowledge, facilitating access to and use of information resources.

Public libraries play a crucial role in providing a diverse array of information resources that can significantly contribute to enhancing maize production. These resources encompass; Books and Journals, Research Papers, Online Databases, Government Publications, and Community Resources. Public libraries serve as dynamic repositories of information, offering maize farmers a multifaceted range of resources, from traditional books and journals to contemporary online databases (Rehman et al., 2022). In providing access to a wealth of knowledge, libraries empower farmers to make informed decisions, adopt best practices, and continuously improve their maize production endeavors.

On a global scale, libraries serve as invaluable gateways to an expansive reservoir of knowledge crucial for enhancing agricultural practices, including maize production.

Among the wealth of resources available, the Food and Agriculture Organization (FAO) of the United Nations stands out as a veritable treasure trove (Herforth et al., 2020). The FAO offers a diverse array of publications and online databases covering every aspect of maize farming, from fundamental planting techniques to sophisticated strategies for pest control and soil management (Hélias, 2019).

This comprehensive repository equips farmers and agricultural stakeholders with essential information needed to address various challenges and optimize their maize cultivation endeavors (WHO, 2022).

In addition to the FAO's resources, scientific journals and databases play a pivotal role in providing in-depth insights into cutting-edge advancements in maize breeding, fertilizer application, irrigation methods, and other critical areas of research (FAO, 2021). These scholarly sources offer a platform for disseminating the latest findings, innovations, and best practices within the agricultural community, fostering continuous learning and improvement in maize production techniques (WHO, 2022).

Furthermore, libraries have forged collaborative partnerships with universities and research institutions to ensure the availability of practical guides and extension bulletins tailored to the needs of maize farmers (Saint et al., 2019). By stocking these resources, libraries facilitate access to up-to-date information on agronomic practices, pest management strategies, market trends, and regulatory guidelines (WHO, 2022). Such collaborative efforts not only enrich the library's collection but also empower farmers with actionable knowledge and evidence-based recommendations to enhance their agricultural productivity and sustainability (Gouache, 2021).

Through these collaborative endeavors and comprehensive resources, libraries play a vital role in bridging the knowledge gap between agricultural research and grassroots farming communities. By providing access to authoritative information, libraries empower farmers to make informed decisions, adopt innovative practices, and overcome challenges, ultimately contributing to the advancement of maize production on a global scale.

When considering a regional perspective, libraries can address the unique challenges and opportunities faced by agricultural communities in specific geographic areas (Boateng et al., 2018). Organizations such as the International Maize and Wheat Improvement Center (CIMMYT) or the International Institute of Tropical Agriculture (IITA) specialize in maize research within particular regions, tailoring their publications and online resources to the specific needs of those areas (FAO, 2021). This focused approach ensures that farmers and stakeholders have access to information that is directly relevant to their local agricultural context (WHO, 2022).

Furthermore, libraries can serve as hubs for knowledge exchange and collaboration within regional agricultural networks (Asongu & Odhiambo, 2020). They provide meeting spaces for farmers, researchers, extension agents, and policymakers to share experiences, exchange ideas, and develop innovative solutions to common challenges (WHO, 2022). Through workshops, seminars, and outreach programs, libraries facilitate dialogue and knowledge-sharing, fostering a sense of community and collective learning among stakeholders involved in maize production (Tchamyou & Asongu, 2017).

In a study to explore the diverse information needs of agriculturists and farmers across various categories, and the extent of available resources within Lesotho and affiliated organizations in identifying potential avenues for meeting these informational

requirements Lesaona-Tshabalala, (2021), established that there was a balanced distribution of farmers engaged in agricultural activities such as maize, sorghum, beans, and vegetable cultivation, as well as livestock farming involving cattle, cows, piggery, and poultry and access to agricultural information. Further, the study established that agriculturists expressed a demand for agricultural information primarily for purposes related to marketing agricultural produce, accessing research insights, and personal development. Farmers, on the other hand, indicated their need for agricultural information to enhance primary production, promote community education, foster personal growth, and ensure sustainable agricultural practices.

The high rating of current awareness services and preference for publications as the preferred method of dissemination were noted. Results indicated that surface mail was the preferred method for the majority of users when it comes to obtaining information. The research emphasized the significance of agricultural information for farmers, but it did not detail the specific information sources accessible to farmers, which will be addressed in the upcoming study. (Lesaona-Tshabalala, 2021)

Amidst the growing importance of agricultural information accessibility and utilization among rural communities, a study by Okeuhie et al. (2021) emphasizes on the challenges and opportunities faced by rural farmers in accessing agricultural information resources. Their study on community librarianship, accessibility, and use of resources at the NRCRI library in Umudike, Nigeria, provides important understanding of how information is shared in agricultural environments.

Using a descriptive survey research method, the study found that rural farmers in Olokoro made extensive use of agricultural information resources available in the NRCRI library.

Nevertheless, despite this significant use, various obstacles arose such as financial limitations, inadequate reading abilities, outdated materials, restricted information literacy, and librarian attitudes. These results highlight the various obstacles that hinder rural farmers from accessing and utilizing agricultural information resources, emphasizing the importance of tailored interventions to overcome these challenges and improve information accessibility. (Okeuhie et al. 2021)

Having sufficient funds, improving information literacy among farmers, and investing in agricultural information resources are key to overcoming challenges in accessing such resources in the library. The research pointed out various challenges of using agricultural information resources in public libraries. However, there was no mention of specific information resources available for farmers, which is the focus of the current study. (Okeuhie et al. 2021).

For Kenyan farmers, public libraries represent invaluable repositories of locally relevant information crucial for optimizing maize production. According to the GoK (2021), the Kenyan Ministry of Agriculture, Livestock, Fisheries, and Cooperatives (MoALFC) plays a pivotal role in disseminating agricultural knowledge, publishing resources such as booklets and brochures tailored to the specific needs and conditions of Kenyan farmers (Phiri et al., 2019). These resources offer essential details on recommended maize varieties, planting calendars, fertilizer use, and other pertinent agronomic practices pertinent to Kenya's agricultural landscape. Libraries must ensure these resources are readily available to farmers, serving as a one-stop shop for accessing locally relevant agricultural information (Misaki et al., 2018).

Moreover, Kenyan universities and research institutes, notably the Kenya Agricultural and Livestock Research Organization (KALRO), conduct extensive research customized to Kenyan soils, pests, diseases, and climatic conditions (KALRO, 2021). Their publications and databases contain valuable insights and findings that are directly applicable to maize farming in Kenya (Chikuni & Kilima, 2019). Public libraries should prioritize providing access to these research outputs, enabling farmers to benefit from the latest scientific advancements and evidence-based recommendations. By putting this valuable knowledge directly into the hands of farmers, libraries empower them to make informed decisions and implement best practices to enhance their maize production (Obiero et al., 2019).

To further enhance their local focus, libraries can serve as platforms for showcasing success stories of Kenyan farmers who have successfully adopted improved maize production techniques (Phiri et al., 2019). These reviews not only inspire and motivate other farmers but also serve as practical examples of innovation and resilience within the local agricultural community. By highlighting real-world examples of successful maize farming practices, libraries foster a culture of knowledge sharing and innovation, creating a supportive environment where farmers can learn from each other's experiences and collectively strive for agricultural excellence (Verkaart et al., 2018; Tumbo et al., 2018).

2.5 Information Services Provided by Public Libraries for Enhancing Maize Production

Information services are activities that provide data and knowledge of interest to users. The interaction is that information services collect, manage, and store data (Sharma, 2019). Users of information services can be divided into two groups: public library users and technical library users. Lending, bibliographic training, remote learning, government

paperwork, reference materials, and special collections are just a few of the user services offered by public libraries.

The methods and operations for preserving, expanding, and supporting library collections, as well as background services including acquisition, cataloguing, classification, inter-library lending, document delivery, and journal systems, are key areas of concentration for library information user services (Sharma, 2019). Information services in public libraries should be accessible and affordable (Onsinyo, 2020).

The identification of information needs among maize farmers involves considering various factors that influence their farming practices and decision-making processes (Nambiro et al. 2021). These indicators play a crucial role in understanding the farmers' requirements, they include; agronomic information, market information, policy and regulation information, climate information, and technological information.

From a global perspective, public libraries serve as crucial repositories of agricultural knowledge on a global scale (Degani, 2022). Initiatives such as those by the Food and Agriculture Organization (FAO) provide farmers worldwide with access to comprehensive resources and databases covering various aspects of maize production (FAO, 2021). Scientific journals and online databases further contribute by disseminating cutting-edge research and best practices in maize farming (Bonfante et al., 2019). Collaboration with universities and research institutions ensures that practical guides and extension bulletins are readily available to farmers, bridging the gap between theory and practice (Van et al., 2021). Regionally focused organizations like the International Maize and Wheat Improvement Center (CIMMYT) and the International Institute of Tropical Agriculture (IITA) play pivotal roles in tailoring information services to specific maize-growing

regions (Chen & Rodriguez, 2022). Their publications and online resources address regional challenges and varieties, providing farmers with contextually relevant knowledge (CIMMYT, 2020). Libraries facilitate access to climate-smart agricultural practices, including drought-resistant varieties and water-saving irrigation techniques adapted to regional climates (IITA, 2021). Through targeted initiatives, libraries contribute to building resilience and sustainability in maize production systems (Garcia & Martinez, 2021).

Accordingly, libraries play a crucial role in delivering valuable information services to farmers through various innovative initiatives (Onsinyo, 2020). For instance, some libraries actively manage social media channels dedicated to disseminating relevant agricultural information to farmers (Sharma, 2019). Through the use of platforms like Facebook, Twitter, and Instagram, libraries can reach a wide audience of farmers and provide them with timely updates, tips, and resources related to farming practices, market trends, and agricultural innovations.

In Kwara State, Nigeria, farmers' utilization of agricultural information sources and services for enhanced productivity was explored in a study conducted by Adio et al. (2019). Employing a survey design, the researchers utilized questionnaires and interviews to gather data, which were subsequently subjected to descriptive analysis. The findings revealed that farmers primarily relied on various sources and services such as interpersonal relations, interactions with fellow farmers, town criers, television, mobile phones, film shows, and radio.

Ngwira and Majawa (2019) conducted research on how agricultural information services are shared with farmers in Malawi to achieve food security. The research utilized a survey methodology approach. Two techniques were utilized to collect primary data and

information in order to gain a comprehensive understanding of the study area. These consisted of questionnaires with a loose structure and interviews on a personal level. Research results showed that farmers required guidance on raising livestock planting, storage, fertilizer application approaches, and a range of other topics. Findings also indicated that posters, radios, and extension agricultural agents were the primary information sources.

Based on the research, it is recommended that libraries be adequately funded in order to improve their agricultural resources, hire skilled librarians in the agriculture field, identify relevant information sources for farmers, and cater to specific information needs of different groups (Adio et al. 2019).

In Kenya, public libraries offer vital support to maize farmers through locally relevant information services (Ochieng & Mwangi, 2023). Government publications from the Ministry of Agriculture, Livestock, Fisheries, and Cooperatives provide essential details on recommended maize varieties and agronomic practices tailored to Kenyan conditions (MoALFC, 2019). Research institutions like the Kenya Agricultural and Livestock Research Organization (KALRO) conduct studies focused on Kenyan soils, pests, and diseases, with their findings accessible through library channels (KALRO, 2020). Libraries showcase success stories of Kenyan farmers who have adopted improved maize production techniques, inspiring others and fostering a culture of knowledge sharing (Kagwe & Kamau, 2021).

Farmers utilized information for various purposes such as crop and animal production, pest control, disease management, weed control, fishing, disaster management, fertilizer application, post-harvest technology, labor sourcing, and obtaining agricultural credit due

to their requirement for it. The study focused on sources of information, but did not specifically address information services like this study will do. (Kagwe & Kamau, 2021)

Crop productivity and farming system efficiency are major concerns since Kakamega District farm sizes are declining. Nambiro et al. (2021) examined the connections between soil-related agricultural information services and maize production efficiency .Cluster sampling was utilized to interview 154 farmers in the Kakamega District. Farmers were classified into two groups: those who had access to soil-related agricultural information services and those who did not, using the data available.

The results showed that farmers who had access to agricultural information services related to soil were able to produce maize more efficiently compared to farmers who did not have such services. The study offers suggestions for enhancing farmers' access to essential resources by fortifying agricultural extension services, both official and informal, fostering stronger ties between farm-level operations, agricultural research, and agricultural extension, and endorsing greater distribution of soil management inputs through policy support. (Nambiro et al. 2021)

These suggestions are given due consideration to the substantial influence that soil-related agricultural information services have on the technical effectiveness of maize production in the research region (Adio et al. 2019). The study identifies information services that are essential in enhancing farmers' technical efficiency including formal and informal agricultural extension services, cooperation between stakeholders, and distribution of soil management inputs.

In order to cover a larger area efficiently, the study also suggested that more extension officers should be recruited, educated, and placed in rural areas. Furthermore, both public

and private media platforms should broadcast agricultural shows at times that suit the schedules of farmers. (Adio et al. 2019). The study focused on the resources and information requirements of farmers, yet did not include details on the specific information services provided by public libraries.

Information Services Provided by Public Libraries can greatly play a crucial role in delivering valuable information services to farmers through various innovative approaches, libraries can host radio shows aimed at educating farmers on various agricultural topics (Nambiro et al. 2021). By collaborating with local radio stations, libraries can broadcast programs that provide farmers with practical advice, expert interviews, and updates on agricultural policies and regulations. This approach ensures that farmers have access to valuable information even in remote areas where internet access may be limited (Onsinyo, 2020).

Libraries also have initiatives to enhance the knowledge of extension officers, who then educate farmers. By providing training programs and resources for extension officers, libraries contribute to the professional development of these key stakeholders in the agricultural sector (Ngwira and Majawa, 2019). Extension officers equipped with up-to-date information and skills can effectively disseminate knowledge to farmers, thereby improving agricultural practices and productivity (Sharma, 2019).

2.6 Information dissemination channels used by public libraries for enhancing maize production

Information dissemination channels are the means by which information is communicated or received with a focus on importance, timing, precision, affordability, trustworthiness,

ease of use, comprehensiveness, and level of detail. Libraries are currently utilizing different methods to distribute information to their patrons. Facebook is the most commonly used platform among library patrons. Many libraries opt to utilize social media platforms like Twitter, blogs, flickr, podcasts, and online videos for sharing their information (Odinga, 2018).

Modern ways of spreading information include extension services and mass media, while traditional ways include interpersonal methods like farmers' personal experiences and family communication, peers, companions, and neighboring agricultural workers (Rahman et al., 2020). Public libraries employ diverse channels to disseminate information aimed at enhancing maize production, such approaches include; traditional media, digital media, workshops and seminars, community outreach programs, and mobile technology. These diverse channels collectively contribute to widening the audience reached by public libraries, thereby enhancing maize production on a broader scale (Adio et al. 2019).

By utilizing both conventional and contemporary methods, libraries are essential in facilitating the efficient dissemination of pertinent information to farmers, thereby contributing to the enhancement of maize agriculture techniques. A study was carried out to examine how innovative agroforestry practices are spread from sources to users through information channels (Martini et al., 2021). Semi-structured interviews were utilized to engage with 144 farmers in Indonesia for the study. Information sources, channels for disseminating agricultural/agroforestry information, and key disseminators were all included in the data collected during the study.

Developed countries offer valuable examples. The United States Department of Agriculture (USDA) National Agricultural Library (NAL) provides a wealth of online

resources (Coble et al., 2018). Public libraries often collaborate with extension services for workshops and demonstrations tailored to local needs (Bentrup, et al., 2018). Similarly, in the Netherlands, Wageningen University & Research partners with libraries to provide access to their online resources and train farmers in their utilization (Zurndorfer, 2018).

Additionally, in Japan, the country's National Agriculture and Food Research Organization (NARO) disseminates information through a combination of online resources, publications, and extension services (NARO, 2021). Public libraries collaborate with NARO to offer localized information specific to Japanese conditions (Zurndorfer, 2018). Developing countries on the other hand have adopted innovative approaches.

India's network of Krishi Vigyan Kendras (KVKs) partners with public libraries to organize training sessions and provide access to extension materials for farmers (Mohan et. al., 2019). In Ghana, the Ghana Library Authority collaborates with the Ministry of Food and Agriculture (MOFA) to establish information centers within libraries (Idiegbeyan-Ose et. al., 2019). These centers offer farmers access to extension bulletins, online resources, and training sessions on improved techniques (Adu et al., 2018). Ethiopia's Agricultural Research Organization (EARO) disseminates information through research centers and extension services (Yigezu, 2021). Public libraries there collaborate with EARO to offer localized information on drought-resistant maize varieties and climate-smart agriculture practices (Kaske, 2020).

Kenya on the other hand presents both potential and challenges (Yılmaz & Njora, 2021). The Ministry of Agriculture, Livestock, Fisheries and Cooperatives (MoALFC) disseminates information through extension bulletins, brochures, and radio programs (Tata & McNamara, 2018). However, access to this information remains limited in remote areas

like Laikipia East. Public libraries in Kenya are increasingly seen as potential hubs for agricultural information, but research suggests a lack of resources, trained personnel, and farmer awareness regarding library services (NARO, 2021).

The study findings revealed four different information channels: mass media, interpersonal communication with opinion leaders, extension agents, and trustworthy contacts like family and friends, formal extension services or government programs, and social events like weddings and village meetings (Martini et al., 2021). Farmers viewed personal contacts (interpersonal communication) as the most readily available option.

he research also discovered that opinion leaders and government extension agents were the main individuals responsible for spreading agroforestry innovations. Engaging in conversations with the agroforestry disseminators was the most favored way of receiving information. The study identifies key agricultural information dissemination channels including mass media, interpersonal communication, formal extension services and social gatherings. Similarly, the current study will investigate information dissemination channels for enhancing maize production in Kenya. (Martini et al., 2021).

The exchange of knowledge in agriculture is essential to improving farming methods and yield. This phenomenon is clarified by a study conducted in 2019 by Aldosari et al., which looked into how Pakistani farmers felt about electronic media. The study used random sampling to pick 183 respondents, and Chi-square analysis and descriptive statistics were used to evaluate the data. The results emphasized how important mobile phones and the internet are as sources of agricultural information, and how important TV and radio are as channels for spreading agricultural knowledge in Pakistan. The goal of the current research

is to investigate agricultural information distribution pathways in the Kenyan context, taking inspiration from this work.

Enhancing farmers' availability of valuable agricultural information decreases the expenses associated with information search, resulting in increased agricultural productivity and sustainability. Mwalupaso et al. (2019) assessed how farmers' technical efficiency in Zambia is affected by using mobile phones to gather agricultural information. Farmers were chosen through a two-step sampling method, and the Cobb-Douglas (CD) production function was used to analyze the relationship using two methods, the traditional stochastic production frontier (SPF) and propensity score matching-stochastic production frontier (PSM-SPF) model.

The study discovered that in both instances, there was a notable and favorable connection between farmers' technical efficiency and the use of mobile phones. The research found that mobile phones play a crucial role in improving farmers' technical efficiency. Nevertheless, the research only concentrated on mobile phones, whereas the present study will investigate different information sources. (Mwalupaso et al. 2019)

In Tanzania, the effectiveness of agricultural information delivery channels for smallholder farmers was investigated. Employing a descriptive cross-sectional design Ndimbwa et al. (2021), study revealed a significant issue: Smallholder farmers face important challenges in improving production due to the difficulty in obtaining timely and relevant agricultural information and knowledge presented in a suitable way. As a result, these farmers mainly depend on informal channels.

Furthermore, farmer associations and trial fields are becoming increasingly popular as other avenues to obtain agricultural knowledge. The research discovered that informal

channels are the main way farmers in Tanzania obtain agricultural information. To address this issue, the study recommended efforts to improve the dissemination of agricultural information and knowledge. (Ndimbwa et al. 2021),

An investigation was conducted by Bhavanishankar et al (2021) to identify the communication channels available and used by the farmers in India. Survey method was applied and the structured questionnaire tool was used to collect the data from farmers. The study revealed that 35.6% farmers use television, 25.8% farmers use newspapers, and 22.8% farmers use radio as their personal communication media. The study highlighted television, newspaper and radio as the main communication channels available for farmers in India.

In examining chickpea information's existing communication and dissemination methods and the factors influencing them in Embu County, Kenya Anyango (2016) conducted a research study. Farmers were surveyed using a semi-structured questionnaire. The study revealed that the most utilized communication channels were fellow farmers and staff from the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).

To enhance chickpea awareness, the study recommended increasing the frequency of field days, demonstrations, and farmer group meetings. Additionally, it suggested incorporating various communication methods, including information and communication technologies (ICTs), alongside interpersonal communication approaches. While the study emphasized diverse channels for disseminating chickpea information, the current investigation will concentrate on information dissemination channels specific to maize production. (Anyango, 2016)

2.7 Theoretical Framework

This study will be guided by four main theories to inform the objectives and support the development of the research variables. These will include the information Needs Theory as discussed by Taylor in 1968 (Ruthven, 2019), to understand the specific knowledge gaps among maize farmers in Laikipia East. Information-seeking Behavior Theory by Wilson discussed in 1981 (Oza., 2021), to examine how farmers seek out information and the role of public libraries in fulfilling these needs.

Additionally, the Service-Dominant Logic as postulated by Vargo and Lusch in 2004 (Tregua et al., 2021; Yeon & Lee, 2021), for understanding the services provided by public libraries beyond mere access to information, such as training sessions or expert consultations and Information Poverty Theory can be used to understand the barriers that maize farmers in Laikipia East Sub-County face in accessing critical agricultural information.

2.7.1 Information Needs Theory

The theory of Information Needs serves as another way to explain how value is generated through exchange among different groups of actors, according to Vargo and Lusch in 2004. It originates from the field of library and information science, and focuses on understanding and addressing the specific knowledge requirements of individuals or groups (Tregua et.al. 2021).

Its milestone is identifying the gap between what people know and what they need to know to effectively perform tasks or make decisions. This theory is used to guide the development of information services, ensuring that libraries, information centers, and online resources are aligned with the specific needs of their users, thereby facilitating better

decision-making, learning, and problem-solving across various domains (Yeon & Lee, 2021).

The Information Needs Theory in the context of maize farmers in Laikipia East would inform the exploration on the specific gaps in knowledge that prevent farmers from maximizing their crop yields. (Alvermann et al., 2018). This can entail knowing the best farming practices, recognizing and eliminating pests, and adjusting to shifting weather patterns. Public libraries can customize their services and resources to the specific needs of the farming community by identifying these gaps, which would ultimately improve the region's maize output.

Despite the application of the information needs theory in this research, it suffers from weaknesses such as its use in the dynamic information environment, the theory may not adequately address the evolving nature of the information environment, and how changes in technology and media affect information needs (Srinivasan & Swink, 2018). Information seekers and users have varying access ways and abilities in using the information.

Access to information sources and an individual's ability to use them effectively can greatly impact information needs, yet the theory does not always consider these practical constraints (Alvermann et al., 2018). Additionally, the theory does not consider the cultural and social factors, in that information needs are influenced by cultural and social contexts, but these are not always adequately addressed by the theory, which sometimes overlooks the diversity of information practices across different groups.

2.7.2 Information-seeking Behaviour Theory

With its origins in the late 20th century, primarily in Carol Kuhlthau's work in 2008 (Soroya et al., 2021), the Information-seeking Behavior Theory fundamentally altered our

knowledge of how people look for information to meet their requirements (Mirzaei et al., 2021). During her time at Rutgers University, Kuhlthau conducted ground-breaking research that explored the cognitive and affective processes that underlie information seeking (Kulthau, 2020; Kulthau, 2008). This research led to the creation of a comprehensive model that outlines the stages people go through when faced with information tasks.

The theory is a framework that examines how people look for, get, and use information to meet their information demands. Information science, psychology, communication studies, and sociology are the theoretical foundations of this paradigm. In the context of information seeking, it discusses how human behavior is dynamic and complicated (Oza, 2021).

Information Seeking Behavior Theory in this research will explore how individuals, such as maize farmers in Laikipia East, actively search for information to satisfy their specific needs. This theory can help understand the channels through which farmers seek information, be it through traditional means like books and extension services or modern methods such as the internet and mobile technology. Public libraries, by aligning their resources and services with these information- seeking behaviors, can play a crucial role in providing access to relevant agricultural information, thereby supporting farmers in making informed decisions about their practices.

The Information Seeking Behavior Theory serves as a valuable framework for comprehending how individuals seek and utilize information (Mirzaei et al., 2021). However, its application in research may unveil several weaknesses. The theory falls short in explaining the wide variety of individual information-seeking activities that are impacted

by situational, psychological, and personal factors. The unpredictability of human decision-making processes makes it difficult to forecast information-seeking behavior (Soroya et al., 2021). Furthermore, the hypothesis does not accurately capture how quickly advancing technology is influencing information-seeking habits.

By connecting the study on how public libraries improve maize production to the Diffusion of Innovations Theory, we can understand how farmers adopt agricultural innovations. This method aids in creating successful plans for spreading agricultural knowledge, boosting adoption rates, and ultimately enhancing maize production in Laikipia East Sub-County. The study aims to enhance comprehension of the processes that drive the spread of agricultural innovations via public libraries, resulting in improved and enduring agricultural methods.

2.7.3 Community Informatics Theory

Community informatics theory is a multidisciplinary field that studies the link between communities and information and communication technologies (ICTs) (Taherdoost, 2018), with a particular emphasis on how ICTs can empower communities (Eze et al., 2021), increase social inclusion, and encourage local development (Buskens, 2020). The theory was proposed in the late twentieth century and has grown throughout time as a result of the collective contributions of scholars and practitioners from various disciplines, including sociology, anthropology, computer science, and others (Anwar & Frings-Hessami, 2020). Michael Gurstein in 1979, according to Eze et al., (2021) is credited with popularizing the phrase "Community Informatics" in the mid- 1990s to define the relationship between community development and ICT community Informatics (CI) theory stands at the intersection of technology and social empowerment, offering a compelling framework for

understanding how communities engage with information and communication technologies (ICTs) (Buskens, 2020). Before CI formally emerged, early practices demonstrated communities' instinctive adoption of communication technologies, albeit rudimentary ones, such as newsletters, as far back as the 1980s (Huang, 2018). These grassroots efforts laid the groundwork for what would later coalesce into a cohesive field. The term "community informatics" gained prominence in the late 1990s, with figures like Michael Gurstein playing pivotal roles in its conceptualization and development (Eze et al., 2021). Gurstein introduced the concept of "effective use," which transcends mere access to technology by focusing on how communities harness it for their advancement (Anwar & Frings-Hessami, 2020). Central to CI theory is the notion of empowering communities through ICTs to achieve their collective goals and bolster social processes.

Community Informatics Theory (CIT) emphasizes the importance of information and communication technologies (ICTs) in empowering communities and facilitating their development processes (Buskens, 2020). It focuses on how communities' access, use, and create information to address local needs and challenges. In the context of your research on the role of public libraries in enhancing maize production in Laikipia East Sub-County, Kenya, CIT can provide a theoretical framework for understanding how information flows within the community and how public libraries can serve as hubs for accessing agricultural information.

2.7.4 Information Poverty Theory

The theory was proposed by Elfreda Chatman in 1996, explores how certain groups or individuals lack access to, or are systematically excluded from, essential information that could improve their lives. The theory is particularly concerned with marginalized or

disadvantaged communities who may not seek or be able to access vital information due to social, economic, cultural, or institutional barriers. (Merton, 1972)

Information Poverty Theory was used to understand the barriers that maize farmers in Laikipia East Sub-County face in accessing critical agricultural information. These barriers might include lack of awareness about available resources, cultural or social stigma associated with seeking help, economic constraints, or physical distance from public libraries.

By applying this theory, the study can uncover the underlying reasons why some farmers may not be using public libraries to access information that could enhance their maize production. (Buskens, 2020).

The theory will help evaluate whether public libraries in Laikipia East Sub-County are effectively addressing the information needs of maize farmers, particularly those who are information-poor. It will also guide an assessment of whether the libraries are accessible and inclusive in their services. Understanding the extent to which public libraries mitigate information poverty can inform recommendations for improving library services to better support the farmers. (Oza, 2021).

Information Poverty Theory posits that those experiencing information poverty may have different or limited information-seeking behaviors compared to those with better access. The theory will inform an investigation into how maize farmers in the region seek information, what barriers they face, and how these behaviors are shaped by their socio-economic context. Insights from this perspective can help tailor library services to better align with the actual information-seeking patterns and needs of maize farmers. (Buskens,

2020).

The theory highlights the impact of social and cultural factors on information access and usage. It will be used to explore how community norms, trust issues, or social networks influence maize farmers' interactions with public libraries and their willingness to seek and use information. Understanding these dynamics can help in designing library programs that are culturally sensitive and more effective in reaching out to and engaging the farmers.

By applying Information Poverty Theory, the study will provide evidence-based recommendations for policies aimed at reducing information poverty among maize farmers. This involve improving the accessibility and relevance of information resources provided by public libraries or addressing broader socio-economic factors that contribute to information poverty. (Oza, 2021).

The theory will help ensure that policy recommendations are grounded in a thorough understanding of the specific challenges faced by the information-poor in the region.

2.8 Summary and Research Gap

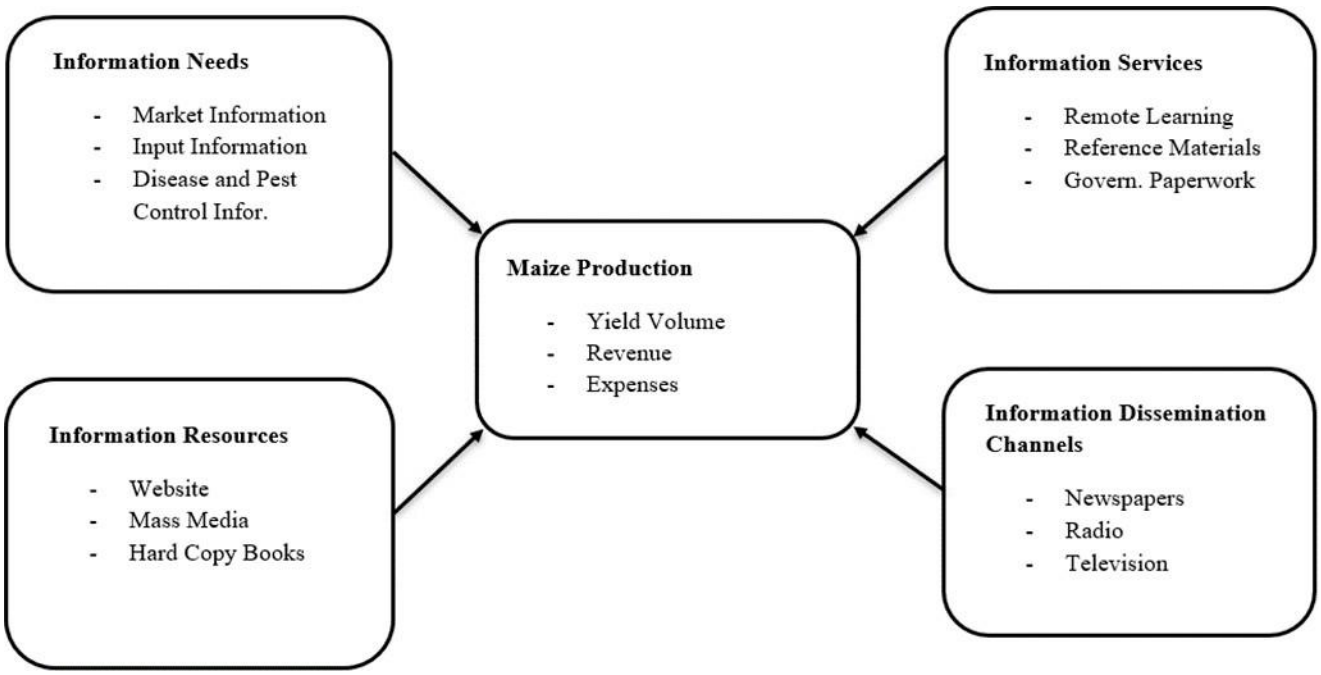
The contribution of public libraries on improving maize production in Kenya's Laikipia East Sub-County was mostly understudied. (Rehman et al., 2022). Public libraries are well-known for helping people find knowledge, but little was known about how specifically they have aided in the development of agriculture, especially maize production. (Donatti et al., 2019). In order to address this, the research looked at the unique information demands of maize farmers, assess the value and usability of agricultural resources available in public libraries, and assess the efficacy of different information distribution channels. In order to close the information gap about public libraries' role in advancing agriculture in

this area, the study also aimed to present actual data on the effects of library services on farming practices and productivity. (Onsinyo, 2020).

2.9 Conceptual Framework

Figure 2. 1:

Showing the Conceptual framework



Independent Variables **Dependent Variable** **Independent Variables**

Source: (Researcher, 2024)

2.9.1 Description of Variables

Figure 2.1 indicated the independent variables as information needs, information resources, information services, and information dissemination channels, while the dependent variable was maize production.

Both the dependent and independent variables used in this study served as the focal point of the study and represented the outcome and result of the study interest. The variable encompassed various aspects crucial for understanding the agricultural output. These included "Yield Volume," indicating the quantity of maize harvested per unit area, "Revenue," denoted the total income generated from maize sales, and "Expenses, “which covered the costs incurred during maize cultivation, including inputs and operational expenses.

Information needs as an independent variable referred to the specific informational requirements of maize farmers in Laikipia East Sub-County related to their production activities. This variable encompassed factors influencing maize production and the accessibility of information resources and services. Information needs encompass vital areas such as "Market Information," pertains to data on market trends, prices, demand, and supply dynamics of maize. "Inputs Information" includes details on agricultural inputs like seeds, fertilizers, and pesticides, covering their types, availability, quality, and proper utilization. Additionally, "Disease and Pest Control Information" referred to knowledge and strategies for identifying, preventing, and managing diseases and pests affecting maize crops.

Information resources as the second independent variable in this research, encompassed the different sources and platforms from which maize farmers obtained relevant information to support their production activities. This variable considered platforms and materials facilitating access to pertinent information. This included "Websites" that serve as online repositories of resources, tools, and information related to maize production. "Mass Media," included newspapers, radio, and television, are traditional channels for

disseminating agricultural information to a broader audience. "Hard Copy Books" represent printed materials offering comprehensive guidance on various aspects of maize farming. Additionally, the independent variable Information services, represented the various services provided to maize farmers to meet their informational needs and support their production efforts.

This variable encompassed educational and supportive measures for maize farmers. "Remote Learning" initiatives provided avenues for acquiring knowledge and skills through digital platforms. "Reference Materials," such as books, journals, and manuals, serve as valuable sources of information and guidance. Additionally, "Government Paperwork" included official documents, regulations, and policies issued by governmental bodies relevant to maize production.

Finally, the independent variable information dissemination channels, refers to the channels or mediums through which information relevant to maize production was communicated to farmers in Laikipia East Sub-County. This variable represents the avenues through which information reaches maize farmers. "Newspapers" disseminate news, articles, and updates pertinent to agricultural practices, including maize cultivation. "Radio" broadcasts programs, interviews, and discussions addressing agricultural topics, while "Television" features visual media covering agricultural practices and innovations, including those related to maize farming.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter described the research design, Study population, sample and sampling frame, sampling techniques, research instruments, data collection procedures, validity, reliability, and the research ethics that the research followed.

3.2 Research Design

The research design, as described by Muller et al. (2018), is the strategy and guidance used by a researcher during the various stages of their study. Research design serves as a structure for gathering and evaluating data (Tobi and Kampen, 2018). As stated by (Dubey and Kothari, 2022), research design involves setting parameters for data collection and analysis in order to achieve a balance between procedural efficiency and alignment with the study objective. Selecting a research design reflects how much importance is given to different elements of the research process (Asenahabi, 2019).

This study used a survey approach that was guided by a cross-sectional research design. The study used this approach because studies using a survey approach have superior generalizability and greater external reliability (Maxwell, 2021). Surveys allow the collection of a large amount of data from a sizeable population in a highly economical way, are perceived as authoritative by people in general and are both comparatively easy to explain and understand (Story & Tait, 2019).

A cross-sectional design on the other hand, entails the collection of data on more than one case and at a single point in time to collect a body of quantitative or quantifiable data in

connection with two or more variables, which are then examined to detect patterns of association (Pan, 2021).

The cross-sectional survey research design was best suited to this study as it aims at finding out the prevalence of a phenomenon, situation, problem, attitude, or issue(Wang & Cheng, 2020), by taking a cross-section of the population of the farmers and librarians in Laikipia East County. It was useful in obtaining an overall picture as it stands at the time of the study (Kesmodel, 2018).

3.3 Location of Study

Laikipia County is situated in the Rift Valley region and is among the 47 counties in Kenya. Laikipia County is made up of three administrative sub-counties: Laikipia East, Laikipia North, and Laikipia West. Laikipia East Sub-County is situated to the east, while Laikipia North is to the north, and Laikipia West to the west of Laikipia County. The sub-county administrative centers are located in Nanyuki, Dol-Dol, and Rumuruti, in that order (LCIDP, 2019).

In the North, Laikipia County shares borders with Samburu County, while Isiolo County is to the North East, Meru County to the East, Nyeri County to the South East, Nyandarua County and Nakuru County to the South West, and Baringo County to the West. It is situated between 0o18` and 0o 51` North latitudes and 36o longitude (GoK, 2018). The study will be conducted at the Nanyuki library in Laikipia town and involve farmers from the wider Lia East sub-county area.

Nanyuki Library is a public library in Laikipia which is mandated by the law under Cap 225 of the Laws of Kenya, April 1965. It is situated nearby to A.C.K Church Nanyuki and the government office County Assembly Hall in Nanyuki town. The selection of this

particular location was made to concentrate on an area that has both significant maize farming activity as well as easily accessible public library services for local inhabitants. Nanyuki town offers an ideal setting for this study due to its relevance in supporting agricultural practices about both its central role in maize production activities and the availability of relevant resources through the nearby library facility (Mutunga, 2021). This geographic concentration provides an opportunity for a more detailed analysis of the potential impact or assistance that library resources and services may have towards agricultural practices, particularly to maize production among community members.

Map 1: Administrative Boundaries of Laikipia County

Source: Laikipia ICDP (2019)

3.4 Target Population

A population is a group of individuals, objects, or items from which samples are taken for measurement (Stratton, 2021). Wyer and Carlston, (2019) observe that a population is the total collection of elements about which one wants to make inferences. The target population of this study comprised library staff working in the Nanyuki public library totaling 3, and maize-growing farmers within the Laikipia East sub-county totaling 12500 as reported by County Government of Laikipia bulletin as of 2022 (County Government of Laikipia, 2022).

Maize farmers from Laikipia East Sub-County form a crucial part of the target population as they are directly engaged in maize cultivation and are the primary beneficiaries of any potential support or information provided by public libraries. By including the maize farmers from this specific sub- county, the research aimed to gather insights from a diverse group of farmers with varying experiences, practices, and challenges related to maize production.

The library staff, on the other hand formed part of the target population that is involved in providing library services to the maize farmers within the Laikipia East sub-County. The aim was to gather information on how the farmers have been using the library service as related to their maize farming activities and the library services they have been providing for the farmers in the study area.

3.5 Sampling Size and Sampling Technique

3.5.1 Sample Size

In selecting the different subgroups of the farmers, namely the large-scale and the small-scale farmers, the research employed a stratified random sampling technique (Rahman et al., 2022). Stratified random sampling was ideal for this study because it addressed the heterogeneity of the population (Etikan & Babtope, 2019). The population of maize farmers in Laikipia East Sub- County consisted of two distinct subgroups: large-scale farmers and small-scale farmers. These groups had different characteristics, farming practices, access to resources, and reliance on public libraries.

Stratified sampling ensured that both subgroups were adequately represented in the sample, allowing for more precise and generalizable results (Buntin, 2020). This was crucial for understanding how public libraries impact both types of farmers. By reducing variability within each stratum, stratified sampling enhanced the accuracy of the estimates (Berndt, 2020). Variability within each subgroup; large-scale vs. small-scale was likely to be less than the variability in the overall population.

The process of implementing stratified random sampling involved several key steps (Rahman et al., 2022). First, the population of maize farmers was divided into two strata: large-scale farmers and small-scale farmers. This classification was based on criteria such as the size of the farm (hectares under maize cultivation). Consequently, the overall sample size needed for the study would be determined.

Using stratified random sampling in this study ensured a comprehensive and balanced understanding of the role of public libraries in enhancing maize production among different scales of farmers in Laikipia East Sub-County. This approach increased precision (Berndt,

2020), provided better insights, and enhanced the generalizability of the findings, ensuring that they were representative of the entire population of maize farmers in the area.

A sample size refers to the number of items to be selected from the universe (population) to constitute a sample (Dubey & Kothari, 2022). The sample size depends on what one wants to know, the purpose of the inquiry, what is at stake, what is useful, what has credibility, and what can be done with available time and resources (Lakens, 2022). The following formula according to Cochran (1963) was used to determine the sample size for maize farmers in Laikipia East County:

$$N_0 = \frac{Z^2 p q}{\varepsilon^2} \quad \text{(i)}$$

N0 – Sample size when the population is > 10,000

Z^2 – Standard normal deviant required at a confidence level of 95% which is 1.96.

– The proportion of maize farmers in Laikipia East County is set at 0.5.

– 1-p

ε – 0.5 error of margin allowed.

$$N_0 = \frac{1.96^2 * 0.5 * (1-0.5)}{0.05^2} = 384 \quad \text{(ii)}$$

For maize farmers in Laikipia East County from a total population of: - 12500,

= Sample size of population >10,000 x Target Population

Sample size of population >10,000 + Target population

$$\frac{384 * 12500}{=}$$

384 + 12500 = **3 7 3** Maize Farmers

Large Scale Maize Farmer's sample

Large-scale maize growers usually have large land holdings many of which exceed set thresholds which allows them to cultivate large amounts of maize crops. Because they have more financial means, these farmers are more willing to invest in new agricultural technologies, machinery, and supplies. Their main focus was commercial, not only subsistence farming, but seeing maize cultivation as a vital source of money. They might more skillfully optimize their production and marketing plans since they had better access to market networks, finance facilities, and agricultural extension services.

Mechanized farming methods, like tractor harvesting and plowing, were preferred by large-scale maize growers in order to take advantage of economies of scale and improve overall productivity. Many of these farmers also claimed to have received more education and training in modern farming techniques, which significantly augments their capacity to adopt and implement innovative farming methods.

Sample size determination per strata = Number in the Category x Total Sample Size

Target population

$= \frac{5000 * 373}{12500} =$ **1 4 9** Large Scale Maize Farmers

Small-Scale Maize Farmers Sample

With limited land holdings, small-scale maize farmers generally conduct subsistence farming, with a primary goal of growing maize for domestic use. Due to severe financial resource constraints, this group was unable to purchase the machinery, technology, and modern agricultural inputs necessary for increased output. Their primary farming focus was subsistence, with maize production being prioritized over commercial pursuits to meet household food security needs.

In addition, the potential of small-scale maize farmers to increase productivity and profitability was hindered by their difficulty in gaining access to markets, finance facilities, and agricultural extension services. This group's farming methods were distinguished by labor intensity, since farmers and family members actively engage in a variety of agricultural tasks, from clearing land to harvesting.

Furthermore, because they had limited resources and little access to contemporary technology, small-scale maize farmers frequently use manual labor and organic fertilizers in their traditional agricultural practices. Although these age-old methods demonstrated their inventiveness, they also provided problems for sustainability and production given the changing nature of agricultural environments.

$\frac{7500 * 373}{12500}$

= **2 2 4** Small Scale Maize Farmers

Table 3. 1:

Distribution of Population and Sample of Farmers for the Study

Category	Population Size	Sample size
Large Scale Maize Farmers	5000	149
Small Scale Maize Farmers	7500	224
Total	12500	373

Laaksonen, (2018), noted that when taking the questionnaire to the field, the sample size must be increased when using stratified sampling to maintain the necessary precision. Therefore, this study took more than 380 questionnaires to cater for discrepancies such as uncollected or incomplete questionnaires (Heifets et al., 2019).

The insights gathered from these stakeholders' enabled researchers to establish the current level of engagement between farmers and libraries, identify areas for improvement or intervention, and propose recommendations for enhancing the role of public libraries in supporting agricultural development in Laikipia County, particularly regarding maize production.

3.5.2 Sampling Technique

The sampling technique employed was purposive sampling (Ames et al., 2019), where participants were selected based on their direct involvement in maize production and library services in the specified area. It is a non-probability sampling method where

participants were selected based on specific criteria that align with the research objectives (Denieffe, 2020).

A rigorous set of processes was be followed to apply the purposive sampling strategy to the selection of the maize producers' sample: The first step was to identify important players in the maize farming community, including farmers' associations, agricultural cooperatives, or local leaders who are well-versed in the conditions on the farm. These stakeholders were essential channels through which one can reach a representative group of participants.

Clear and extensive standards were developed to identify maize farmers who represent a range of demographics, farming practices, and levels of engagement with public library services. A more advanced selection procedure was made possible by the inclusion of criteria to take into account variables like farm size, farming tenure, and use of library resources.

Drawing upon the delineated criteria, a purposive sample of maize farmers were meticulously selected to partake in the study. Striving for inclusivity, efforts were undertaken to encompass a spectrum of subgroups the large scale and small-scale farmers within the farming community, thereby encapsulating a broad spectrum of perspectives and experiences.

In order to engage maize farmers who satisfy the predetermined selection criteria, the recruiting procedure was used to direct outreach campaigns or cooperative endeavors with local agricultural extension workers. This process was supported by open and honest communication, which clearly explained the goals of the research, the expected contributions, and the benefits of participation in order to encourage voluntary engagement

and informed consent. Similar techniques were used to select the library staff sample, which included the following steps: The first step was to identify appropriate professionals inside the public library system, such as librarians, managers, and outreach coordinators. These individuals were regarded as critical stakeholders with vital insights into the distribution of agricultural information and services through public libraries.

The identification of library staff members was guided by well-defined selection criteria that considered their duties, responsibilities, and agricultural information services expertise. The selection procedure was influenced by elements including years of experience, job title, and expertise with agricultural resources. After that, a purposeful sample of library employees was carefully selected to take part in the research, and every attempt was made to guarantee that representatives from different Laikipia East Sub-County library branches or facilities are included.

The recruitment procedure included invitations to library staff members who match the defined selection criteria. This was accomplished through direct communication or joint efforts with library administration. Clear and complete descriptions of the study objectives and the relevance of their contributions was offered to encourage informed decision-making and voluntary participation.

3.5.3 Inclusion and Exclusion Criteria for Maize Farmers

Inclusion and exclusion criteria help researchers define the characteristics of the participants they want to include or exclude from their study (Hennink et al., 2019). These criteria are essential for ensuring that the sample accurately represents the population of interest and that the study results can be generalized appropriately (Hennink & Kaiser,

2022). These criteria help ensure that the selected sample accurately represents the target population and effectively addresses the research objectives.

As applied to the maize farmers, inclusion criteria encompassed individuals residing within Laikipia East Sub County who primarily engage in maize farming as their occupation. Both experienced and novice farmers, whether they own or manage farms, were eligible for inclusion. There are generally no age restrictions unless specific age groups are required for the study. Participation willingness was also a key criterion, ensuring that selected individuals are willing to take part in the research.

Additional considerations include demographic variables such as gender, education level, and years of experience, which are included in the criteria based on research objectives. The chosen sampling methodology aligned with the established criteria, whether it involves random sampling, stratified sampling, or another approach (Braun & Clarke, 2021). Ethical considerations were paramount to ensure that the criteria do not discriminate against any group and that participation is voluntary and informed (Feher, 2024).

3.6 Data Collection Instruments

To collect information from respondents in an organized and methodical way, data collection instruments were vital tools in the research process (Jain, 2021). These tools includes surveys, questionnaires, checklists for observations, interviews, and standardized tests, among other formats (Lobe et al., 2020). The features of the study population, the nature of the data needed, and the research aimed all played a role in the selection of each type of instrument (Creswell & Creswell, 2017).

Assuring the quality and dependability of the data gathered requires the creation and application of efficient data collection tools (Alam, 2021). Valid instruments capture the

concepts they are designed to measure, whereas reliable instruments produce consistent results over repeated uses (Patel & Patel, 2019). The quality of the data was affected by the instrument used, which affected the inferences that was made from the study (Johnson et al. 2020). The research employed the following instruments of data collection.

3.6.1 Questionnaires for the Farmers

Primary data sources were utilized to collect data in this research. The questionnaire was administered to all the identified respondents, the farmers and the librarians of the target population. The questionnaire contained both open and closed-ended questions. The Questionnaire was administered groups to the farmers that formed the sample size; the farmers comprised both large-scale and small-scale maize farmers. The first section captured the general information such as education background, and information needed for maize farmers. The second section contains information on information dissemination mechanisms, resource availability and accessibility aspects, and quality of information in Laikipia East County.

The development of data collection instruments suitable for the study objectives is an essential skill for a researcher (Mkandawire, 2019). For this study, the researcher will rely exclusively on primary data collected through a structured questionnaire, which will be self-administered. The choice of a structured questionnaire is based on its ability to save time and money by enabling quick data collection. Additionally, it ensures that the confidentiality of the respondents is maintained, and they do not feel judged by the researcher (Bartram, 2019).

Quantitative data will be collected through closed and scale-type questions for all study variables. Similarly, qualitative data will be gathered using open-ended questions in the

questionnaire that will be created for all study variables. The majority of the questions will be included in the scale- type Likert question for all variables, which will evaluate the contribution of public libraries to maize production enhancement using a scale ranging from 1= strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree. By utilizing this scale, it will be possible to quantitatively analyze even the qualitative questions in the Likert scale tables.

The questionnaire (Appendix. II) for the farmers are organized as follows: The first part of the questionnaire is the background information which not only captures the bio-data of the respondents but also the instructions to fill out the questionnaire. The other parts of the questionnaire are organized chronologically in the order of variables as follows: Maize Production, Information Needs, Information resources, Information Services, and Information Dissemination Channels. All the sections will have a mixture of closed-ended questions, an equal number of questions in the Likert items, and open-ended questions. Some of the strong aspects are presented as indicators of each of the variables in the conceptual framework and later expanded and changed into questions in the questionnaire.

3.6.2 Interview Schedules for Library Staff

Utilizing interview schedules for library staff as a data collection method offers a valuable means of gathering insights (Pallant, 2020), into the libraries' contributions and potential impact on this research. The interview schedules (Appendix III), will be designed to engage with various stakeholders within the public libraries, including namely the library head, the circulation and digital librarians involved in agricultural outreach programs or services The interviews will aim to explore several key areas, such as the current initiatives or programs offered by the libraries to support agricultural activities, including maize production, the

resources available to farmers within the library, and any partnerships or collaborations with agricultural organizations or government agencies.

Additionally, the interviews would seek to understand the perceived effectiveness of these initiatives (Dubey and Kothari, 2022), any challenges faced in implementing them, and suggestions for improving or expanding library services to better support maize production and agricultural development in the region. Moreover, interview schedules offer a structured approach to data collection (Lakens, 2022). Allowing for consistent questioning across respondents while still providing flexibility for probing deeper into specific areas of interest (Pallant, 2020). By engaging directly with library staff, researchers can gain firsthand insights into the day-to-day operations of the libraries, the level of community engagement, and the extent to which agricultural resources and information are being disseminated to local farmers.

Furthermore, conducting interviews with library staff allowed for a qualitative exploration of the complexities and issues involved in promoting agricultural development through library services. Staff members can provide valuable perspectives on the unique needs and challenges faced by farmers in the region, as well as the role that libraries can play in addressing these issues through innovative programming, outreach efforts, and resource allocation.

3.7 Pilot Testing

Arriving at pretest figures for a social research pilot study involve a series of methodological steps designed to ensure the pilot study is both manageable and informative (Lowe, 2019). The key considerations and steps, supported by the literature, help determine the appropriate pretest figures including the purpose of the pilot study (Serdar et al. 2021),

sample size considerations (Tseng, 2021), and practicality and resource availability (Lakens, 2022). Pilot studies are conducted to test the feasibility of the main study, refine the research instruments, and identify potential problems in study design and methodology (Lowe, 2019).

Typically, the studies involved smaller sample sizes than the main study. According to Serdar et al. (2021), the sample size should be large enough to provide useful information but not as large as to be impractical. Gamboa (2023) suggests that a sample size of 10-30 participants is often sufficient for a pilot study aimed at preliminary testing of instruments and procedures. The feasibility of recruiting participants, time constraints, and budget were crucial considerations (Sassenberg, 2019). Limited resources may necessitate a smaller sample size (Pearson, 2020).

Selecting Nakuru County as the pilot study site for the primary research in Laikipia East Sub-County is a strategic decision for multiple reasons. To begin with, Nakuru County has a comparable agricultural situation to that of Laikipia East, specifically when it comes to maize farming. Both areas experience similar weather patterns, soil compositions, and farming obstacles, making research results from Nakuru applicable to Laikipia East. Moreover, Nakuru County provided improved accessibility and well-developed resources such as public libraries and agricultural support services that help in managing the logistical aspects and gathering data efficiently for the pilot study. The population of Nakuru County was seen as a sample that accurately represents Laikipia East, since both regions share similar socio-economic backgrounds, education levels, and farming techniques. This level of representativeness enabled precise forecasts about the effectiveness of the main study's interventions in Laikipia East.

A pilot experiment was implemented using questionnaires and interview guides with 10 farmers in Nakuru County and 3 library staff (namely the library head, the Circulation and digital librarians) in Nakuru public library to check for the reliability and validity of the questionnaire. The pilot study revealed if respondents could answer all questions on the survey questionnaire. If any questions appeared unclear, they were amended until respondents can fill out the questionnaires themselves. This pilot study made it possible for the researcher to understand the entire process of data collection, management, and how to utilize available resources (Sang et al., 2018).

Through this pilot study, the feasibility and acceptability of the study was established. It expected that the retention rate for subjects with their consent was more than 90%. The results were used as the foundation to proceed with a full-scale study, where the researcher found that the results of the study have the potential to provide information on the study. This phase contributed in refining the instruments towards better validity and reliability so that collected data was accurate and supported research objectives effectively.

3.8 Procedure for Collecting Data

The researcher collected primary data through the administration of questionnaires to the representatives of the farmers and the librarians for the study. The questionnaires were delivered directly while others were sent via e-mails if they were not accessed physically by the researcher. The questionnaire method ensured that confidentiality is maintained. This method is also cheap and saves time in data collection.

3.8.1 Procedures for Administering Questionnaires

To guarantee a systematic and exacting gathering of information for our study on the contribution of public libraries to improving maize production in Laikipia East Sub-County, particular protocols were put in place for distributing questionnaires, by following the steps First, before data collecting begins, a thorough questionnaire was carefully created. This survey was designed to extract relevant data about farmers' perceptions of the impact of library services on maize production, as well as their access to and use of public library resources.

Using a stratified random sampling technique, a representative sample of farmers from various regions within the Laikipia East Sub-County will be chosen. The purpose of this intentional sampling approach was to guarantee that the data gathered accurately reflects the diverse demographic and geographic features of the research region. The questionnaires were distributed to the chosen respondents by qualified enumerators.

To facilitate access to the targeted population, prior agreements were made with agricultural extension officers or local community leaders. To guarantee consistency and dependability of results, enumerators provided participants a clear description of the study's goals, their informed consent, and delivered the questionnaire in an organized way. Strict quality control procedures were followed during the data gathering process to ensure the validity and dependability of the information gathered.

The university supervisors undertook spot checks, monitor enumerator performance on a regular basis, and carefully evaluated submitted questionnaires for accuracy and completeness. The answers obtained from the questionnaires were added to a digital

database once data collecting is finished. Data input operations were carried out by trained staff members with built-in checks to minimize errors and maintain data integrity.

3.8.2 Procedures for Conducting Interviews

Apart from distributing questionnaires, interviews were carried out to acquire comprehensive qualitative insights into the function of public libraries in augmenting maize production output. Key themes, questions, and prompts included in an interview guide that was prepared to guarantee focused and organized interviews. In order to guarantee representation from a range of stakeholder groups involved in maize cultivation and library services within the Laikipia East Sub-County, interview participants were purposefully chosen. In order to enhance the depth and scope of the qualitative data that is gathered, careful attempts were taken to incorporate people with a variety of backgrounds and perspectives.

Every participant had their informed consent carefully obtained before the interviews begun. In order to maintain ethical standards, this procedure entailed providing a clear explanation of the study's goals, stressing that participation is optional, and putting safeguards in place to ensure response confidentiality. The chosen participants were interviewed in-person or virtually by skilled interviewers. With the participants' permission, audio recordings of interviews were made regularly to ensure data accuracy and to accurately capture comprehensive responses.

Interviewers used probing strategies to get participants to go into more detail about their answers and address any unclear or ambiguous statements during the interview. A deeper comprehension of the perspectives of participants was made possible by the rich and nuanced data collection that this participatory approach creates. Following the interviews,

recorded sessions were transcribed verbatim, maintaining the integrity of participants' contributions. Thematic analysis was next carried out to identify trends, themes, and revelations pertinent to the study's goals, shedding light on important conclusions and ramifications.

3.9 Validity and Reliability of Instruments

3.9.1 Validity

Instrument validity is the degree to which results obtained from the analysis of the data represent the phenomenon under study (Dubey & Kothari, 2022). The validity of the questionnaire was ascertained through scrutiny by experts.

To realize this, the instruments was submitted to the University supervisors who ascertained the following aspects concerning the validity of the entire questionnaire and specifically on the questions for each of the variables: On face validity, the examination and recommendations by the University supervisors ensured the questionnaire is presentable with a professional layout that would confuse or distract the respondents.

The experts will also ensure content validity by ascertaining that questions under each variable comprehensively represent all aspects of the variable under consideration without any variable being under-researched (Asenahabi, 2019). Content validity ensures that the questionnaire and the questions asked for each variable are comprehensively suitable for a study of this quality (McEwan, 2020). The University supervisors ensured the construct validity of the questionnaire. This was done by ensuring accuracy in measuring the variable as informed by the questions asked. In other words, the construct validity ensured that accurate and relevant questions were posed for each of the variables.

3.9.2 Reliability

Reliability on the other hand, is a measure of the degree to which a research instrument yields consistent results or data on repeated trials (Mohamad et al., 2015). According to Charters et al., 2024), reliability assesses how consistent the scores were for each individual from one administration of an instrument to another and from one set of items to another. The instrument's reliability was tested using the test-retest technique through a pilot study (Hübner, 2024).

The questionnaires were administered or pilot-tested to on the farmers and the library staff in Nakuru County. After they had filled them, and after some time, the same instruments were re- administered to the same respondents. The answers from both tests were compared to look for consistency. Based on the outcome of the pilot test, questions were reworded, introduced, or deleted to ensure that they were stated clearly and had the same meaning to all respondents.

Cronbach's alpha will be used to measure the reliability of the questionnaire. Cronbach's alpha

Usually computed from the following formula (Barbera et al., 2021);

$$\text{Alpha} = \frac{NC}{\boldsymbol{v} + (N-1)C} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(iii)}$$

Where: N = the number of items, v = the average variance and C = the average inter-item covariance. (A value greater than 0.7 will be accepted).

3.10 Data Analysis and Presentation

Data analysis is a systematic process of transcribing, collating, editing, coding and reporting the data in a manner that makes it sensible and accessible to the reader and

researcher for interpretation and discussion (Pallant, 2020). Data was coded in SPSS version 27 and analyzed using descriptive and inferential statistics.

3.10.1 Analysis of Quantitative Data

The analysis of quantitative data within this study encompassed various steps to evaluate the numerical information obtained through surveys, and questionnaires (Springuel et al., 2019). Initially, the data underwent a cleaning process and preparation, which aimed at identifying and rectifying errors, missing values, or inconsistencies (Pallant, 2020). This rigorous cleaning ensures the accuracy and reliability of the data during subsequent analysis stages (Mat Roni & Djajadikerta, 2021).

Accordingly, descriptive statistics was computed to provide a comprehensive summary of the main characteristics inherent in the quantitative dataset (Asenahabi, 2019). Metrics such as mean, median, mode, standard deviation, and range was calculated, offering insights into key aspects of maize production trends and patterns in library utilization (Dubey & Kothari, 2022). To enhance comprehension and interpretation, the quantitative data was visually represented through the use of charts, graphs, and tables.

These visual aids included bar charts comparing maize production levels in areas with and without accessible public libraries, line graphs illustrating temporal trends, or scatter plots elucidating the relationship between library usage and maize output. Through these visualizations, key insights gleaned from the quantitative analysis were effectively communicated to stakeholders and research audiences (Lakens, 2022; Pallant, 2020).

3.10.2 Analysis of Qualitative data

The analysis of qualitative data in this study, often derived from interviews, focus groups, or open- ended survey questions (Asenahabi, 2019), offers valuable insights into the

experiences, perceptions, and attitudes of individuals (Braun & Clarke, 2021). This qualitative analysis unfolds through several systematic steps. Initially, the collected qualitative data, including interview transcripts, underwent careful transcription and coding to identify underlying themes, patterns, or categories within the dataset (Feher, 2024).

Thematic analysis was then employed to uncover recurring themes or patterns across the qualitative data, such as perceptions (Hennink et al., 2019), regarding the utility of library resources, challenges encountered in accessing information, or recommendations for enhancing library services to promote maize production efforts. Moreover, qualitative findings are subjected to triangulation (Bartram, 2019), wherein they are juxtaposed with quantitative data to validate or broaden the insights garnered, thereby ensuring a comprehensive understanding of the research topic from multiple vantage points (Dubey & Kothari, 2022).

Qualitative findings were presented through narrative descriptions, participant quotations, or case studies, offering vivid illustrations of key themes and providing contextual depth to the quantitative data (Asenahabi, 2019). Through this narrative presentation, the qualitative analysis enriches the overall understanding of the interplay between public libraries and maize production in the Laikipia East Sub-County. These variables were represented as strings of characters, known as string variables in SPSS (Mat Roni & Djajadikerta, 2021).

3.11 Measurement of Variables

Table 3.2 gives an outline of how the variables will be operationalized and measured

Table 3. 2:

Operationalization and measurement of variables

Research objectives	Operational Variables	Measurement
i. Establish information needs of maize farmers in Laikipia East Sub-County	Market information Input information Disease and pest control information	Descriptive statistics
ii. Examine the information resources available at public libraries to promote maize production in Laikipia East Sub-County	Website, mass media, hard copies	Descriptive statistics
iii. Determine the information services provided by public libraries to promote maize production in Laikipia East Sub-County	remote learning, reference material government paper	Descriptive statistics
iv. Assess the information dissemination channels used by public libraries to avail information to maize farmers in Laikipia East Sub-County	Newspaper,radio,television	Descriptive statistics

3.12 Ethical Consideration

To begin with, the Department of Postgraduate Students at Kenya Methodist University issued both clearance and introduction letters to the researcher as a prerequisite for obtaining a research permit from the National Commission for Science Technology and Innovation (NACOSTI). To obtain data from the desired participants, the researcher will request permission from Laikipia County.

This authorization is necessary for engaging with potential respondents. Furthermore, a concise cover letter was composed and submitted alongside the consent form which details the study's purpose, reason for contacting target individuals as well as research title so that any other motives aside from academic objectives can be clarified before the commencement of work. The cover letter served to ensure open communication while dispelling concerns about unspoken intentions beyond legitimate educational research interests. The process of collecting data was conducted openly and impartially, with respondents participating voluntarily.

To ensure confidentiality and privacy, individuals completing the questionnaires were not be required to disclose personal information that might reveal their identity or personal details. Additionally, access to these chronologically-serialized questionnaires was only granted to selected personnel such as the research assistants and primary researcher - unauthorized individuals are strictly prohibited from viewing them at any given time. In the event that respondents were unable to fill out the provided questionnaires, the researcher coordinated with them and arranged for a suitable date in which they submitted their completed forms. The researcher was committed to honesty and maintaining high

levels of integrity by accurately reporting all data presented by participants through both questionnaire responses and interviews.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents, interprets and discusses the found results. This has been done in accordance with the objectives of the study. In the first instance, the response rate and the background information of Maize farmers in Laikipia East Sub-County and library staff. The study had five Variables; Maize production, Information needs, information resources, information services and information dissemination channels. In each of the mentioned variables, quantitative data are presented first and thereafter the incorporation of consolidated qualitative data gathered through interviews from the library staff. Each variable's results presentation is followed by interpretation and lastly, a discussion from previous literature.

4.2 Results on Response Rate

The study administered 373 questionnaires to Maize farmers in Laikipia East Sub-County. After the data gathering exercise, 270 (72.4%) were filled, hence valid. For the library staff, the study was able to interview all the 3(100%) library staff it had intended to interview. The study therefore, had an overall response rate of 86.2%, which is good. The good response rate was due to cooperation of library staff and maize farmers in Laikipia East Sub-county. These findings agree with the recommendation put across by Mugenda and Mugenda (2003) that a response rate of 70% and above is an excellent representation of the study respondents. Similarly, Babbie and Mouton (2001) posited that response rates of 60% and 70% are classified as good and very good; while, a study which establishes a

response rate of 50% is still adequate for carrying out data analysis.

4.3 Results on Reliability Tests

Before using the data for result computation, the study evaluated its accuracy and reliability. This was verified by calculating the correlation coefficients between the sentiments of the independent and dependent variables, and the Cronbach's alpha values were examined to determine reliability.

Table 4:

Showing reliability and the Cronbach's alpha

Test scale = mean(unstandardized items)	
Average interitem covariance:	3.313007
Number of items in the scale:	30
Scale reliability coefficient:	0.9953

Table 4 presents the reliability assessment of the scale using Cronbach's alpha, which measures internal consistency. The scale, with 30 items, has an average interitem covariance of 3.313007 and a very high Cronbach's alpha value of 0.9953, indicating excellent reliability. This suggests that the items are highly consistent and effectively measure the same underlying concept.

4.4 Background Characteristics

In this section, the background characteristics of maize-farmers and Library staff is provided. Some of the key information gathered pertaining the characteristics of maize farmers included; their highest educational qualification, type of maize farming operated, length of practicing maize farming while for library staff included; highest educational qualification, years of work experience and library section primarily involved in. Demographic details for maize farmers and library staff

are summarized in Tables 4.1 and 4.2 respectively.

4.4.1 Demographic Characteristics of Maize farmers

Table 4.1:

Demographic characteristics of maize farmers

Characteristics	Description	Frequency	Percentage
Level of Education	Primary Education	73	27.0%
	Secondary Education	41	15.2%
	Vocational training/certificate	58	21.5%
	Bachelors	67	24.8%
	Other	31	11.5%
	Total	270	100.0%
Maize farming type	Large Scale Maize Farming	110	41.0%
	Small Scale Maize Farming	160	59.0%
	Total	270	100.0%
Length of practicing maize farming	Between one and three years	38	14.0%
	Between three and five years	42	16.0%
	More than five years	168	62.0%
	Less than one year	22	8.0%
	Total	270	100.0%

Table 4.1 shows the basic demographic characteristics of maize farmers. The first characteristic was the level of education the participating maize farmers in Laikipia East sub-county, Laikipia County had pursed. It is clear that 73(27%) had finished primary education, 41 (15.2%) secondary education, 58 (21.5%) vocational training/ certificate, 67 (24.8%) Bachelor's degree and 31(11.5%) had other qualifications. In the category of other we had 7 who had dropped out of school, 4 had masters and 19 did not have any formal education. The second characteristic about the maize farmers was the type of maize farming they practiced. It is clear that the majority of the farmers who practiced maize

farming were engaged in small-scale farming 160 (59.0%) as compared to large-scale farming 110 (41.0%). The final basic characteristics were the length the farmers had practiced maize farming. Most of the farmers had done maize farming for over 5 years 168(62.0%), then between three and five years 42(16.0%), then between one and three years 38(14.0%) and finally less than one year 22 (8.0%). According to the above table, Farmers' varying educational backgrounds may have an effect on their informational resources, capacity to accept new technology, and general agricultural methods. Higher educated farmers may be more capable of implementing cutting-edge farming practices and increasing yield. Comprehending the equilibrium between small- and large-scale farming can facilitate the customization of resources and support to suit varying farming requirements. When it comes to support, small-scale farmers could require different kinds than large-scale farmers. Farmers' competency and resilience might be impacted by the duration of their maize growing experience. Compared to less experienced farmers, more seasoned farmers may have superior techniques and coping mechanisms developed. In their research paper Small-scale versus large-scale agriculture: Tanzanian experiences, Coulson, A. (2015) states that they contrasted East African smallholder and large-scale farming, pointing out variations in output, resource utilization, and support service accessibility. The study highlights that smallholder farmers need specialized assistance to increase their output because they frequently confront distinct obstacles than large-scale farmers. The significance of the marketing infrastructure is further illustrated by this research. They will be very hesitant to grow that crop as payment for their labor.

4.4.2 Demographic Characteristics of Library Staff

The table below 4.2 below provides the summary of the Demographic characteristics of

Library staff.

Table 4.2:

Demographic characteristics of Library staff

Characteristics	Description	Frequency	Percentage
Level of Education	Primary education	0	0.0%
	Secondary education	0	0.0%
	Vocational training/certificate	0	0.0%
	Bachelor's degree	3	100.0%
	Total	3	
Length of service	Less than one year	0	0.0%
	Between one and three years	1	33.3%
	Between three and five years	1	33.3%
	More than five years	1	33.3%
	Total	3	
Library section	Librarian	1	33.3%
	Circulation	1	33.3%
	Digital library	1	33.3%
	Total	3	

Achora et al. (2019) found that the average age of the respondents in their study on the use of information communication technologies in conservation agriculture knowledge pathways among smaller farmers in Machako and Laikipia counties, Kenya, was 53 years old. This suggests that the farming population is aging. Nearly all of the farmers had completed primary school, based on the average nine years of education that the respondents had acquired. Eighty-eight percent of the respondents worked as farmers, raising cattle and a variety of crops. It follows that agriculture provided the majority of the food and financial stability for the study's participating households.

4.5 Maize Production in Laikipia East Sub-County

The study focused on the maize production in terms of volumes of outputs and how the public libraries helped to solve the challenges associated with the maize production. Table 4.3 below provides the findings of the maize production in Laikipia EastSub-County.

Table 4.3:

Maize Production in Laikipia East Sub-County

Statements on Maize production (N=270)	0(NV)	1(SD)	2(D)	3(N)	4(A)	5(SA)	Mean	Std. Deviation
I have been getting more volumes of maize yield each year since I started using the library	85(31.48%)	18(6.67%)	14(5.19%)	42(15.56%)	58(21.48%)	53(19.63%)	2.478	1.973
Maize production has been consistently through the use of Nanyuki public library improved services	87(32.22%)	15(5.56%)	25(9.26%)	35(12.96%)	54(20.00%)	54(20.00%)	2.43	1.976
Nanyuki public library services have enabled me to increase in maize sales	87(32.22%)	15(5.56%)	20(7.41%)	33(12.22%)	66(24.44%)	49(18.15%)	2.456	1.97
Enabled me to reduce on maize	87(32.22%)	15(5.56%)	19(7.04%)	28(10.37%)	71(26.3%)	50(18.52%)	2.485	1.986

farming input expenses								
Public libraries currently address challanges faced in maize production	81(30.00%)	18(6.67%)	20(7.41%)	37(13.70%)	71(26.30%)	43(15.93%)	2.474	1.918
Access to information through public libraries can significantly improve maize production practices	84(31.11%)	18(6.67%)	14(5.19%)	34(12.59%)	62(22.96%)	58(21.48%)	2.54	2.003

Table 4.3 above shows that since the respondents began using the library mean score of 2.478, they have been able to obtain larger volumes of maize yield annually. This suggested that there was a general tendency toward disagreement or neutrality about the assertion that library services have enhanced maize yields. The high standard deviation indicated a high degree of response variability. The Nanyuki Public Library's enhanced services have regularly increased maize output. With a mean score of 2.43, this statement demonstrated a similar pattern of mixed answers with a little inclination toward disagreement or neutrality. The standard deviation showed that there was a large range of opinions. The respondents' claimed that the Nanyuki public library's services had increased maize sales had a mean score of 2.456, indicating a widespread inclination toward disagreement or neutrality about the contribution of library services to higher

maize sales. There was significant response variability, as indicated by the standard deviation. The data revealed a minor tendency towards disagreement or neutrality regarding the claim that library services had lowered input expenses in maize growing, with a mean score of 2.485. Significant variability was indicated by the standard deviation. The average score of 2.474 indicated a general inclination toward neutrality or disagreement with the question of whether public libraries addressed issues related to maize production. The standard deviation showed that there was a lot of variation in the answers. Although responses still tended toward neutrality or disagreement, this statement obtained the highest mean score of 2.54, suggesting that opinions about the possible influence of library information on bettering maize farming techniques are becoming increasingly positive. The large standard deviation indicated a wide range of viewpoints.

The use of ICTs in conservation agriculture knowledge routes among smallholder farmers in Kenya's Machakos and Laikipia counties is shown in a study conducted by Achora et al. (2019). According to Kenya Makerere University, agriculture is a significant source of income in the study area, and respondents raised and maintained a variety of livestock and crops, respectively. In the farming system, maize and beans were the most common crops, cultivated by at least 90% of the respondents. 15–45% of the interviewees also reported growing potatoes, green grams, sorghum, cassava, and pigeon peas on the farm. It follows that agriculture provided the majority of the food and financial stability for the study's participating households. The results above do not, however, undervalue the relatively small percentage of respondents (roughly 10%) who relied on other non-farm sources of income for their livelihood.

Table 4.3.1

Qualitative Findings on types of information or resources related to maize production

Statements of how the library users should provide insights into the types of information or resources related to maize production.

Statements from library staff	Resulting themes
1. By providing access to information: in this case, libraries serve as a central hub for accessing a wide range of agricultural information, including books, research papers and digital resources 2. Regularly libraries can organize workshops and seminars with agricultural experts to provide hands-on training and knowledge sharing. 3. Through community engagement: Libraries engage the community through programs that raise awareness about modern farming practices and innovations in maize production. 4. Supporting lifelong learning: Libraries promote continuous education by providing upto date resources and learning materials on advances maize	provide insights into the types of information or resources

production technique	
5. Educational Resources: Libraries provide books, journals, manuals, and online databases that cover various aspects of maize production, from basic agronomy to advanced research findings.	Information Access and Dissemination
6. Digital Access: Offering access to digital resources, including e-books, research articles, and online agricultural databases, enables farmers to stay updated with the latest information and innovations.	
7. Training and Workshops	
8. Skill Development: Libraries can organize training sessions and workshops on best practices in maize farming, pest and disease management, and sustainable agricultural techniques.	
9. Expert Talks: Inviting agricultural experts, researchers, and extension officers to speak can provide valuable insights and answer specific queries from farmers.	
10. Public libraries can play a crucial role in	

supporting and enhancing maize production efforts within the community by serving as information hubs and knowledge centers.	

According to table 4.3.1 above the qualitative findings focused on maize production. Libraries provide books, journals, manuals, and online databases that cover various aspects of maize production, from basic agronomy to advanced research findings.

4. 6 Information Needs of Maize Farmers in Laikipia East Sub-County

The first objective of the study was to determine the information needs of maize farmers in Laikipia East Sub-County. Information needs were evaluated to identify the extent to which this aspect affected maize farming in Laikipia East sub-county. The information was gathered from the maize farmers and library staff. Some of the aspects sought regarding information needs were on; types of information needed for maize farming, availability of information when needed, availability of systems to provide the needed information, maize farming issues are addressed by the existing resources and services and access to comprehensive information on maize production techniques and best practices.

The respondents were expected to respond to these statements by choosing their best options in a 5-scale Likert rating scale. The rating for each sentiment was coded in SPSS, where, 5 represented SA= Strongly Agree, 4 represented A= Agree, 3 represented N= Neutral, 2 represented D= Disagree, 1 represented SD= Strongly Disagree and 0 represented NV= I have never used the library. In representing the descriptive findings, mean values and standard

deviation for each statement were computed. For interpretation and reporting of the maize farmers responses, the total number that chose strongly agree and agree was summed up to represent the agreement status, while the total number of those who chose strongly disagree and disagree was summed up to represent the disagreement status concerning the information needs of maize farmers in Laikipia East sub-county.

The results of the responses from the maize growers are shown in Table 4.4 below. To determine how much this factor affects maize growing in the Laikipia East sub-county, information needs were assessed. The library employees and maize farmers provided the information. Aspects such as the types of information required for maize farming, the availability of information when needed, the availability of systems to provide the information, the extent to which existing resources and services address issues related to maize farming, and the availability of comprehensive information on best practices and techniques for producing maize were some of the aspects sought regarding information needs.

Table 4.4:

Descriptive results on information needs

Statements on Maize production (N=270)	0(NV)	1(SD)	2(D)	3(N)	4(A)	5(SA)	Mean	Std. Deviation
Nanyuki public library has all the types of information that I need for my maize farming	91(33.70%)	12(4.44%)	13(4.81%)	56(20.74%)	56(20.74%)	42(15.56%)	2.37	1.925
The information needed is readily available when I need it	85(31.38%)	15(5.56%)	11(4.07%)	56(20.74%)	40(14.81%)	63(23.33%)	2.519	1.99
Nanyuki public library has well equipped systems to provide the needed information	85(31.48%)	12(2.22%)	20(7.41%)	60(22.22%)	50(18.52%)	43(15.93%)	2.396	1.886

Information needs regarding maize production are adequately addressed by existing resources and services	85(31.48%)	12(4.44%))	13(4.81%))	52(19.26%)	52(19.26%)	56(20.74%)	2.526	1.968
I have access to comprehensive information on maize production techniques and best practices for your farming activities	89(32.96%)	12(4.44%))	13(4.81%)	50(18.52%)	44(16.30 %)	62(22.96%)	2.496	2.009

Table 4.4 shows that the majority of the maize farmers have never used the library. The mean values across the statements generally fall below 3, indicating that responses are more inclined to neutrality and disagreement. The standard deviation indicates variability in responses, with some strongly agreeing while others strongly disagreeing. For types of information needed for maize farming, there was a tie between neutral and agree both at 20.74% with majority of the respondents having not used the library at 33.70%.

When farmers were asked in an open-ended question to suggest ways that maize farming production can be improved by the Nanyuki library services for farmers in Laikipia East sub-county, they provided several suggestions. The study developed five themes out of the suggestions. These were: Conduct regular surveys to understand farmers' challenges and tailor library services, make information easily available to farmers, stock the library with updated books and journals, provision of e-books, and remove the library entry fee. India's Mittal & Mehar (2015) study revealed that farmers employ a variety of information sources, some of which may be complementary or serve as stand-ins for one another.

According to this research, farmers get the knowledge they need from a variety of sources. This suggests that the knowledge sources were integrated rather than mutually exclusive in order to effectively provide smallholder farmers with CA information. Even while each knowledge source could effectively promote CA given its current knowledge base, a crucial component was insufficient to meet all of the information needs of farmers. It was believed that integrated knowledge would benefit farmers more in this way (Achora et al., 2019). As a result, this study suggests that in order to achieve goals, data from many sources should be combined to create resulting knowledge and distributed efficiently. An interview was conducted by the library staff at the Nanyuki public library. The librarians were asked to give the common information needs

expressed by farmers in Laikipia East sub-county concerning maize production. The major information needs identified were agricultural policies and subsidies, seed selection, pest and disease management, and post-harvest handling. The complexity of integrating new ICTs to provide the information to farmers varies depending on the social systems in which they are implemented. Among these challenges are issues with sustainability and smallholder farmers' low levels of digital literacy (FAO, 2018). According to Duncombe (2016), the adoption of ICTs in agriculture is a complicated process because every person of the community has different demands and biases when it comes to agricultural information.

The table below provides feedback on the qualitative themes from the questionnaire on the information needs of maize farmers.

Table 4.5.1

Qualitative Findings on information needs related to maize farmers

Statements from maize farmers	Resulting themes
1. They need to know the best practices for harvesting, storing, and processing maize to reduce losses and maintain quality. 2. Providing information about the best maize varieties suited to local soil and climate changes. 3. Farmers need to know the best time to plant maize to maximize yield, considering local climate conditions.	common information needs
4. Regularly updating the library's collection	evolving information needs

with the latest books, research papers and digital resources on maize cultivation and agriculture. 5. Engaging the community through outreach programs to disseminate information and resources directly to farmers. 6. Providing access to online databases and resources where farmers can find information on maize production.	
7. Information on agricultural policies, subsidy programs, and support schemes provided by the government. 8. Visual resources that offer practical demonstrations of farming techniques and best practices. 9. Access to scientific research and articles on the latest advancements in maize production and agricultural practices.	Types of information available

The librarians recommended, as shown in table 4.5.1 above, that they should be interacting with the community by means of outreach initiatives that provide farmers with direct access to resources and information on government assistance programs, agricultural policy, and subsidy programs.

4.7 Information Resources Available at Public Library for Supporting Maize Farming in Laikipia East Sub-County

Farmers in Laikipia East Sub-County can improve their farming practices by using these resources, which include educational workshops and training materials, digital resources and online access, agricultural books and manuals, and materials from local agricultural extension services that provide up-to-date information on best practices and practical advice on maize. It's a good idea to visit your local library and discuss your needs with the librarians; they may be able to point you in the direction of even more specialized services and resources. Table 4.6 below provides the Information Resources Available at Public Library for Supporting Maize Farming in Laikipia East Sub-County.

Table 4.6:

Information Resources

Statements on Maize production (N=270)	0(NV)	1(SD)	2(D)	3(N)	4(A)	5(SA)	Mean	Std. Deviation
The public library provides a comprehensive collection of resources relevant to maize farming.	87(32.22%)	15(5.56%)	13(4.81%)	60(22.22%)	39(14.44%)	56(20.74%)	2.433	1.959
Agricultural information available at the public library is up-to-date and relevant to current farming practices	85(31.48%)	19(7.04%)	13(4.81%)	55(20.37%)	42(15.56%)	56(20.74%)	2.437	1.961
The public library offers easy access to digital resources and the internet for	79(29.26%)	18(6.67%)	18(6.67%)	62(22.96%)	40(14.81%)	53(19.63%)	2.463	1.904

researching maize production techniques								
The information resources provided by public libraries in Laikipia East Sub-County enhance your knowledge and skills in maize production	79(29.26%)	12(4.44%)	17(6.30%)	45(16.67%)	63(23.33%)	54(20.00%)	2.604	1.940
I have access to relevant information resources on maize production outside of public libraries in Laikipia East Sub-County	56(20.74%)	18(6.67%)	17(6.30%)	34(12.59%)	80(29.63%)	65(24.07%)	2.959	1.862
Public libraries continually update and expand their collection of	70(25.93%)	14(5.19%)	17(6.30%)	52(19.26%)	67(24.81%)	50(18.52%)	2.674	1.871

information resources related to maize production	

Table 4.6 indicates that the average rating of 2.433 indicates a neutral to slightly unfavorable opinion on the extent of resources offered by public libraries for growing maize. The wide range of responses is indicated by the high standard deviation. Like the last statement, the mean of 2.437 denotes a neutral to somewhat unfavorable opinion of the relevance and timeliness of agricultural information. A variety of viewpoints are reflected in the high standard deviation. The average score of 2.463 indicates that opinions about the internet's and digital resources' usability for studying maize production are viewed as neutral to slightly negative. By facilitating access to knowledge, instruction, and community resources, libraries are essential to accomplishing the Sustainable Development Goals (SDGs), according to Kamau et al. (2018). Kenyan libraries support a number of Sustainable Development Goals (SDGs), such as responsible consumption and production (SDG 12), sustainable cities and communities (SDG 11), and high-quality education (SDG 4). Libraries provide resources and educational programs that encourage the development of lifelong learning and skills. This covers things like access to academic research, career training, and digital literacy all of which are essential for empowering individuals and communities. Food security in areas like Laikipia East Sub-County depends on the promotion of sustainable agricultural methods like maize production, which public libraries can help with.

The standard deviation of 1.904 is slightly lower, demonstrating somewhat less variety in responses compared to the other claims. According to the respondents, their knowledge and abilities in maize production have been neutrally to somewhat improved by the information resources available at public libraries. A moderate range of opinions is shown by the standard deviation of 1.940. With the highest mean, this statement suggests that people have a more favorable opinion of being able to obtain pertinent knowledge about maize production outside

of public libraries. The reasonable degree of agreement is indicated by the standard deviation of 1.871. According to Sadare et al (2022) publications on agricultural production based on sustainable development goals, case studies, and agricultural research articles can all be accessed through libraries. Data about disease-resistant strains, high-yielding varieties of maize, and the effect of climate change on crop yields may be included in these documents. Libraries are vital social instruments that are crucial to accomplishing sustainable development objectives, according to Abata et al. (2018). A program for access to and awareness of climate information ought to be implemented. Resources on climate change and its mitigation, adaptation, early warning, and effect reduction should be part of this. Public libraries in Laikipia East Sub-County can greatly enhance maize output by utilizing these resources, hence promoting food security and sustainable farming methods in the area.

Table 4.6.1

Qualitative Findings on Information Resources

Statements from Librarians on Information Resources	Resulting themes
1. There are research papers focusing on innovations in maize production, including hybrid varieties, nutrient management, and climate-resilient agriculture.	Range of information resources
2. There are specialized agricultural encyclopedias and textbooks on maize cultivation techniques, pest management,	

and agricultural economics. 3. There are scientific journals such as Journal of Maize Research and Agricultural Systems containing peer-reviewed articles on maize genetics, breeding, and agronomy.	
4. Libraries might archive local agricultural history books or case studies that detail successful maize farming practices specific to the region. 5. Libraries may curate and provide access to reputable websites, online guides, and resources from agricultural organizations or universities that focus on maize farming. 6. Depending on the library's collection, they may provide access to seed catalogs, farming manuals, or guides from agricultural suppliers or seed companies.	Types of resources related to maize farming are available at the public library

Table 4.6.1: Qualitative Findings on Information Resources indicates that through expanding and updating their resource collections, enhancing digital services, and developing enduring bonds with farmers, libraries have the potential to significantly support the advancement of efficient maize production and the particular requirements of regional farmers. Based on the

available feedback, it appears that more concentrated and substantial resources are needed to enhance maize growing practices and reduce input costs. Given the divergent views libraries may curate and provide access to reputable websites, online guides, and resources from agricultural organizations or universities that focus on maize farming. On the significance of the services provided, libraries must regularly assess the effectiveness of their resources and offerings.

4.8 Information Services Provided by Public Library for Supporting Maize Farming in Laikipia East Sub-County

The goal was to find the information services provided by the public library. Even though public libraries in Laikipia East Sub-County are regarded to offer a number of services that are reasonably beneficial for maize production, opinions of these services vary widely. Improving the overall effectiveness of library resources in supporting maize farming could be achieved through improved service delivery and a closer alignment with farmer needs. Views on public libraries' ability to help with maize production range from quite favorable to neutral overall. Finding out if the public library personnel is informed and helpful in locating information about maize cultivation is the goal. The public library's workshops and seminars are a great way to increase maize output.

Table 4.7 below provides Information Services Provided by Public Library for Supporting Maize Farming in Laikipia East Sub-County

Table 4.7:

Information Services

Statements on Maize production (N=270)	0(NV)	1(SD)	2(D)	3(N)	4(A)	5(SA)	Mean	Std. Deviation
Nanyuki public library provides variety of information services to boost my maize production	79(29.26%)	9(3.33%)	15(5.56%)	36(13.33%)	64(23.70%)	67(24.81%)	2.733	1.999
The information and services provided by the public library have significantly improved my maize farming practices	73(27.04%)	15(5.56%)	11(4.07%)	45(16.67%)	65(24.07%)	61(22.59%)	2.730	1.945
The public library staff are knowledgeable and helpful in finding information related to maize production	76(28.15%)	12(4.44%)	13(4.81%)	25(9.26%)	79(29.26%)	65(24.07%)	2.793	1.997
Workshops and seminars organized by the public library are very useful for improving maize productivity	73(27.04%)	12(4.44%)	16(5.93%)	39(14.44%)	59(21.85%)	71(26.30%)	2.785	1.977
Public libraries offer specialized	70(25.93%)	15(5.56%)	16(5.93%)	39(14.44%)	76(28.15%)	54(20.00%)	2.733	1.908

information services tailored to the needs of maize farmers								
Information services currently provided by public libraries support maize production in Laikipia East Sub-County	70(25.93 %)	15(5.56 %)	20(7.41 %)	34(12.59 %)	70(25.93 %)	61(22.59 %)	2.748	1.935
Public libraries have contributed to improving maize production practices and outcomes in Laikipia East Sub-County	70(25.93 %)	18(6.67 %)	15(5.56 %)	37(13.70 %)	59(21.85 %)	71(26.30 %)	2.778	1.973

As stated in table 4.7 the average score of 2.733 indicated that people's opinions of the range of information services provided by the Nanyuki Public Library to assist maize production were neutral to somewhat favorable. A wide range of opinions is shown by the large standard deviation of 1.999. This statement's similar mean suggests that, despite some good attitude regarding the advancements in maize agricultural methods brought forth by library services, opinions are still mostly divided. The wide range of experiences among respondents was indicated by the high standard deviation of 1.945. A neutral to somewhat positive opinion of the staff's capacity to provide information on maize output was indicated by the mean score of 2.793. Once more, the high standard deviation indicated a range of perspectives regarding staff effectiveness. The important role libraries play in promoting agricultural research and

productivity is highlighted by the study by Ilo et al.(2019) on the impact of library information resources and services on research productivity. By utilizing their research to enhance maize yield in Laikipia East Sub-County, we may see that public library-hosted workshops and seminars can have a very significant effect. Here's how these kinds of things can improve maize yield. Workshops led by agricultural specialists, researchers, and extension agents who can impart the newest methods in maize cultivation can be held in libraries. This covers subjects including crop rotation, irrigation techniques, insect control, and soil management. According to the respondents, the library's workshops and seminars have a neutral to slightly favorable impact on increasing maize productivity. The large standard deviation of 1.977 indicates the variety in replies. There was a neutral to slightly positive opinion that public libraries provide customized services for farmers who grow maize. Compared to other claims, the standard deviation of 1.908 was comparatively lower, indicating a little higher degree of unanimity. The declaration expressed opinions on how well public libraries' information services assist the region's maize production, ranging from neutral to somewhat positive. The large standard deviation of 1.935 indicated a range of viewpoints. According to the respondents, public libraries have improved maize production methods and results in a neutral to slightly favorable way. A wide range of experiences was suggested by the large standard deviation of 1.973.

Table 4.7.1:

Qualitative Findings on Information Services

Statements from library staff on information services	**Resulting themes**
1. Librarians provide personalized	Information services that the library offered

assistance in finding information on maize production techniques, pest management strategies, soil nutrition, and other agricultural topics. This includes helping users navigate library catalogs, databases, and online resources. 2. Libraries maintain collections of books, journals, and periodicals specifically focused on agriculture and maize production. They provide access to current research, best practices, and historical perspectives in the field. 3. Through ILL services, libraries can borrow materials from other libraries on behalf of users. This allows access to resources that may not be available locally but are essential for research or study.	
4. Establishing mobile library units that travel to rural areas and maize farming communities within Laikipia East Sub-County. These units could be equipped with laptops, tablets, and internet	Innovative or tailored information services that have been developed by the library

connectivity to provide on-the-spot access to agricultural databases, e-resources, and practical guides on maize farming techniques. 5. Creating a digital repository or database specifically focused on local maize farming practices, crop rotation strategies, pest management solutions, and soil conservation methods relevant to Laikipia East. 6. Offering farm visits and one-on-one consultations with agricultural librarians or extension officers.	
7. Providing access to technology resources, such as computers, internet access, and agricultural apps, helps farmers utilize digital tools for farm management, market analysis, and decision-making. 8. Librarians likely provide personalized assistance and guidance to farmers seeking information on maize production. 9. Libraries offer advisory services, such as agricultural helplines or consultations	Perception on the variety of information services

with agricultural experts, supports farmers in addressing specific challenges they face in maize production.	

According to table 4.7.1 Libraries provide advisory services that assist farmers in tackling particular issues they encounter in the cultivation of maize, such as meetings with agricultural experts or agricultural helplines. Providing individual consultations with agricultural librarians or extension agents, as well as farm visits. Setting up mobile libraries that tour Laikipia East Sub-County's rural areas and communities that grow maize. These mobile libraries might be outfitted with laptops, tablets, and internet access to offer instant access to e-resources, agricultural databases, and how-to manuals for growing maize.

4.9 Information Dissemination Channels to Maize Farmers in Laikipia East Sub-County

In order to properly inform maize farmers in Laikipia East Sub-County, a combination of conventional and contemporary media must be used. Planning frequent neighborhood gatherings so that specialists and extension agents could discuss the most recent advancements in farming methods is very essential. The public library effectively distributes knowledge on maize production using a variety of platforms (social media, community boards, etc.). When it comes to sharing information about maize production, public libraries are a better resource than other places like community gatherings or agricultural extension agencies. For other farmers, public libraries provide a trustworthy source of information about producing maize. Table 4.8 below provides the findings in Information Dissemination Channels to Maize Farmers in Laikipia East Sub-County.

Table 4.8:*Information Dissemination Channels*

Statements on Maize production (N=270)	0(NV)	1(SD)	2(D)	3(N)	4(A)	5(SA)	Mean	Std. Deviation
The public library efficiently uses various channels (such as community boards, social media, etc.) to disseminate information on maize production.]	75(27.78%)	18(6.67%)	13(4.81%)	55(20.37%)	47(%)17.41	62(22.96%)	2.619	1.943
I am satisfied with how frequently the public library updates and communicates new agricultural information.]	67(24.81%)	23(8.52%)	16(5.93%)	58(21.48%)	51(18.89%)	55(20.37%)	2.622	1.873
The public library plays a crucial role in the community by	67(24.81%)	20(7.41%)	14(5.19%)	44(16.30%)	69(25.56%)	56(20.74%)	2.726	1.899

bridging the information gap for maize farmers								
Public libraries are channels for disseminating information on maize production compared to other sources such as agricultural extension services or community meetings	70(25.93%)	15(5.56%)	19(7.04%)	38(14.07%)	67(24.81%)	61(22.59%)	2.741	1.930
I receive information on maize production from public libraries compared to other available channels (e.g., radio broadcasts, agricultural fairs, online	73(27.04%)	15(5.56%)	11(4.07%)	58(21.48%)	58(%)21.48	55(20.37%)	2.659	1.903

platforms)

Public libraries are a reliable source of information on maize production to other farmers in Laikipia East Sub-County?	70(25.93%)	15(5.56%)	14(5.19%)	34(12.59%)	69(25.56%)	68(25.19%)	2.819	1.963

Table 4.8 shows that the average scores of 2.619 suggested a neutral to somewhat favorable opinion of the library's effectiveness in sharing information through a variety of channels, including social media and community boards. The large standard deviation of 1.943 indicated that respondents' opinions were not all the same. Regarding how frequently the public library updated and disseminated new agricultural knowledge, the comment on satisfaction with update frequency and communication revealed a neutral to somewhat positive opinion. The comparatively high standard deviation of 1.873 suggested a range of satisfaction levels. The respondents had a neutral to somewhat positive opinion of the library's contribution to helping maize farmers bridge the information gap. The high standard deviation of 1.899 indicated differing views regarding this role's efficacy. In comparison to other sources like agricultural extension services or community gatherings, the mean of 2.741 suggested a neutral to slightly positive perception of public libraries as means for conveying knowledge on maize production. The substantial standard deviation of 1.930 brought attention to the wide range of responses. Regarding the quantity of information obtained from public libraries in comparison to other channels like radio broadcasts or internet platforms, this statement on information receipt compared to other channels revealed a neutral to slightly positive perspective. The large standard deviation of 1.903 indicated that respondents' experiences differed widely. The statements' highest mean (2.819) revealed a neutral to slightly positive opinion of public libraries as trustworthy sources of knowledge about maize production. A variety of perspectives on reliability were represented in the high standard deviation. The study by Ilo et al. (2019) emphasizes how important library information resources and services are to helping agricultural scientists do more productive research. By applying this knowledge to the

production of maize, we may investigate the ways in which public libraries serve as special venues for information sharing in contrast to community gatherings and agricultural extension services. A wide variety of information sources, including books, scholarly publications, research papers, and digital resources, are accessible through public libraries. Farmers will have access to current and varied knowledge on pest control, soil health, and other topics related to maize production methods thanks to this extensive compilation. Libraries are impartial sources of information that are free from commercial prejudice. Because of its objectivity, the materials and recommendations provided are guaranteed to be based on the greatest available science (Agoh et al., 2021).

Table 4.8.1

Qualitative findings on Information Dissemination Channels

Statements from library staff on information dissemination Channels	**Resulting themes**
1. Producing and distributing printed materials such as brochures, pamphlets, and leaflets that highlight best practices in maize production, seasonal tips, and relevant resources available at the library. These can be distributed at the library itself, local agricultural events, and community centers.	Utilization of various channels to disseminate information

2. Utilizing the library's website and social media channels to share articles, blog posts, and info graphics on maize production techniques, pest management strategies, market trends, and upcoming events or workshops related to agriculture. 3. Sending out regular email newsletters to subscribers who are interested in agricultural topics.	
4. Engaging directly with farmers and stakeholders through community meetings, farmers' groups, and cooperative societies allows for face-to-face interaction. Libraries can participate in or organize these meetings to provide information, conduct workshops, and gather feedback. 5. Utilizing local newspapers, newsletters, and community notice boards can help reach a broader	Effective information dissemination channels

audience. Printed materials such as posters, flyers, and handouts distributed at local markets, cooperatives, and agricultural input suppliers can also be effective. 6. Libraries can organize regular workshops, training sessions, and field demonstrations specifically tailored to maize cultivation. 7. Create social media posts (Facebook, Twitter) with bite-sized information on maize production.	

As stated in table 4.8.1 above, libraries are able to plan frequent training sessions, workshops, and field presentations especially related to maize farming. Face-to-face connection can be facilitated by interacting directly with farmers and stakeholders through community meetings, farmers' clubs, and cooperative societies. Libraries can host or participate in these events to share information, provide seminars, and get input. Reaching a larger audience can be facilitated by making use of community notice boards, newsletters, and local newspapers. Printed materials from cooperatives, local markets, and suppliers of agricultural inputs, such as posters, flyers, and handouts, can also be quite successful.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the entire study by providing an overview of the reported findings, conclusions and henceforth provide amicable recommendations. In order to improve farmers' access to knowledge on maize production, this study sought to evaluate the contribution of public libraries to the promotion of maize production in Laikipia East Sub County, Laikipia County, Kenya. The main issue stemmed from the study's observation that not much research had been done on how public libraries may improve maize output. The goal of the current study is to ascertain how public libraries can improve maize production. The study aimed to identify the information needs of the Laikipia East Sub-County's maize farmers, analyze the information resources available at public libraries to support the region's maize production, ascertain the information services offered by public libraries to support the region's maize production, and evaluate the channels through which public libraries disseminate information to the region's maize farmers. The information poverty, information needs, information seeking behavior, and community informatics theories served as the foundation for this study. The survey method utilized in this study was informed by a cross-sectional research design. This method was chosen for the study because surveys are better at generalizing findings and have higher levels of external dependability. Three library employees from Nanyuki Public Library and 373 maize farmers from Laikipia East County were the study's intended participants. Participants who were maize farmers were chosen at random, but library employees were

chosen on purpose. Farmers who completed self-administered questionnaires and librarians who scheduled interviews provided the data for the study. The quantitative data analysis process involved multiple stages for assessing the numerical data collected via the surveys.

5.2 Summary of Findings of the Study

The total respondents were 373 maize farmers in the Laikipia East Sub-County yielding a valid completion rate of 270 (72.4%). Furthermore, 86.2% of the three library staff members who were selected for interviews were successfully interviewed. The high response rate is indicative of the farmers' and library employees' excellent collaboration. It was evident that of those surveyed, 73 (27%), 41 (15.2%), 58 (21.5%), 67 (24.8%), and 31 (11.5%) had completed their primary, secondary, or vocational education. Seven people had dropped out of school, four held master's degrees, and nineteen had no formal education at all in the "other" group. The majority of farmers had been growing maize for more than five years (168, or 62.0%), followed by between three and five years (42, or 16.0%), between one and three years (38, or 14.0%), and less than one year (22, or 8.0%).

5.2.1 Establish information needs of maize farmers in Laikipia East Sub-County

Finding out what information the maize farmers in Laikipia East Sub-County needed was the study's initial goal. To determine how much this factor affects maize growing in the Laikipia East sub-county, information needs were assessed. Response variability is shown by the standard deviation, where some respondents strongly agree while others strongly disagree. There was a tie between agree and neutral respondents (20.74%) about the types of information needed for growing maize, and 33.70% of respondents said they had never utilized the library. Farmers in the Laikipia East sub-county offered a number of ideas in

response to an open-ended question about how the Nanyuki library services could increase maize growing productivity.

Several important recommendations surfaced in answer to an open-ended inquiry about enhancing maize agricultural productivity in the Laikipia East sub-county using the Nanyuki library services. These included carrying out frequent surveys to comprehend the difficulties faced by farmers, improving information accessibility, upgrading library resources, offering e-books, and doing away with the admission charge to the library. Farmers' common information needs were found to be related to seed selection, pest and disease management, post-harvest handling, agricultural policy and subsidies, and library staff interviews. The high standard deviation indicated a high degree of response variability. The Nanyuki Public Library's enhanced services have regularly increased maize output. With a mean score of 2.43, this statement demonstrated a similar pattern of mixed answers with a little inclination toward disagreement or neutrality. The standard deviation showed that there was a large range of opinions.

5.2.2 Examine the information resources available at public libraries to promote maize production in Laikipia East Sub-County

The second objective was to examine the information resources available at public libraries to promote maize production in Laikipia East Sub-County. With an average rating of 2.433 and a significant standard deviation reflecting a wide range of viewpoints, it revealed that respondents' perceptions of the resources provided by public libraries for maize production are usually neutral to somewhat unfavorable. Similarly, with a mean of 2.437 and a wide range of responses as seen by the high standard deviation, the relevance and timeliness of agricultural information from libraries are likewise viewed as neutral to somewhat

unfavorable. With an average score of 2.463 and a somewhat lower standard deviation of 1.904, respondents evaluated the usability of the internet and digital tools for researching maize cultivation as neutral to slightly negative, indicating less diversity in responses compared to other claims. With a moderate range of opinions (standard deviation of 1.940), respondents believed that the information resources accessible at public libraries had improved their knowledge and abilities in maize production in a neutral to somewhat positive way. The highest mean score and a respectable level of agreement (standard deviation of 1.871), however, suggested that they had a more positive opinion of learning pertinent information on maize production from sources other than public libraries.

5.2.3 Determine the information services provided by public libraries to promote maize production in Laikipia East Sub-County

The third objective was to determine the information services provided by public libraries to promote maize production in Laikipia East Sub-County. With an average score of 2.733, Table 4.7 shows that attitudes on the variety of information services offered by the Nanyuki Public Library for maize cultivation are largely neutral to moderately favorable. A wide diversity of viewpoints is reflected in the enormous 1.999 standard deviation. This shows that opinions are still split, even if some respondents think the library has helped maize farming. The assessment of improvements in maize farming techniques made possible by library services shows a similar pattern, with a mean score of 1.945 that reflects a wide range of perspectives. With a mean score of 2.793 and a significant standard deviation, respondents also evaluated the staff's capacity to deliver information about maize as neutral to moderately positive, reflecting differing opinions on staff efficacy. Respondents'

opinions ranged from indifferent to slightly favorable when it came to the effect of library workshops and seminars on maize productivity; a significant standard deviation of 1.977 indicated a wide range of experiences. A lower standard deviation of 1.908 suggests that the perception of public libraries' tailored services for maize farmers was marginally more consistent. Libraries can borrow materials on behalf of users from other libraries by using Interlibrary Loan (ILL) services. This makes it possible to obtain materials that might not be readily available locally yet are crucial for study or research. In the Laikipia East Sub-County, establishing mobile library units that visit farming communities and rural areas could have a significant impact. These mobile libraries might be outfitted with laptops, tablets, and internet access to offer instant access to e-resources, agricultural databases, and how-to manuals for growing maize.

5.2.4 Assess the information dissemination channels used by public libraries to avail information to maize farmers in Laikipia East Sub-County

The third objective was to assess the information dissemination channels used by public libraries to avail information to maize farmers in Laikipia East Sub-County. An understanding of respondents' opinions of the Nanyuki Public Library's capacity to promote maize production can be seen in Table 4.8. With a wide standard deviation of 1.943 suggesting a range of perspectives, the average score of 2.619 indicates a neutral to moderately favorable assessment on the usefulness of the library in disseminating information through multiple channels, such as social media and community boards. Regarding the effectiveness and regularity of updates and the library's dissemination of new agricultural knowledge, respondents' opinions ranged from neutral to moderately

positive. The wide range of satisfaction levels is reflected in the large standard deviation of 1.873. The target audience can be successfully drawn in and informed with consistent updates and interesting material. Face-to-face connection can be facilitated by interacting directly with farmers and stakeholders through community meetings, farmers' clubs, and cooperative societies. Libraries can host or participate in these events to share information, provide seminars, and get input. Strategic planning and active participation are required to enable farmers to get information on maize production through various channels, such as social media and community boards. They recommended that posting brief updates on maize production on social media platforms like Facebook and Twitter can have a significant positive influence and benefit farmers. Infographics, quick films highlighting excellent practices, or quotations from authorities in agriculture could all be examples of this. The standard deviation showed that there was a lot of variation in the answers. Although responses still tended toward neutrality or disagreement, this statement obtained the highest mean score of 2.54, suggesting that opinions about the possible influence of library information on bettering maize farming techniques are becoming increasingly positive. The large standard deviation indicated a wide range of viewpoints.

5.2.5 Summary on maize production

The improved services provided by the Nanyuki Public Library have consistently raised maize yield. This statement showed a similar pattern of mixed responses with a slight tendency toward disagreement or neutrality, with a mean score of 2.43. There was a wide range of opinions, as the standard deviation demonstrated. The mean score of 2.456 for the respondents' claim that the Nanyuki public library's services had enhanced maize sales suggests a general tendency toward disagreement or neutrality regarding the library's role

in increasing maize sales. The standard deviation showed that there was a large amount of response variability. With a mean score of 2.485, the results showed a little tendency towards disagreement or neutrality regarding the claim that library services had reduced input expenses in the farming of maize. Research articles focusing on innovations in maize production, such as hybrid varieties, nutrient management, and climate-resilient agriculture, should be provided in public libraries, according to respondents surveyed about the range of information resources available at the library that specifically cater to maize production and agricultural development. They proposed that libraries could curate and make accessible credible websites, online manuals, and resources from universities or agricultural organizations that specialize in growing maize. Depending on the library's collection, they might also make accessible seed catalogs, farming manuals, or guides from seed companies or suppliers.

5.3 Conclusions

The study concluded the following based on the following objectives on the usage of public libraries on the maize production in Laikipia East Sub-County.

5.3.1 Establish information needs of maize farmers in Laikipia East Sub-County

The Laikipia East Sub-County's maize farmers' information needs were successfully recognized by the study. Farmers have often noted that there are particular information needs in areas such as post-harvest processing, disease and pest management, seed selection, and agricultural policies and subsidies. In conclusion, even though the public library is essential for offering information and assistance, there is still space for improvement in the way it caters to the particular requirements of the Laikipia East Sub-

County's maize farmers. The library may better assist farmers in gaining access to vital knowledge for enhancing maize production by concentrating on upgrading resources, organizing information sessions, participating in community conversations, and encouraging open forums. The conflicting opinions on how the impact on maize sales will be felt underscore the need for additional analysis and possibly more focused initiatives in order to adequately address the requirements of the farmers.

5.3.2 Examine the information resources available at public libraries to promote maize production in Laikipia East Sub-County

In conclusion, although Laikipia East Sub-County public libraries offer some useful resources, there is space for development in terms of these materials' applicability and efficiency for maize production. Alternative information sources seem to be more beneficial to farmers, which emphasizes the need for public libraries to improve their services and better match them with the real-world requirements of maize farmers. The average evaluations show that most respondents see public libraries' resources for growing maize as neutral to somewhat unfavorable. The feedback that is currently available suggests that in order to improve maize farming techniques and lower input costs, more focused and significant resources are required. Libraries should routinely evaluate the efficacy of their resources and services in light of the conflicting opinions regarding the impact of those services. By conducting surveys or focus groups with farmers, library services can better understand their requirements and be tailored to meet those needs.

5.3.3 Determine the information services provided by public libraries to promote maize production in Laikipia East Sub-County

In conclusion, there is a great deal of variation in the perceptions of the various services that public libraries in Laikipia East Sub-County provide, even though these services are thought to be relatively advantageous for maize production. The large standard deviations seen in different aspects indicate a wide range of experiences and viewpoints among the participants. Views of the maize farmer-specific services provided by the library were slightly more consistent, with a smaller standard deviation of 1.908. In conclusion, Laikipia East Sub-County public libraries offer a variety of information services, but there is need for development in the way they assist in the production of maize. According to the feedback received thus far, local farmers' problems require more focused and significant services. The findings indicated that library services are beneficial at reducing input costs for maize cultivation, with a mean score of 2.485. This score indicates that respondents did not firmly believe that library services had greatly reduced their farming, reflecting a broad propensity towards disagreement or indifference.

5.3.4 Assess the information dissemination channels used by public libraries to avail information to maize farmers in Laikipia East Sub-County

In conclusion, although public libraries in Laikipia East Sub-County are acknowledged for their contribution to the dissemination of agricultural knowledge, opinions of their efficacy in using different channels differ greatly. Improving these dispersion initiatives' impact and consistency could increase their overall efficacy in helping maize farmers. With a mean score of 2.741 and a substantial standard deviation of 1.930, public libraries were judged

as neutral to slightly positive in their effectiveness for distributing knowledge on maize production when compared to alternative sources like agricultural extension services or community meetings. In a similar vein, attitudes of the knowledge obtained from libraries as opposed to other sources, such as the internet or radio, ranged from neutral to slightly favorable, with a standard deviation that represented a wide variety of experiences. In conclusion, there is a lot of room for development even though Laikipia East Sub-County public libraries offer a variety of ways for information to be shared. Libraries can better serve maize farmers by increasing the use of printed materials, improving digital and social media participation, and fostering community interactions. The input received thus far indicates that although there is a positive trend, more work has to be done to improve the perceived influence of library material on maize farming techniques and address the differences in viewpoints.

5.3.5 Conclusions on maize production

According to the survey results, the Nanyuki Public Library's services have had a moderate effect on the results of maize farming. Most respondents expressed disagreement or indifference about the library's efficacy in raising maize production, increasing sales, and lowering input costs. The broad standard deviations and varied replies indicate that maize farmers' perceptions of the utility of library resources vary widely. In spite of this, some have pointed out that the library may increase its influence by offering more specialized resources. They also suggested that research publications on improvements in maize production like hybrid varieties, nutrition management, and climate-resilient practices be included. The library could also play a bigger role in maize growing if it made reliable online materials, seed catalogs, and farming manuals available.

5.4 Recommendations

The study outlined recommendations based on the presented findings.

5.4.1 Establish information needs of maize farmers in Laikipia East Sub-County

Conducting outreach initiatives to educate maize farmers about the materials available at the library and how they can best utilize them. Organizing workshops or instructional sessions to show people how to use the library's resources. Providing resources, such as manuals on post-harvest processing, disease and pest management, seed selection, and agricultural policies, that are especially suited to the needs of maize farmers. Survey farmers on a regular basis to find out what they think of the library's offerings and what needs to be improved. Utilize the input received to improve and modify the offered services and resources. Collaborate with regional authorities, institutions, and agricultural extension agencies to offer thorough and current information through the library. Public libraries in Laikipia East Sub-County can better serve the changing information demands of maize farmers by putting these suggestions into practice. Library Communications Team should ensure that the libraries will become more relevant and useful through regular resource updates, improved access to expert knowledge, direct farmer participation, and the creation of specialized digital tools. Furthermore, better outreach and communication with the community outreach coordinators will guarantee that farmers are aware of and able to utilize the resources that are available. The assistance given to the farming community will be improved and optimized with the help of monitoring and assessing the results of these initiatives.

5.4.2 Examine the information resources available at public libraries to promote maize production in Laikipia East Sub-County

The Library Management should ensure they are collaborating with organizations and specialists in agriculture to improve the caliber and applicability of the information offered. These collaborations can aid in guaranteeing the comprehensiveness and correctness of the library's resources. Evaluating the preferences and needs of maize farmers on a regular basis to make sure library services meet their needs. Library Staff should ensure there are focus groups and surveys are used to get feedback and make data-driven changes. Arranging training sessions and workshops to assist farmers in maximizing the use of resources. Advice on how to access and use library resources to increase maize production may fall under this category. Working together with institutes dedicated to agriculture can also improve the caliber and applicability of the materials offered. Libraries can help maize farmers more successfully and help the area's sustainable farming practices grow by implementing these suggestions.

5.4.3 Determine the information services provided by public libraries to promote maize production in Laikipia East Sub-County

The Library staff should make the resources and services offered by the library more suited to the unique requirements of maize producers. Update the documents frequently and provide useful, farmer-focused information on important subjects including crop management strategies, insect control, and seed selection. Increase the accessibility of library services by expanding their hours, enhancing their digital presence, and streamlining the information-gathering process. Make sure farmers have easy access to the materials they require. Provide workshops and specialized programs that address the

unique difficulties experienced by maize producers. Make these programs such that they offer useful guidance and solutions. Employ outreach techniques to increase knowledge of the resources and services offered by the library and foster greater community involvement. The Librarians should develop a dedicated digital repository, hosting educational events, boosting community involvement, and raising awareness will all help to further solidify the library's support position for effective maize production.

5.4.4 Assess the information dissemination channels used by public libraries to avail information to maize farmers in Laikipia East Sub-County

The library management should collaborate with nearby farming associations and community organizations to advertise library resources and services. Public libraries in Laikipia East Sub-County have the potential to become more effective in aiding maize farmers through the use of mobile library units, improved digital content, social media engagement, and distribution channel diversification and expansion. Libraries can host or participate in these events to share information, provide seminars, and get input. Strategic planning and active participation are required to enable farmers to get information on maize production through various channels, such as social media and community boards.

Through focused outreach initiatives, raise awareness of the agricultural resources available at the library. They recommended that posting brief updates on maize production on social media platforms like Facebook and Twitter can have a significant positive influence and benefit farmers. Enhancing the relevance and impact of information services can be achieved through increasing community interaction, developing interactive tools, and encouraging feedback. Ensuring that the library's efforts are consistently in line with

the requirements of the farming community will need collaboration with local stakeholders and continuous evaluation. With the help of these suggestions, farmers who grow maize should be able to obtain timely, useful information to aid in their farming methods.

5.4.5 Recommendations on maize production

It is recommended that the library staff provide user manuals and provide on-site assistance. Creating guidelines and offering assistance on agricultural matters should be aided by Agricultural Extension Agents. Librarians should form and preserve alliances with institutions and specialists in agriculture. Research institutions ought to take part in resource development and advisory responsibilities. Expand the quantity of research papers and resources available on advances in the production of maize, such as nutrient management, climate-resilient agriculture, and hybrid varieties. Assign links to reliable websites, online guides, and digital materials from respectable agricultural associations and academic institutions. Digital materials should be created, managed, and made user-friendly by IT and library staff.

5.4.6 Implication of findings on theories, Policy and Practices

5.4.6.1 Implications on Theories

The results of the study support the information poverty theory, which holds that a lack of information can impede progress and lead to poverty. According to the statistics, public libraries have the potential to increase maize output, but there is still a lot of space for growth in terms of how well they meet the unique information demands of farmers. This implies that improving agricultural outcomes and lowering poverty in rural communities

may be possible by tackling information poverty through focused library services.

Information Needs Theory: The study focuses on the particular information requirements of maize producers, including expertise in pest control, optimal harvesting techniques, and kinds of maize. This lends credence to the idea that effective information dissemination and usage require an awareness of and attention to particular information demands. The results indicate that libraries, especially in agricultural contexts, should customize their services and resources to match the specific demands of their patrons.

Theory of Information Seeking Behavior: This theory looks at how people look for and utilize information. The study shows that information demands for maize farmers are varied and specialized, and public libraries should modify their approaches to better meet these needs. The results suggest that libraries can create materials and services that are more useful by having a better grasp of how farmers seek out information.

The notion of community informatics theory on the application of information and communication technology to meet the needs of local communities. The study's conclusions imply that incorporating technology such as mobile libraries and digital repositories can greatly improve farmers' access to knowledge. This is consistent with the theory's focus on empowering communities and meeting local needs through the use of information technology.

5.4.6.2 Implications on Policy

The results suggest that agricultural information services should be given priority in library policies. Policies ought to support the development of focused information services for farmers as well as the purchase of resources unique to the cultivation of maize. Policies that encourage frequent collection upgrades and take farmer input into account when

planning resources may also be taken into consideration by libraries. According to the findings, public libraries could need more financing to provide better services to farmers. It is recommended that policy makers allocate resources towards the advancement of mobile libraries, digital repositories, and technological training programs for farmers and librarians. Libraries' influence on maize production can be strengthened by securing sufficient financing for these projects.

The results point to the necessity of increased cooperation between agricultural organizations and libraries. The creation and sharing of pertinent agricultural knowledge may be aided by policies that support collaborations between research institutions, public libraries, and agricultural extension agencies. Policies ought to support librarians' education on agricultural subjects and information services. The efficiency of library services in assisting with maize production can be increased by enhancing the ability of librarians to respond to questions about agriculture and make use of pertinent digital resources.

5.4.6.3 Implications on Practices

Public libraries should concentrate on enhancing their offerings by providing individualized help, building specialized collections, and setting up online archives for agricultural data. Developing workshops on maize production and deploying mobile library units are doable actions that can improve the applicability and accessibility of library services for farmers.

To successfully communicate information about maize production, libraries should increase their digital presence on websites and social media. A larger audience can be reached and farmers can receive timely information and resources by producing interesting

and educational digital material.

Access to and instruction in agricultural technologies and apps should be made available through libraries. Giving farmers useful advice on how to use digital tools for market research, farm management, and decision-making may empower them and increase productivity. Continuous enhancement requires regular feedback collection from farmers and evaluation of the effects of library services on maize output. To better assist farmers, libraries should set up procedures for evaluating the success of their programs and making data-driven changes.

5.5 Suggestions for further Studies

Considering the presented results the following recommendations for further studies are outlined:Evaluating the degree to which digital library resources, such as e-books and online databases, assist in the production of maize. Examine how users engage with these devices and how farming practices are impacted by them. To examine user engagement with these technologies and to gain a deeper understanding of how digital library resources such as e-books and online databases support the production of maize. Subsequent research on the utilization of digital resources from libraries can yield important information about the effects of e-books, online databases, and other digital tools on maize production. Researchers can find chances to improve the help libraries offer to maize farmers by looking at user interaction, efficacy, adoption of technology, and how these resources are integrated with other library services. By ensuring that digital resources are used efficiently, this research will contribute to the improvement of agricultural methods and results.

Conducting a long-term investigation to track the effects of library activities on maize

production results over time. This would facilitate understanding of the long-term effects of library resources and services on maize cultivation. Long-term research will shed important light on the ways that resources and services offered by libraries affect maize yield over time. Libraries may enhance their initiatives to improve farming practices and ultimately increase agricultural output and farmer well-being in Laikipia East Sub-County by monitoring these effects and making necessary adjustments to their current methods.

Analyzing the variations in maize productivity between farmers who utilize public libraries and those who don't by conducting a comparison research. Creating a study to compare the farming techniques, input costs, and maize production of library users and non-users is essential as well as gathering information on farming techniques, library use, and production results from both groups. To find the effect of library resources on maize production, compare the performance of users with non-users. The library research team ought to oversee the planning and execution of the comparison study.Public libraries can help maize farmers in Laikipia East Sub-County more successfully by implementing these suggestions, which will enhance agricultural methods and results. Additionally, by using this strategy, libraries will be able to comprehend how their services and resources affect farming.

REFERENCES

Abata-Ebire, B. D., Adebowale, J. A., & Ojokuku, B. Y. (2018). Achieving sustainable development goals (SDGs) in Nigeria: the roles of libraries. International journal of applied technologies in library and information management, *American Journal of Agricultural Economics*, 4(2), 89-95. https://www.researchgate.net/publication/328942559_Achieving_Sustainable_Development_GoalsThe_Roles_of_Libraries.

Abdulai, A. (2023). Information acquisition and the adoption of improved crop varieties. *American Journal of Agricultural Economics*, *105*(4), 1049–1062. https://doi.org/10.1111/ajae.12419.

Achora, J. C., Mwije, A., & Masabo, E. (2019). *Use of information communication technologies in conservation agriculture knowledge pathways among smallholder farmers in Machakos and Laikipia counties, Kenya*. Makerere University.

Achora, J. C., Mwije, A., & Masabo, E. (2019). *Use of information communication technologies in conservation agriculture knowledge pathways among smallholder farmers in Machakos and Laikipia counties, Kenya*. Kenya Makerere University. http://makir.mak.ac.ug/handle/10570/7757.

Adio, E. O., Abu, Y., YUsuf, S. K., & Nansoh, S. (2016). Use of agricultural information sources and services by farmers for improve

productivity in Kwara State. *Library Philosophy and Practice, Asian Research Journal of Humanities and Social Sciences* 45(3) 1456, 1â. https://www.academia.edu/download/66261627/fulltext_2_.pdf.

Adjei, V., & Kyerematen, R. (2018). Impacts of Changing Climate on Maize Production in the Transitional Zone of Ghana. *American Journal of Climate Change*, *07*(03), 463–476. https://doi.org/10.4236/ajcc.2018.73028

Adu, M. O., Yawson, D. O., Armah, F. A., Abano, E. E., & Quansah, R. (2018). Systematic review of the effects of agricultural interventions on food security in northern Ghana. *PLoS One*, *13*(9), e0203605. https://pubmed.ncbi.nlm.nih.gov/30192868/

Agoh, A. J., Annune, A. E., & Idachaba Joy Asibi. (2021). Assessing the Extent of Provision and Constraints of Utilization of Library and Information Service Delivery on Scholarly Communication Output in Agricultural Research Institutes in North-Central Nigeria. *South Asian Research Journal of Humanities and Social Sciences*, *3*(5), 280–295. https://sarpublication.com/media/articles/SARJHSS_35_280294_FT_njeZT3N.pdf.

Agoh, A. J., Annune, A. E., & Idichaba, J. A. (2021). Library Information Services, Resources and Research Productivity of Agricultural Scientists from Agricultural Research Institutes in Nigeria. *South*

Asian Research Journal of Arts, Language and Literature, 3(5), 75-80.https://sarpublication.com/media/articles/SARJALL_35_75-80_FT.pdf.

Alam, M. K. (2021). A systematic qualitative case study: questions, data collection, NVivo analysis and saturation. *Qualitative Research in Organizations and Management: An International Journal*, *16*(1), 1-31. https://doi.org/10.1016/j.jssas.2017.05.004.

Berndt, A. E. (2020). Sampling methods. *Journal of Human Lactation, 36*(2), 224-226. https://doi.org/10.1016/j.jssas.2017.05.004.

Aldosari, F., Al Shunaifi, M. S., Ullah, M. A., Muddassir, M., & Noor, M. A. (2019). Farmers' perceptions regarding the use of Information and Communication Technology (ICT) in Khyber Pakhtunkhwa, Northern Pakistan. *Journal of the Saudi Society of Agricultural Sciences*, *18*(2), 211–217. https://doi.org/10.1016/j.jssas.2017.05.004.

Almekinders, C. J. M., Hebinck, P., Marinus, W., Kiaka, R. D., & Waswa, W. W. (2021). Why farmers use so many different maize varieties in West Kenya. *Outlook on Agriculture*, *50*(4), 406–417. https://doi.org/10.1177/00307270211054211.

Alvermann, D. E., Unrau, N. J., Sailors, M., & Ruddell, R. B. (2018). *Theoretical Models and Processes of Literacy* (D. E. Alvermann, N. J. Unrau, M. Sailors, & R. B. Ruddell, Eds.; 7th ed.). Routledge.

https://doi.org/10.4324/9781315110592.

Ames, H., Glenton, C., & Lewin, S. (2019). Purposive sampling in a qualitative evidence synthesis: a worked example from a synthesis on parental perceptions of vaccination communication. *BMC Medical Research Methodology*, *19*(1), 26. https://doi.org/10.1186/s12874-019-0665-4.

Anwar, M., & Frings-Hessami, V. (2020). Empowering women through access to information: the sustainability of a community informatics project in Bangladesh. In Sustainable Digital Communities: 15th International Conference, *iConference 2020, Boras, Sweden, March 23–26, 2020, Proceedings 15 (pp. 3-14). Springer International Publishing. https://link.springer.com/chapter/10.1007/978-3-030-43687-2_1*.

Anyango, C. (2016). *Dissemination of agricultural innovations: socio-economic analysis of communication channels used in improved chickpea (Cicer arietinum L) Varieties in Embu County, Kenya* [Doctoral dissertation, Jomo Kenyatta University of Science and Technology]Kenya . http://ir.jkuat.ac.ke/handle/123456789/2384.

Armstrong, R. A. (2019). Should Pearson's correlation coefficient be avoided? *Ophthalmic and Physiological Optics*, *39*(5), 316–327. https://doi.org/10.1111/opo.12636.

Asenahabi, B. M. (2019). Qualitative research, mixed method research. In

International Journal of Contemporary Applied Researches 6, (5). 13-15 www.ijcar.net

Asongu, S. A., & Odhiambo, N. M. (2020). Remittances, the diffusion of information and industrialisation in Africa. *Contemporary Social Science*,*15*(1),98-117. https://doi.org/10.1080/21582041.2019.1618898.

Baer-Nawrocka, A., & Sadowski, A. (2019). Food security and food self-sufficiency around the world: A typology of countries. *PLOS ONE, 14*(3), e0213448. https://doi.org/10.1371/journal.pone.0213448.

Bailey, D. Von, Jones, E., & Dickinson, D. L. (2002). Knowledge Management and Comparative International Strategies on Vertical Information Flow in the Global Food System. *American Journal of Agricultural Economics*, *84*(5), 1337–1344. https://doi.org/10.1111/1467- 8276.00399.

Barbera, J., Naibert, N., Komperda, R., & Pentecost, T. C. (2021). Clarity on Cronbach's Alpha Use. *Journal of Chemical Education*, *98*(2), 257–258. https://doi.org/10.1021/acs.jchemed.0c00183

Bentrup, G., Cernusca, I., & Gold, M. (2018). Supporting US agricultural landscapes under changing conditions with agroforestry: An annotatedbibliography.https://research.fs.usda.gov/treesearch/56389

Bhakta, I., Phadikar, S., & Majumder, K. (2019). State-of-the-art technologies in precision agriculture: a systematic review. *Journal of the Science of Food and Agriculture*, *99*(11), 4878–4888. https://doi.org/10.1002/jsfa.9693

Bhat, S. A., & Huang, N.-F. (2021). Big Data and AI Revolution in Precision Agriculture: Survey and Challenges. *IEEE Access*, *9*(2), 110209–110222. https://doi.org/10.1109/ACCESS.2021.3102227

Boateng, A., Asongu, S., Akamavi, R., & Tchamyou, V. (2018). Information asymmetry and market power in the African banking industry. *Journal of Multinational Financial Management*,*44*,6983.https://www.sciencedirect.com/science/article/abs/pii/S1042444X17301639.

Braun, V., & Clarke, V. (2021). To saturate or not to saturate? Questioning data saturation as a useful concept for thematic analysis and sample-size rationales. *Qualitative Research in Sport, Exercise and Health*,*13*(2), 201–216. https://doi.org/10.1080/2159676X.2019.1704846

Braun, V., Clarke, V., Boulton, E., Davey, L., & McEvoy, C. (2021). The online survey as a qualitative research tool. *International Journal of Social Research Methodology*, *24*(6), 641– 654. https://doi.org/10.1080/13645579.2020.1805550.

Buntin, G. D. (2020). Developing a primary sampling program. In *Handbook of sampling methods for arthropods in agriculture* (99-115). CRC Press.

Buskens, I. (2020). Community informatics and women empowerment: Opening the black box of the female self-in-transformation. *American behavioral scientist*, 64(13), 1818-1833.

https://doi.org/10.1016/j.pbi.2018.05.004.

Cairns, J. E., & Prasanna, B. (2019). Developing and deploying climate-resilient maize varieties in the developing world. *Current Opinion in Plant Biology*, *45*(14), 226–230. https://doi.org/10.1016/j.pbi.2018.05.004

Charters, B., Foster, K., Lawton, B., Lee, L., Byrnes, J., Mihala, G., Cassidy, C., Schults, J., Kleidon, T. M., McCaffery, R., Van, K., Funk, V., & Ullman, A. (2024). Novel Peripheral Intravenous Catheter Securement for Children and Catheter Failure Reduction. *JAMA Pediatrics17(5), 24-30*. https://doi.org/10.1001/jamapediatrics.2024.0167

Chikuni, T., & Kilima, F. T. (2019). Smallholder farmers' market participation and mobile phone- based market information services in Lilongwe, Malawi. *The Electronic Journal of Information Systems in Developing Countries*, *85*(6), e12097. https://doi.org/10.1002/isd2.12097.

Coble, K. H., Mishra, A. K., Ferrell, S., & Griffin, T. (2018). Big data in agriculture: A challenge for the future. *Applied Economic Perspectives and Policy*, *40*(1), 79-96. https://doi.org/10.1093/aepp/ppx056.

Coulson, A. (2015). Small-scale and large-scale agriculture: Tanzanian experiences. *Looking Back, Looking Ahead—Land, Agriculture and Society in East Africa, A Festschrift for Kjell Havnevik*, 23(2), 44-73. https://doi.org/10.1016/j.jssas.2017.05.004.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

De Groote, H., Kimenju, S. C., Munyua, B., Palmas, S., Kassie, M., & Bruce, A. (2020). Spread and impact of fall armyworm (Spodoptera frugiperda J.E. Smith) in maize production areas of Kenya. *Agriculture, Ecosystems & Environment*, *292*, 106804. https://doi.org/10.1016/j.agee.2019.106804

Degani, O. (2021). A review: Late wilt of maize—the pathogen, the disease, current status, and future perspective. *Journal of Fungi*, *7*(11),989-100. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8621787/.

Degani, O., Chen, A., Dor, S., Orlov-Levin, V., Jacob, M., Shoshani, G., & Rabinovitz, O. (2022). Remote evaluation of maize cultivars

susceptibility to late wilt disease caused by Magnaporthiopsis maydis. *Journal of Plant Pathology*, *104*(2), 509-525.https://doi.org/10.1007/s42161-022-01039-9

Denieffe, S. (2020). Commentary: Purposive sampling: complex or simple? Research case examples. *Journal of Research in Nursing*, *25*(8), 662–663. https://doi.org/10.1177/1744987120928156.

Donatti, C. I., Harvey, C. A., Martinez-Rodriguez, M. R., Vignola, R., & Rodriguez, C. M. (2019). Vulnerability of smallholder farmers to climate change in Central America and Mexico: current knowledge and research gaps. *Climate and Development*, *11*(3), 264-286.

https://doi.org/10.1016/j.jssas.2017.05.004.

Dubey, U. K. B., & Kothari, D. P. (2022). *Research Methodology*. Chapman and Hall/CRC. https://doi.org/10.1201/9781315167138.

Duncombe, R. (2016). Mobile phones for agricultural and rural development: A literature review and suggestions for future research. *The European Journal of Development Research*, 28(2), 213-

https://doi.org/10.1016/j.jssas.2017.05.004.

Dutta, S., Geiger, T., & Lanvin, B. (2015). The global information technology report 2015. *In World Economic*.14(5), 1295–1319. https://doi.org/10.1016/j.gfs.2018.03.007.

Ekpa, O., Palacios-Rojas, N., Kruseman, G., Fogliano, V., & Linnemann,

A. R. (2019). Sub- Saharan African maize-based foods: Technological perspectives to increase the food and nutrition security impacts of maize breeding programmes. *Global Food Security*, *17*, 48–56. https://doi.org/10.1016/j.gfs.2018.03.007.

Erenstein, O., Jaleta, M., Sonder, K., Mottaleb, K., & Prasanna, B. M. (2022). Global maize production, consumption and trade: trends and R&D implications. *Food Security*, *14*(5), 1295–1319. https://doi.org/10.1007/s12571-022-01288-7.

Etikan, I., & Babtope, O. (2019). A basic approach in sampling methodology and sample size calculation. *Med Life Clin*, *1*(2), 1006. https://www.medtextpublications.com/open-access/a-basic-approach-in-sampling-methodology-and-sample-size-calculation-249.pdf.

Eze, P. U., Ezenkwu, C. P., & Etteh, C. C. (2021). Community informatics for sustainable management of pandemics in developing countries: A case study of COVID-19 in Nigeria. *Ethics, Medicine and Public Health*, *16*, 100632. https://doi.org/10.1016/j.jemep.2021.100632

Fathima, F. N., Awor, P., Yen, Y.-C., Gnanaselvam, N. A., & Zakham, F. (2020). Challenges and coping strategies faced by female scientists—A metacentric cross sectional study. *PLOS ONE*, *15*(9), e0238635. https://doi.org/10.1371/journal.pone.0238635.

Feder, G., Just, R. E., & Zilberman, D. (2021). Adoption of Agricultural

Innovations in Developing Countries: A Survey. *Economic Development and Cultural Change, 33*(2), 255–298. https://doi.org/10.1086/451461.

Feher, K. (2024). Exploring AI media. Definitions, conceptual model, research agenda. *Journal of Media Business Studies,* 1–24. https://doi.org/10.1080/16522354.2024.2340419.

Food and Agriculture Organization of the United Nations. (2018). 20 Success Stories of Agricultural Innovation from the Innovation Fair. http://www.fao.org/3/CA2588EN/ca2588en.pdf#page=11.

Gamboa Graus, M. E. (2023). Sample size calculation in scientific research. *Dilemas* Contemporáneos: Educación, Política y Valores, 11(1). https://www.geopoll.com/blog/sample-size-research/

Giulivi, N., Harou, A. P., Gautam, S., & Guereña, D. (2023). Getting the message out: Information and communication technologies and agricultural extension. *American Journal of Agricultural Economics*, *105*(3), 1011–1045. https://doi.org/10.1111/ajae.12348.

Gouache, C. (2021). *Proposed Guidelines on Pre-Arrival Risk Assessments ofForeign Vessels: Using Lessons Learned to Strengthen Implementation of the UN FAO Agreement on Port State Measures.* https://escholarship.org/uc/item/8091w57h.

Grass, I., Loos, J., Baensch, S., Batáry, P., Librán-Embid, F., Ficiciyan,

A., Klaus, F., Riechers, M., Rosa, J., Tiede, J., Udy, K., Westphal, C., Wurz, A., & Tscharntke, T. (2019). Land- sharing-sparing connectivity landscapes for ecosystem services and biodiversity conservation. *People and Nature*, *1*(2), 262–272. https://doi.org/10.1002/pan3.21.

Grote, U., Fasse, A., Nguyen, T. T., & Erenstein, O. (2021). Food Security and the Dynamics of Wheat and Maize Value Chains in Africa and Asia. *Frontiers in Sustainable Food Systems,4*. https://doi.org/10.3389/fsufs.2020.617009

Hangel, N., & ChoGlueck, C. (2023). On the pursuitworthiness of qualitative methods in empirical philosophy of science. *Studies in History and Philosophy of Science*, *98*, 29–39. https://doi.org/10.1016/j.shpsa.2022.12.009.

Harvey, C. A., Saborio-Rodríguez, M., Martinez-Rodríguez, M. R., Viguera, B., Chain- Guadarrama, A., Vignola, R., & Alpizar, F. (2018). Climate change impacts and adaptation among smallholder farmers in Central America. *Agriculture & Food Security*, *7*(1), 1-20 https://doi.org/10.1007/s11027-012-9374-6.

Hélias, A. (2019). Data for fish stock assessment obtained from the CMSY algorithm for all Global FAO Datasets. *Data*, *4*(2), 78. https://doi.org/10.1007/s11027-012-9374-6.

Hennink, M., & Kaiser, B. (2022). Sample sizes for saturation in

qualitative research: A systematic review of empirical tests. *Social Science & Medicine*, *292*(12), 114–523. https://doi.org/10.1016/j.socscimed.2021.114523

Hennink, M., Kaiser, Bonnie., & Weber, M. B. (2019). What Influences Saturation? Estimating Sample Sizes in Focus Group Research. *Qualitative Health Research*, *29*(10), 1483–1496. https://doi.org/10.1177/1049732318821692.

Herforth, A., Bai, Y., Venkat, A., Mahrt, K., Ebel, A., & Masters, W. A. (2020). *Cost and affordability of healthy diets across and within countries: Background paper for The State of Food Security and Nutrition in the World 2020. FAO Agricultural Development Economics Technical Study 9* (9), 12-15

https://doi.org/10.1016/j.socscimed.2021.114523.

Huang, X. (2018). The Typical Practice, Main Characteristics and Useful Reference of Community Informatics in the US. In 2nd International Conference on e-Education. *E-Business and Information Management,*38(1),103-115. https://www.clausiuspress.com/conferences/LNEMSS/EEIM%202018/M18110236.pdf.

Hübner, F. (2024). *Method, Methodology and Research Design in Artistic Research*. Routledge. https://doi.org/10.4324/9781003188841.

Idiegbeyan-Ose, J., Owolabi, A., Segun-Adeniran, C., Aregbesola, A., Emmanuel Owolabi, S., & Eyiolorunshe, T. (2019). Information provision by public library to agricultural extension agents in a developing country. *Public Library Quarterly*, *38*(1), 103-115. *Journal of Sociology*, *78*(1), 9–47. http://www.jstor.org/stable/2776569.

Iwuchukwu, J. C., & Obazi, S. A. (2020). Information Needs of Rice Farmers on Inorganic Fertilizer Use in Ebonyi State, Nigeria. *Journal of Agricultural Extension*, *24*(3), 9–21. https://doi.org/10.4314/jae.v24i3.2.

Jain, N. (2021). Survey versus interviews: Comparing data collection tools for exploratory research. *The Qualitative Report*, 26(2), 541-554. https://doi.org/10.46743/2160-.

Jena, P. R., De Groote, H., Nayak, B. P., & Hittmeyer, A. (2021). Evolution of Fertiliser Use and its Impact on Maize Productivity in Kenya: Evidence from Multiple Surveys. *Food Security*, *13*(1), 95–111. https://doi.org/10.1007/s12571-020-01105-z.

Jin, Z., Azzari, G., You, C., Di Tommaso, S., Aston, S., Burke, M., & Lobell, D. B. (2019). Smallholder maize area and yield mapping at national scales with Google Earth Engine. *Remote Sensing of Environment*, *228*(23), 115–128. https://doi.org/10.1016/j.rse.2019.04.016.

Johnson, J. L., Adkins, D., & Chauvin, S. (2020). A review of the quality indicators of rigor in qualitative research. *American journal of pharmaceuticaleducation*,*84*(1),71-87. https://doi.org/10.1016/j.socscimed.2021.114523.

Kamau, G. W., & Owano, A. (2018). *The Role of Libraries in the achievement of sustainable development goals in Kenya* https://www.researchgate.net/publication/331167511_.

Karanja, D. D., Jayne, T. S., & Strasberg, P. (2019). *Kenya agricultural marketing and policy analysis project maize productivity and impact of market liberalization in Kenya. (e-journal),* 105(4), 1049–1062. https://doi.org/10.1111/ajae.12419.

Kaske, D. (2020). Information needs and seeking behavior of farmers in Southern Ethiopia. *Library Philosophy and Practice (e-journal)*, 105(4), 1049–1062. https://doi.org/10.1111/ajae.12419.

Kesmodel, U. S. (2018). Cross-sectional studies – what are they good for? *Acta Obstetricia et Gynecologica Scandinavica*, *97*(4), 388–393. https://doi.org/10.1111/aogs.13331.

Kovalchuk, M., Gabrielsson, M., & Rollins, M. (2023). Industrial BRAND-personality formation in a B2B stakeholder network: A service-dominant logic approach. *Industrial Marketing Management*, *114*, 313–330. https://doi.org/10.1016/j.indmarman.2023.05.006.

Kuperstein-Blasco, D., & Mäkinen, S. (2023). Recognizing the preventive quality in the adoption of innovations: The case of third-party ownership photovoltaic systems in Finland. *Heliyon*, *9*(11), e21907. https://doi.org/10.1016/j.heliyon.2023.e21907.

Laaksonen, S. (2018). Designing a Questionnaire and Survey Modes. In *Survey Methodology and Missing Data* (pp. 27–47). Springer International Publishing. https://doi.org/10.1007/978-3- 319-79011-4_3.

Lakens, D. (2022). Sample Size Justification. *Collabra: Psychology*, *8*(1), 6-10 https://doi.org/10.1525/collabra.33267.

Lakens, D. (2022). Sample size justification. *Collabra: psychology*, *8*(1), 20-31. https://doi.org/10.1111/ajae.12419.

Leroux, L., Castets, M., Baron, C., Escorihuela, M.-J., Bégué, A., & Lo Seen, D. (2019). Maize yield estimation in West Africa from crop process-induced combinations of multi-domain remote sensing indices. *European Journal of Agronomy*, *108*(15), 11–26. https://doi.org/10.1016/j.eja.2019.04.007.

Lesaona-Tshabalala, B. V. (2021). Agricultural information needs and resources available to agriculturists and farmers in a developing country with special reference to Lesotho. Unpublished Dissertation] in the Department of Information Studies Faculty of Arts,

https://ujcontent.uj.ac.za/view/pdfCoverPage?instCode=27UOJ_INST&filePid=136026070 007691&download=true.

Lobe, B., Morgan, D., & Hoffman, K. A. (2020). Qualitative data collection in an era of social distancing. *International journal of qualitative methods*,*38*(1), 103-115. https://doi.org/10.1038/s41598-021-89962-2.

Lowe, N. K. (2019). What is a pilot study?. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, *48*(2), 117-118. https://www.jognn.org/article/S0884-2175 (19)30006-1/fulltext

Lusk, J. L., & Chandra, R. (2021). Farmer and farm worker illnesses and deaths from COVID-19 and impacts on agricultural output. *PLOS ONE*, *16*(4), e0250621. https://doi.org/10.1371/journal.pone.0250621.

Maitah, M., Malec, K., & Maitah, K. (2021). Influence of precipitation and temperature on maize production in the Czech Republic from 2002 to 2019. *Scientific Reports*, *11*(1), 10-17. https://doi.org/10.1038/s41598-021-89962-2.

Martini, E., Paramita, E., & Roshetko, J. M. (2021). Information channels for disseminating innovative agroforestry practices to villages in Southern Sulawesi, Indonesia. *ICRAF WorkingPaper-WorldAgroforestryCentre*,(224). https://www.cabdirect.org/cabdirect/abstract/20163398474.

Mat Roni, S., & Djajadikerta, H. G. (2021). *Data Analysis with SPSS for Survey-based Research*. Springer. https://doi.org/10.1007/978-981-16-0193-4.

Mauti, N., Chege, A., & Kiplag, J. (2018). Evaluating Access and Use of Information Resources by Postgraduate Students at Adventist University of Africa Library in Kenya. *International Journal of Humanities & Social Science Studies*, *4*(4), 92–100. https://www.ijhsss.com/files/11.-Norah-Mouti.pdf.

Maxwell, J. A. (2021). Why qualitative methods are necessary for generalization. *Qualitative Psychology*, *8*(1), 111–118. https://doi.org/10.1037/qup0000173.

McEwan, B. (2020). Sampling and validity. *Annals of the International Communication Association*, *44*(3), 235–247. https://doi.org/10.1080/23808985.2020.1792793.

Merton, R. K. (1972). Insiders and outsiders: A chapter in the sociology of knowledge. American

Mirzaei, A., Aslani, P., Luca, E. J., & Schneider, C. R. (2021). Predictors of Health Information– Seeking Behavior: Systematic Literature Review and Network Analysis. *Journal of Medical Internet Research*, *23*(7), e21680. https://doi.org/10.2196/21680

Misaki, E., Apiola, M., Gaiani, S., & Tedre, M. (2018). Challenges facing

sub-Saharan small-scale farmers in accessing farming information through mobile phones: A systematic literature review. *The Electronic Journal of Information Systems in Developing Countries*, *84*(4), e12034. https://doi.org/10.1002/isd2.12034.

Mittal, S., & Mehar, M. (2015). Socio-economic factors affecting adoption of modern information and communication technology by farmers in India: Analysis using a multivariate probit model. *The Journal of Agricultural Education and Extension, 22*(2), 199-212. https://doi.org/10.2196/21680

Mohamad, M. M., Sulaiman, N. L., Sern, L. C., & Salleh, K. M. (2015). Measuring the Validity and Reliability of Research Instruments. *Procedia - Social and Behavioral Sciences*, *204*(November 2014), 164–171. https://doi.org/10.1016/j.sbspro.2015.08.129.

Mohan Kumar, S., Suman, S., Kulkarni, U. P., & Siddalingaswamy, N. H. (2019). Feasibility study of effective usage of available Agricultural Information System for various Village Boundaries of India. *J Robot Mech Eng Resr*, *3*(2), 1-7.

Muller, R. O., Hancock, G. R., & Stapleton, L. M. (2018). *The Reviewer's Guide to Quantitative Methods in the Social Sciences*. https://doi.org/10.4324/9781315755649.

Munialo, S., Dahlin, A. S., Onyango M., C., Oluoch-Kosura, W., Marstorp, H., & Öborn, I. (2020). Soil and management-related

factors contributing to maize yield gaps in western Kenya. *Food and Energy Security*, *9*(1). https://doi.org/10.1002/fes3.189.

Mutunga, J. G. (2021). *Natural resources and security in laikipia county, kenya university*. *Journal of Agribusiness in Developing and Emerging Economies*, *9*(1), 4–21. https://doi.org/10.1108/JADEE-01-2018-0013

Nagarajan, L., Naseem, A., & Pray, C. (2019). Contribution of policy change on maize varietal development and yields in Kenya. *Journal of Agribusiness in Developing and Emerging Economies*, *9*(1), 4–21. https://doi.org/10.1108/JADEE-01-2018-0013.

Nambiro, E., Chianu, J., & Murage, A. W. (2020). *The association of agricultural information services and technical efficiency among maize producers in Kakamega, western Kenya* .https://ageconsearch.umn.edu/record/95961/.

Nayal, K., Raut, R. D., Narkhede, B. E., Priyadarshinee, P., Panchal, G. B., & Gedam, V. V. (2021). Antecedents for blockchain technology-enabled sustainable agriculture supply chain. *Annals of Operations Research*, *3*(5), 12-18. https://doi.org/10.1007/s10479-021-04423-3.

Nduwimana, D. (2020). Optimizing Nitrogen Use Efficiency and Maize Yield under Varying Fertilizer Rates in Kenya. *International Journal of Bioresource Science*, *7*(2), 1–18. https://doi.org/10.30954/2347-9655.02.2020.4

Ngutu, M., Bukachi, S., Olungah, C. O., Kiteme, B., Kaeser, F., & Haller, T. (2018). The actors, rules and regulations linked to export horticulture production and access to land and water as common pool resources in Laikipia County, Northwest Mount Kenya. *Land, 7*(3), 110. doi: h□ps://doi.org/10.24218/jrmer.2019.30.

Obiero, K. O., Waidbacher, H., Nyawanda, B. O., Munguti, J. M., Manyala, J. O., & Kaunda- Arara, B. (2019). Predicting uptake of aquaculture technologies among smallholder fish farmers in Kenya. *AquacultureInternational,27(3),* 1689-1707. https://doi.org/10.1007/s10499-019-00423-0.

Okeuhie, S.N., Agbagha, M.M., Ndu, M.O., Emmanuela C. A. (2021). Accessibility and Utilization of Agricultural Information Sources in NRCRI Library by Rural Farmers in Olokoro, Umuahia South, Abia State. Inter. J. Acad. Lib. *Info. Sci. 9*(9), 472-477. https://www.academicresearchjournals.org/IJALIS/PDF/2021/September/Okeuhie%20et%2 0al.pdf.

Onsinyo, C. N. (2020). Challenges of accessing library and information services for persons with disabilities in university libraries in Meru County, Kenya. *International Journal of Economics, Business and Management Research*, *2*(01), 429-438. IJEBMR_02_151.pdf https://ijebmr.com/uploads/pdf/archivepdf/2020/IJEBMR_02_151.pdf,

Orimoloye, I. R. (2022). Agricultural drought and its potential impacts: enabling decision-support for food security in vulnerable regions. *Frontiers in Sustainable Food Systems*, *6*, 838824. *https://doi.org/10.3389/fsufs.2022.838824*,

Pallant, J. (2020). *SPSS Survival Manual*. Routledge. *https://doi.org/10.4324/9781003117452*.

Pan, X. (2021). Repeated Cross-Sectional Design. In *Encyclopedia of Gerontology and Population Aging* (4246–4250). Springer International Publishing. https://doi.org/10.1007/978-3- 030-22009-9_578

Parker, L., Bourgoin, C., Martinez-Valle, A., & Läderach, P. (2019). Vulnerability of the agricultural sector to climate change: The development of a pan-tropical Climate Risk Vulnerability Assessment to inform sub-national decision making. *PLOS ONE*, *14*(3), e0213641. https://doi.org/10.1371/journal.pone.0213641.

Patel, M., & Patel, N. (2019). Exploring research methodology. *International Journal of Research and Review*, *6*(3), 48-55. https://www.ijrrjournal.com/IJRR_Vol.6_Issue.3_March2019/IJRR0011.

Pearson, N., Naylor, P.-J., Ashe, M. C., Fernandez, M., Yoong, S. L., & Wolfenden, L. (2020). Guidance for conducting feasibility and pilot studies for implementation trials. *Pilot and Feasibility Studies*, *6*(1).

https://doi.org/10.1186/s40814-020-00634-w.

Phiri, A., Chipeta, G. T., & Chawinga, W. D. (2019). Information needs and barriers of rural smallholder farmers in developing countries: A case study of rural smallholder farmers in Malawi. *Information Development*, *35*(3), 421-434. https://doi.org/10.1177/026666691875522.

Rahman, M. M., Tabash, M. I., Salamzadeh, A., Abduli, S., & Rahaman, M. S. (2022). Sampling techniques (probability) for quantitative social science researchers: conceptual guidelines with examples. *See Review*, *17*(1), 42-51. https://sciendo.com/article/10.2478/seeur-2022-0023.

Rahman, T., Ara, S., & Khan, N. A. (2020). Agro-information Service and Information-seeking Behaviour of Small-scale Farmers in Rural Bangladesh. *Asia-Pacific Journal of Rural Development*, *30*(1-2), 175–194. https://doi.org/10.1177/1018529120977259.

Raman Nair, R. (2019) Agricultural information service for the farmers and the public: A study. *ILA bulletin*. *Journal of Rural Development*, *30*(1-2), 175–194.http://eprints.rclis.org/9639.

Rehman, M., Razzaq, A., Baig, I. A., Jabeen, J., Tahir, M. H. N., Ahmed, U. I., Altaf, A., & Abbas,T. (2022). Semantics Analysis of Agricultural Experts' Opinions for Crop Productivity through Machine Learning. *Applied Artificial Intelligence*, *36*(1).

https://doi.org/10.1080/08839514.2021.2012055.

Rop, Z. (2019). Information Needs of and Services to Small-Scale Vegetable Farmers in Laikipia County, Kenya. *Regional Journal of Information and Knowledge Management*, 3(1), 1-14. https://rjikm.org/assets/img/Man%203.1.1%20-%20Final1497.pdf

Ruthven, I. (2019). The language of information need: Differentiating conscious and formalized information needs. *Information Processing & Management*, *56*(1), 77–90. https://doi.org/10.1016/j.ipm.2018.09.005.

Sadare, O. O., Moothi, K., & Daramola, M. O. (2022). The Role of the Library in Actualising United Nation Sustainable Development Goals in South Africa. *Academic Libraries: Reflecting on Crisis, the Fourth Industrial Revolution and the Way Forward*, 161-179.

Saint Ville, A., Po, J. Y. T., Sen, A., Bui, A., & Melgar-Quiñonez, H. (2019). Food security and the Food Insecurity Experience Scale (FIES): ensuring progress by 2030. *Food Security*, *11*, 483-491.

Santpoort, R. (2020). The Drivers of Maize Area Expansion in Sub-Saharan Africa. How Policies to Boost Maize Production Overlook the Interests of Smallholder Farmers. *Land*, *9*(3), 68–79. https://doi.org/10.3390/land9030068.

Sassenberg, K., & Ditrich, L. (2019). Research in social psychology

changed between 2011 and 2016: Larger sample sizes, more self-report measures, and more online studies. *Advances in Methods and Practices in Psychological Science*, *2*(2), 107-114. https://www.researchgate.net/publication/361628724_The_Role_of_the_Library_in_Actualising_United_Nation_Sustainable_Development_Goals_in_South_Africa.

Seo, B., Lee, J., Lee, K. D., Hong, S., & Kang, S. (2019). Improving remotely-sensed crop monitoring by NDVI-based crop phenology estimators for maize and soybeans in Iowa and Illinois, USA. *Field Crops Research*, *238*, 113-128. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7745163/.

Serdar, C. C., Cihan, M., Yücel, D., & Serdar, M. A. (2021). Sample size, power and effect size revisited: simplified and practical approaches in pre-clinical, clinical and laboratory studies. *Biochemia medica*, *31*(1),27-53. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7745163/.

Shagoury, R., & Miller Power, B. (2023). *Living the Questions*. Routledge. https://doi.org/10.4324/9781032681528.

Sharma, U., Chetri, P., Minocha, S., Roy, A., Holker, T., Patt, A., & Joerin, J. (2021). Do phone- based short message services improve the uptake of agri-met advice by farmers? A case study in Haryana, India. *Climate Risk Management*, *33*(9),

100321.https://doi.org/10.1016/j.crm.2021.100321.

Sheng, Y., Ding, J., & Huang, J. (2019). The Relationship between Farm Size and Productivity in Agriculture: Evidence from Maize Production in Northern China. *American Journal of Agricultural Economics*, *101*(3), 790–806. https://doi.org/10.1093/ajae/aay104.

Shin, H., & Baek, S. (2023). Unequal diffusion of innovation: Focusing on the digital divide in using smartphones for travel. *Journal of Hospitality and Tourism Management*, *55*, 277–281. https://doi.org/10.1016/j.jhtm.2023.04.012.

Siedlecki, S. L. (2020). Understanding Descriptive Research Designs and Methods. *Clinical Nurse Specialist*, *34*(1), 8–12. https://doi.org/10.1097/NUR.0000000000000493.

Smith, M. (2019). Top Ten Challenges Facing Public Libraries. *Public Library Quarterly*, *38*(3), 241–247. https://doi.org/10.1080/01616846.2019.1608617

Smutny, Z., & Vehovar, V. (2020). Social informatics research: Schools of thought, methodological basis, and thematic conceptualization. *Journal of the Association for Information Science and Technology*, 71(5), 529-539. https://doi.org/10.1002/asi.24280.

Soroya, S. H., Farooq, A., Mahmood, K., Isoaho, J., & Zara, S. (2021). From information seeking to information avoidance: Understanding

the health information behavior during a global health crisis. *Information Processing & Management*, *58*(2), 102440. https://doi.org/10.1016/j.ipm.2020.102440.

Springuel, R. P., Wittmann, M. C., & Thompson, J. R. (2019). Reconsidering the encoding of data in physics education research. *Physical Review Physics Education Research*, *15*(2), 0201– 0311. https://doi.org/10.1103/PhysRevPhysEducRes.15.020103.

Srinivasan, R., & Swink, M. (2018). An Investigation of Visibility and Flexibility as Complements to Supply Chain Analytics: An Organizational Information Processing Theory Perspective. *Production and Operations management*,*27*(10),1849–1867. https://doi.org/10.1111/poms.12746.

Story, D. A., & Tait, A. R. (2019). Survey Research. *Anesthesiology*, *130*(2), 192–202. https://doi.org/10.1097/ALN.0000000000002436.

Stratton, S. J. (2021). Population Research: Convenience Sampling Strategies. *Prehospital and Disaster Medicine*, *36*(4), 373–374. https://doi.org/10.1017/S1049023X21000649.

Striepe, M. (2021). Combining concept mapping with semi-structured interviews: adding another dimension to the research process. *International Journal of Research & Method in Education*, *44*(5), 519–532. https://doi.org/10.1080/1743727X.2020.1841746.

Tarus, C. B. K. (2019). Maize Crisis: A Position Paper on Strategies for Addressing Challenges Facing Maize Farming In Kenya. *East African Scholars Journal of Education, Humanities and Literature*, *2*(3), 519–532 http://www.easpublisher.com/easjehl/.

Tata, J. S., & McNamara, P. E. (2018). Impact of ICT on agricultural extension services delivery: evidence from the Catholic Relief Services SMART skills and Farmbook project in Kenya. *The Journal of Agricultural Education and Extension*, *24*(1), 89-110. http://www.easpublisher.com/easjehl/.

Tchamyou, V. S., & Asongu, S. A. (2017). Information sharing and financial sector development in Africa. *Journal of African Business*, *18*(1),24-49.https://econpapers.repec.org/article/tafwjabxx/v_3a18_3ay_3a2017_3ai_3a1_3ap_3a24-49.htm.

Ten-Berge, H. F. M., Hijbeek, R., van Loon, M. P., Rurinda, J., Tesfaye, K., Zingore, S., Craufurd, P., van Heerwaarden, J., Brentrup, F., Schröder, J. J., Boogaard, H. L., de Groot, H. L. E., & van Ittersum, M. K. (2019). Maize crop nutrient input requirements for food security in sub- Saharan Africa. *Global Food Security*, *23*, 9–21. https://doi.org/10.1016/j.gfs.2019.02.001.

Tobi, H., & Kampen, J. K. (2018). Research design: the methodology for interdisciplinary research framework. *Quality & Quantity*, *52*(3),

1209–1225. https://doi.org/10.1007/s11135-017- 0513-8.

Tregua, M., Brozovic, D., & D'Auria, A. (2021). 15 years of service-dominant logic: analyzing citation practices of Vargo and Lusch (2004). *Journal of Service Theory and Practice*, *31*(4), 563–606. https://doi.org/10.1108/JSTP-08-2019-0174.

Tseng, C. H., & Sim, D. (2021). Sample size planning for pilot studies. *arXiv preprint arXiv:2105.05483*. https://arxiv.org/abs/2105.05483.

Tumbo, S. D., Mwalukasa, N., Fue, K. G., Mlozi, M. R., Haug, R., & Sanga, C. (2018). Exploring information seeking behavior of farmers' in information related to climate change adaptation through ICT (CHAI). *International Review of Research in Open and Distributed Learning*, *19*(3).https://www.researchgate.net/publication/326348441_Exploring_Information_Seeking_Behavior_of_Farmers'_in_Information_Related_to_Climate_Change_Adaptation_Through_ICT_CHAI.

Unver, M., & Koyuncu, J. Y. (2020). *Journal of Economics Library*, *3*(1), 100–110. https://doi.org/10.1016/j.jbusres.2023.11396.

Van Campenhout, B., Spielman, D. J., & Lecoutere, E. (2021). Information and Communication Technologies to Provide Agricultural Advice to Smallholder Farmers: Experimental Evidence from Uganda. *American Journal of Agricultural Economics*, *103*(1), 317–337. https://doi.org/10.1002/ajae.12089.

Vargo, S. L., Wieland, H., & O'Brien, M. (2023). Service-dominant logic as a unifying theoretical framework for the re-institutionalization of the marketing discipline. *Journal of Business Research, 164,* 113965. https://doi.org/10.1016/j.jbusres.2023.11396.

Vaughan, C., Hansen, J., Roudier, P., Watkiss, P., & Carr, E. (2019). Evaluating agricultural weather and climate services in Africa: Evidence, methods, and a learning agenda. *WIREs Climate Change*, *10*(4), 12–26. https://doi.org/10.1002/wcc.586.

Verkaart, S., Mausch, K., & Harris, D. (2018). Who are those people we call farmers? Rural Kenyan aspirations and realities. *Development in Practice*,*28*(4), 468-479. https://doi.org/10.1016/j.procs.2023.10.235.

Wan Mokhtar, W. N. H., Izhar, T. A. T., Zaini, M. K., & Hussin, N. (2022). The Importance of Digital Literacy Skills among Farmers for Sustainable Food Security. *International Journal of Academic Research in Progressive Education and Development*, *11*(1).43-48 https://doi.org/10.6007/ijarped/v11-i1/12104.

Wang, Y., Hong, D., & Huang, J. (2023). A Diffusion of Innovation Perspective for Digital Transformation on Education. *Procedia Computer Science*, *225*(3), 2439–2448. https://doi.org/10.1016/j.procs.2023.10.235.

Wang, X., & Cheng, Z. (2020). Cross-Sectional

Studies. *Chest, 158*(1), S65–S71. https://doi.org/10.1016/j.chest.2020.03.012.

Wangeci, I., & Njoroge, R. (2021). Awareness and use of information resources to promote environmental protection and conservation at Kenya national library service, Nairobi. *African Journal of Education and Practice*, *7*(3), 1–13. https://doi.org/10.1016/j.procs.2023.10.235.

Wanyama, D., Mighty, M., Sim, S., & Koti, F. (2021). A spatial assessment of land suitability for maize farming in Kenya. *Geocarto International*, *36*(12), 1378–1395. https://doi.org/10.1080/10106049.2019.1648564.

World Health Organization. (2022). *WHO/FAO Inter-Regional meeting to promote healthy diets through the informal food sector in Asia: 20–22 August 2019, Bangkok, Thailand* (No. SEA- NUT-201). World Health Organization. Regional Office for South-East Asia. https://www.who.int/publications/i/item/sea-nut-201.

Wyer, R. S., & Carlston, D. E. (2019). *Social Cognition, Inference, and Attribution*. Psychology Press. https://doi.org/10.4324/9780203781593.

Yeon, J., & Lee, J. Y. (2021). Employment information needs and information behaviour of North Korean refugees. *Information Research: An International Electronic Journal*, *26*(4), 7-19

https://doi.org/10.47989/irpaper914.

Yi, F., Sun, D., & Zhou, Y. (2019). Grain subsidy, liquidity constraints and food security—Impact of the grain subsidy program on the grain-sown areas in China. *Food Policy, 50,* 114–124. https://doi.org/10.1016/j.foodpol.2014.10.009.

Yigezu Wendimu, G. (2021). The challenges and prospects of Ethiopian agriculture. *Cogent Food & Agriculture, 7*(1), 56.-68 https://doi.org/10.1016/j.procs.2023.10.235.

Yılmaz, H., & Njora, B. (2021). Analysis of the impact of agricultural policies on food security in Kenya. *Eurasian Journal of Agricultural Research, 5*(2), 66-83. https://doi.org/10.47989/irpaper914.

Zurndorfer, H. T. (2021). *China bibliography: a research guide to reference works about China past and present American Journal of Agricultural Economics, 103*(1), 317–337. https://doi.org/10.1002/ajae.12089.

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APPENDICES

Appendix I: Consent to Participate in the Study

Susaide Maina

Kenya Methodist University

P.O. Box 267 – 60200.

Dear respondent,

I am writing to request for consent to participate in my study which will help me to actualize my academic research that investigates on **analysis of the role of public libraries in enhancing maize production in Laikipia east sub-county, Laikipia county, Kenya**. This research hope to aims to assess the role of public libraries in promoting maize production in Laikipia East Sub County, Laikipia County, Kenya to enhance access to maize production information by farmers.

Procedure to be followed

The specific questions in the questionnaire and interview is organized into sections ranging from section A to F. Section A covers the introduction part constituting the biographical information of the sampled respondents. Section B constitutes questions on the dependent variable while Sections, C, D, E, and F, contain questions regarding the independent variables. Several questions in the questionnaire are closed-ended, and some open-ended ones for each construct. All sentiments in the questionnaire are in 5 points Likert scale. In total. It takes approximately 10 to 15 minutes to complete the questionnaire and respond to interview session. The respondent is under no obligation to complete the questionnaire or

to answer all questions presented or participate in the interview. If one comes across a question which one don't wish to answer, simply skip it.

I hope you will be willing to participate, your responses are important and valued in this study, and will go a long way to help in designing appropriate framework. I hope you will also be willing to participate in this study in your capacity as the librarian and a maize farmer

Discomforts and risks

In this study, there is no risks of participating in the research. The reputation of the participant will also not be injured. The respondent is welcome to discontinue participation in the study at any time, should one wish to do so due to discomfort. You may also stop the interview at any time. The interview may take about 30 minutes to complete.

Benefits

a) You will have a chance to independently express your thoughts, feelings, understanding, and perceptions on the role of public libraries in enhancing maize production in Laikipia County.
b) The results, discussions and recommendations may better assist the library in tailoring library resources and services to meet the informational demands of farmers

Rewards

There is no reward for anyone who chooses to participate in the study.

Confidentiality

Your participation will remain strictly confidential. No name will be recorded on the questionnaire or attached to any of the data you provide. The data collection will be kept

in a confidential location after collection and in future and, moreover, will not have anything to identify you.

Contact Information

Should you have questions regarding your participation, please contact me on susaidemaina@gmail.com. You may also contact my research supervisor at paul.maku@kemu.ac.ke

I am kindly asking you to sign the consent form (below) indicating agreement for you to participate in the study. By signing this consent form, is also an indicator that one has agreed to participate in the study.

Participant's Statement

The above statement regarding my participation in the study is clear to me. I have been given a chance to ask questions and my questions have been answered to my satisfaction. My participation in this study is entirely voluntary. I understand that my records will be kept private and that I can leave the study at any time. I understand that I will not be victimized at my place of work whether I decide to leave the study or not and my decision will not affect the way I am treated at my work place.

Name of Participant…… Date……..

Signature…….

Investigator's Statement

I, the undersigned, have explained to the volunteer in a language s/he understands the procedures to be followed in the study and the risks and the benefits involved.

Name of Interviewer……Date…….

Interviewer Signature……

Appendix II: Questionnaire Item

Questionnaire to Farmers

Instructions:

Answer the questions accurately by ticking in the provided space and writing on the open spaces without indicating your name

Questionnaire for Farmers

Instructions:

Answer the questions accurately by ticking in the provided space and writing on the open spaces **without** indicating your name

Section A: Background Information

a) What is the highest level of academic qualification you have achieved as a farmer

i. Primary education ( )

ii. Secondary education ( )

iii. Vocational training/certificate ( )

iv. Bachelor's degree ( )

v. Other (please specify) …….

b) Indicate the type of maize farming you operate in

i. Small Scale Maize Farming ( )

ii. Large Scale Maize Farming ( )

iii. Any other Explain
……
……
……
……
……
……
……

c) For how long have you been practicing maize farming?

i. Less than one year ( )
ii. Between one and three years ( )
iii. Between three and five years ( )

iv. More than five years ( )

Section B: Maize Production

d) Tick appropriately to indicate the how your business has grown the most due to support from the library services provided at Nanyuki Public Library

i. Having more volumes of maize Production yearly ( )

ii. Having no change in volumes of maize production yearly ( )

iii. Having less volumes in maize production yearly ( )

iv. I don't use library services to support my maize production business ( )

Explain the reasons for your answer above

……

……

……

5. Please use the following scale to indicate your response. **Tick (√)** the best response regarding maize production. 0 = I have never used library (NV); 1= strongly disagree (SD) 2=Disagree (D) 3=Neutral (N) 4=Agree (A) 5=Strongly Agree (SA)

Maize Production		**0**	**1**	**2**	**3**	**4**	**5**
(i)	I have been getting more volumes of maize yield each year since I started using library services						
(ii)	Maize production has been consistently improved through the use of the Nanyuki public library services						
(iii)	Nanyuki public library services have enabled me to increase in maize sales						
(iv)	Enabled me to reduce on maize farming input expenses						
(v)	Public libraries currently address challenges faced in maize production						
(vi)	Access to information through public libraries can significantly improve maize production practices						

Suggest other ways in which Nanyuki public library can support the maize farming production in Laikipia East sub-County

……

……

……

……

Section C: Information Needs

6. Please use the following scale to indicate your response. **Tick (√)** the best response regarding information needs of maize farmers. 0 = I have never used library (NV); 1= strongly disagree (SD) 2=Disagree (D) 3=Neutral (N) 4=Agree (A) 5=Strongly Agree (SA)

Information Needs	**0**	**1**	**2**	**3**	**4**	**5**
i. Nanyuki public library has all the types of information that I need for my maize farming						
ii. The information needed is readily available when I need it						
iii. Nanyuki public library has well equipped systems to provide the needed information						
iv. Information needs regarding maize production are adequately addressed by existing resources and services						
v. I have access to comprehensive information on maize production techniques and best practices for your farming activities						

Make suggestions on how the Nanyuki public library in Laikipia East sub-County can improve the provision of information needed by maize farmers.

……

Section D: Information Resources

7. Please use the following scale to indicate your response. **Tick (√)** the best response regarding information resources. 0 = I have never used library (NV); 1= strongly disagree (SD) 2=Disagree (D) 3=Neutral (N) 4=Agree (A) 5=Strongly Agree (SA)

Information resources	**0**	**1**	**2**	**3**	**4**	**5**
i. The public library provides a comprehensive collection of resources relevant to maize farming.						
ii. Agricultural information available at the public library is up-to-date and relevant to current farming practices.						
iii. The public library offers easy access to digital resources and the internet for researching maize production techniques						
iv. The information resources provided by public libraries in Laikipia East Sub-County enhance your knowledge and skills in maize production						
v. I have access to relevant information resources on maize production outside of public libraries in Laikipia East Sub-County						
vi. Public libraries continually update and expand their collection of information resources related to maize production.						

Indicate other ways the information resources provided has benefitted you as a maize farmer and suggest way the provision can be improved

……

……

Section E: Information services

8. Please use the following scale to indicate your response. **Tick (√)** the best response regarding information services. 0 = I have never used library (NV); 1= strongly disagree (SD) 2=Disagree (D) 3=Neutral (N) 4=Agree (A) 5=Strongly Agree (SA)

Information services	**0**	**1**	**2**	**3**	**4**	**5**
i. Nanyuki public library provides variety of information services to boost my maize production						
ii. The information and services provided by the public library have significantly improved my maize farming practices.						
iii. The public library staff are knowledgeable and helpful in finding information related to maize production.						
iv. Workshops and seminars organized by the public library are very useful for improving maize productivity.						
v. Public libraries offer specialized information services tailored to the needs of maize farmers						
vi. Information services currently provided by public libraries support maize production in Laikipia East Sub-County						
vii. Public libraries have contributed to improving maize production practices and outcomes in Laikipia East Sub-County						

Suggest other ways the Nanyuki public library can improve services offered to maize farmers in Laikipia East sub-County

……

Section F: Information Dissemination Channels

9. Please use the following scale to indicate your response regarding information dissemination channels. 0 = I have never used library (NV); **Tick (√)** the best response. 1= strongly disagree (SD) 2=Disagree (D) 3=Neutral (N) 4=Agree (A) 5=Strongly Agree (SA)

Information Dissemination Channels	**0**	**1**	**2**	**3**	**4**	**5**
i. The public library efficiently uses various channels (such as community boards, social media, etc.) to disseminate information on maize production.						
ii. I am satisfied with how frequently the public library updates and communicates new agricultural information.						
iii. The public library plays a crucial role in the community by bridging the information gap for maize farmers.						
iv. Public libraries are channels for disseminating information on maize production compared to other sources such as agricultural extension services or community meetings						
v. I receive information on maize production from public libraries compared to other available channels (e.g., radio broadcasts, agricultural fairs, online platforms						
vi. Public libraries are a reliable source of information on maize production to other farmers in Laikipia East Sub- County?						

Suggest more ways the Nanyuki public library can help you in accessing to information that is important for your maize farming.

……

……

THANK YOU FOR YOUR PARTICIPATION

Appendix III: Interview Schedules

Interview Schedules for Library Staff

A: Demographic information

1. What is your highest academic qualification?

2. How many years of work experience do you have?

3. In which library section are you primarily involved?

Section B: Maize Production

1. Can you provide insights into the types of information or resources related to maize production that are frequently sought by maize farmers in Laikipia East Sub-County?
2. How do you perceive the role of public libraries in supporting and enhancing maize production efforts within the community, particularly in terms of providing access to relevant agricultural information and expertise?
3. How do you perceive the effectiveness of library resources in aiding farmers to enhance their maize production skills?

Section C: Information Needs

1. What are some common information needs expressed by farmers in Laikipia East Sub-County concerning maize production?
2. How does the library assess and address the evolving information needs of the local community about maize cultivation and agricultural practices?
3. Can you describe the types of information available at Nanyuki public library that you believe would be beneficial for maize farmers in their farming practices?

Section D: Information Resources

1. Could you outline the range of information resources available at the library that specifically cater to maize production and agricultural development?
2. How does the library collaborate with external organizations or agencies to ensure the availability of up-to-date and comprehensive information resources relevant to maize production in the local context?
3. What types of resources related to maize farming are available at the public library?

Section E: Information Services

1. What specific information services does the library offer to support individuals and organizations involved in maize production and agricultural activities?
2. Can you describe any innovative or tailored information services that have been developed by the library to address the unique needs of maize farmers and stakeholders in

Laikipia East Sub-County?

3. How do you perceive the variety of information services offered by Nanyuki public library in supporting maize production?

Section F: Information Dissemination Channels

1. How does the library utilize various channels to disseminate information related to maize production to the target audience effectively?

2. Are there any preferred or particularly effective information dissemination channels identified by library patrons or stakeholders involved in maize cultivation and agricultural development in the area?

3. How does the public library facilitate the dissemination of information on maize production to farmers through different channels like community boards and social media?

Appendix IV: Introduction Letter to NACOSTI

KENYA METHODIST UNIVERSITY
P. O. Box 267 Meru - 60200, Kenya
Tel: 254-064-30301/31229/30367/31171
Fax: 254-64-30162
Email: deanrd@kemu.ac.ke
DIRECTORATE OF POSTGRADUATE STUDIES

Our Ref: KeMU/NACOSTI/ISK/09/2024 June 24, 2024

Commission Secretary,
National Commission for Science, Technology and Innovations,
P.O. Box 30623-00100
NAIROBI.

Dear Sir/Madam,

RE: SUSAIDE WANGARI MAINA – (REG. NO. ISK-3-1846-1/2022)

This is to confirm that the above named person is a bona fide student of Kenya Methodist University, in the School of Science and Technology, Department of Information Science undertaking a Master's Degree in Information Science. She is conducting research on; **"Analysis of The Role of Public Libraries in Enhancing Maize Production in Laikipia East Sub-County, Laikipia County, Kenya".**

We confirm that her research proposal has been presented and approved by the University.

In this regard, we are requesting your office to issue a research license to enable her collect data.

Any assistance accorded to her will be appreciated.

Yours sincerely,

24 JUN 2024

Dr. John M. Muchiri (PhD)
Dean, Postgraduate Studies
Cc: Dean, SST

Appendix V: NACOSTI RESEARCH PERMIT

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Ref No: **235343**

Date of Issue: **11/July/2024**

RESEARCH LICENSE

This is to Certify that Ms., SUSAIDE WANGARI MAINA of Kenya Methodist University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Laikipia on the topic: ANALYSIS OF THE ROLE OF PUBLIC LIBRARIES IN ENHANCING MAIZE PRODUCTION IN LAIKIPIA EAST SUB-COUNTY, LAIKIPIA COUNTY, KENYA for the period ending :, 11/July/2025.

License No: **NACOSTI/P/24/37546**

235343

Applicant Identification Number

Director General
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