

**GENDER DISPARITIES IN SMALLHODER FARMERS' ACCESS TO
AGRICULTURAL PRODUCTIVE RESOURCES IN THE CASSAVA VALUE CHAIN
IN RONGO SUB COUNTY, MIGORI COUNTY, KENYA**

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DECLARATION AND RECOMMENDATION

Declaration

This research thesis is my original work and has not been presented for conferment of any degree in Egerton University or any other university.

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DEDICATION

This work is dedicated to my family and friends for their love, care and support.

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It is by God's Grace that I have come this far. All the Glory and Honour be unto Him.

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ABSTRACT

Agriculture is a crucial source of rural livelihoods in Kenya, and contributes significantly to the country's economy. Smallholder women are the main producers especially within households in rural areas. However, women as compared to men are challenged in accessing agricultural productive resources. To explore disparities in access to agricultural productive resources, this study was undertaken in Migori County's Rongo Sub County. A cross-sectional research design was used. 1,080 cassava farmers were targeted with an accessible population of 92 smallholder cassava farmers. Central, East, North and South Kamagambo Wards were purposively selected since cassava is grown in them. Stratified and simple random sampling techniques were employed to choose study respondents. Data was collected over a two-week period in the month of July 2019 from 46 men and 46 women smallholder cassava farmers using researcher-administered questionnaire. The tool was developed in line with the study objectives, and a rational analysis of the tool by experts who reviewed its readability and clarity. The pilot test was undertaken with 30 respondents in Awendo Sub-county's North Sakwa Ward. Reliability of the tools was determined at 0.805 Cronbach's alpha. Qualitative data analysis was done by using frequencies and Chi square tests with the of SPSS version 20 software. Demographic data was summarised in frequencies. Data on gender involvement in cassava value chain, access to land, market information, extension services and credit were subjected to Chi-square test at α level of 0.05. The results showed that women dominate cassava production, processing, marketing and consumption. Men had more access to land, market information, agricultural extension services and credit than women. More women than men faced poor price and post-harvest losses, while more men than women faced poor roads and distance to market. Both men and women had similar opportunities in regard to receiving extension services from government extension agents. However, more men than women received extension services from research agencies, institutions of learning, Non-governmental Organisations and Cooperatives. More men than women had bank accounts. Based on the findings of this study, it was concluded that for women to make meaningful contributions in cassava value chain it is imperative that more agricultural productive resources be provided to women smallholder farmers and their accessibility increased. For women to equally benefit in cassava value chain upgrading interventions there is an urgent need for the disparities identified to be addressed and for further studies to be undertaken.

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ABBREVIATIONS AND ACRONYMS

FAO	Food and Agriculture Organisation of the United Nations
GDP	Gross Domestic Product
IFAD	International Fund for Agriculture Development
MCIDP	Migori County Integrated Development Plan
MOALF	Ministry of Agriculture, Livestock and Fisheries
NACOSTI	National Commission on Science Technology and Innovation
R&D	Research and Development
SDGs	Sustainable Development Goals
SWOT	Strengths, Weaknesses, Opportunities and Threats
WFP	World Food Programme of the United Nations

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Agriculture remains the cornerstone of the Kenyan economy. Apart from being the leading single sources of foreign exchange earnings for the country, agricultural sector provides the bulk of the food eaten locally (Onyalo, 2019). Specifically, the sector forms the largest source of livelihood (food security, income and income needs) for over 80% of the Kenyans. It is also contributes to 25% of the Gross Domestic Product (GDP), and another 27% of GDP indirectly through linkages with other sectors (Eichsteller et al., 2021). The sector employs over 40% of overall population and more than 70% of Kenya's rural population, hence the significance of agricultural sector in the overall Kenyan economy cannot be underrated (Njuki et al., 2021).

Women play a significant role in agricultural productivity and account for 43% of agricultural labour force in the developing countries, and 42% to 65% of the agricultural labour for in Kenya (Onyalo, 2019) besides their traditional domestic role. Moreover, women contribute to 60% to 80% of food produced in most parts of the developing world and are accountable for most of the foods produced worldwide (Eichsteller et al., 2021). The crucial roles of women agriculture sector differ because it considerably varies within and among regions, and are increasingly shifting fast across the globe in view of social and economic forces that are transforming agriculture domain (Agada et al., 2018). It is strongly imperative to consider gender issues in the adoption of value chain approaches to development in agriculture (Mbabazi, 2020; Onyalo, 2019).

As in various developing countries, Kenya included, women comprise over 80% of the agricultural producers (Lagat & Maina, 2017). While Kenyan women produce over 70% of the food consumed, they still face severe disadvantages more than men in accessing productive resources including support services such as agricultural advisory and extension services, and markets, training, education, training, credit and land (Visser & Wangu, 2021; Eichsteller et al., 2021). Bridging the gender gap in agriculture, especially food value chains can yield significant benefits through increasing productivity, decreasing hunger and poverty and spurring sustainable rural development (Agada et al., 2018; Masamha, et al., 2017).

Granting the involvement of women in rural agricultural production is higher than men at the household level and they devote more time in farming related endeavours, their efforts have

remained unrecognised and undocumented at the national and international levels (Anderson et al., 2012; Detera et al., 2018). Despite the sector of agriculture progressively becoming more sophisticated with modern innovations and technologies, commercialised and globally incorporated, women have little access or almost do not have access to productive assets (Ankrah et al., 2020), and agricultural information given by agricultural extension agents and agencies (Forbang et al., 2019). For instance, majority of agricultural extension services and programmes providing assistance as well as training to smallholder farmers lean towards men since they are the heads of households (Williams & Taron, 2020). Land is critical assets for reducing poverty, enhancing food security as well as rural development because it provides a trajectory to earning a livelihood by producing and selling crop produce, and the of accessing credit (Lusasi & Mwaseba, 2020). But men and women never often enjoy the same rights land (Slavchevska et al., 2021). For instance, the gender disparity in terms of ownership of land is one of the wanting globally. 17% of men compared to less than 2% of women singularly own land (Otunba-Payne, 2020). The customary and legislative land inheritance provided in patrilineal system discriminate against women while men are more like to access and inherit land at the expense women (Anderson et al., 2021). Land inheritance laws by the 1978 Land Use Act of Kenya (LUAK), which was put in place to offer women and men equivalent chances to ancestral land inheritance, however, virtually, falls short in attaining this goal. The LUAK only applies to women who are legally married (Njuki et al., 2021). In addition, land ownership transference still remains largely under jurisdiction of primogeniture rule (customary law), which decrees that the land is transferred to the eldest son, or the eldest male relative of the dead if male child is non-existent thereby overlooking daughters or wives (Otunba-Payne, 2020). Land rights of Kenyan women is majorly tenable through the channel of their marriage or spouses, and they keep this access to land as long as they stay in their spouse's household (Adam et al., 2020). As a result of land rights disparity, inadequate access to productive resources by women, lack of adequate education and discriminatory sociocultural norms, Kenyan women are rendered vulnerable to food insecurity and poverty (Onyalo, 2019).

Consequently, several studies have reported positive association between increased agricultural productivity and access to credit among smallholder farmers (Ankrah et al., 2020; Linh et al., 2019; Akter et al., 2017). However, most of the smallholder farmers are not able to access credit and unable to significantly ameliorate their agricultural production, income as well as social welfare (Anderson et al., 2021; Detera et al., 2018). The improvement of non-farm and farm income and overall household income is promoted by better access to credit (Linh et al.,

2019). Financing of agriculture is a critical and essential gist of agricultural production, and an indispensable step in determining quality and amount of materials, inputs, labour and technology employed by farmers (Agada et al., 2018). Frugally, smallholder farmers are one of the feeblest groups in Kenya and are always imprisoned in a poverty vicious cycle. Their marginal tendency to utilise and save remains low, and access to working capital is important for smallholder farmers to bypass this poverty vicious cycle, increase agricultural operations and ameliorate livelihoods (Adegbite & Machethe, 2020; Mannah-Blankson, 2018). Men working in agriculture sector are always on even better terms than the women who do related tasks in agricultural production. Virtually, women always have less inadequate access to production resources, agricultural financial information services and have little influence over their earnings or livelihoods (Adegbite & Machethe, 2020; Ankrah et al., 2020). As a consequence, women who comprise over 70% of the smallholder farmers are passed over (). Because of these reasons, women in the rural areas face a list of challenges which negatively impact their part in agricultural production (Meagher et al., 2020; Detera et al., 2018).

The Government of Kenya has identified agriculture sector as among the critical drivers of Vision 2030 (Kidaso et al., 2021) and the 'Big Four Agenda' (Kidaso et al., 2021; Bor, 2019) new blue prints for Kenya's development and achieving the Sustainable Development Goals (SDGs). To date, different policy strategies and initiatives have been suggested to increase agricultural production and productivity (Danso-Abbeam et al., 2018). These strategies provide productive resources and agricultural extension services to farmers in order to help them optimise their limited ability available to enhance agricultural production and productivity in their respective countries (Ankrah et al., 2020). Productive resources aim at enhance capacity of smallholder farmers and offer them agricultural information and technologies to both women and men at their household level to reduce hunger and reduce poverty via sustainable growth in the agricultural production (Akter et al., 2017). Nevertheless, women farmers in the rural areas are form major contributors to agricultural production face various challenges and constraints in accessing agricultural productive resources. Therefore, the need address gender disparity in access to productive resources in the cassava value chain. Studies such as those by Quisimbing et al. (2021) have looked at market involvement without making an allowance for the gender disparity in access to agricultural productive resources in traditional agricultural food value chains. Little information is available concerning gender difference in access smallholder farmers' access to agricultural productive resources in traditional agricultural food value chains, especially cassava at household level which is the focus of this study. This present

research therefore was designed to assess gender disparities in access to agricultural productive resources by smallholder farmers in the cassava value chain in Rongo Sub County of Migori County.

1.2 Statement of the Problem

Women in Kenya form a majority of smallholder farmers offering most of the workforce and managing a large portion of the agricultural activities very day (World Bank, 2021). The problem is that despite women's key role in agricultural production, they face different challenges and constraints in accessing productive resources that provided by the government and private organisations. Yet, agricultural productive resources and advisory services play a crucial part in building capacity and disseminating agricultural information on advanced and modern technologies and research targeted at ameliorating agricultural production and productivity. Increased production and productivity is advantageous in encouraging household food security, alleviating poverty and increasing incomes (FAO, IFAD & WFP, 2021).

Conversely, women face many constraints in their pursuit to access agricultural productive resources. These challenges range from access to productive land, poor market and financial infrastructure, inadequate appropriate strategies for effective and efficient research and enough extension methods, and restricted involvement of female farmers in agricultural extension services among others. Restricted coverage of productive resources across agricultural value chains in rural areas and constraints accessing productive resources to farmers-specific contexts have also been stressed as critical issues in the provision of agricultural productive resources (Kangile et al., 2021). There is available literature on women's access to productive resources in overall, however, there is a lack of agreement on actual magnitude and effects of gender difference in access to agricultural productive resources in Migori County. Thus, this research study sought to understand the disparities smallholder farmers face in access in access to land, market, agricultural extension services in the cassava value chain in Rongo Sub County of Migori County.

1.3 Purpose of the Study

This study purposed to determine the gender disparities namely access to land, markets, agricultural extension services and credit by smallholder farmers in the cassava value chain in Rongo Sub County of Migori County and to understand how women and men benefit from cassava value chain processes.

1.4 Specific Objectives

- 1 To determine the gender disparity in access to land by smallholder farmers in the cassava value chain in Rongo Sub County.
- 2 To determine the gender disparity in access to markets by smallholder farmers in the cassava value chain in Rongo Sub County;
- 3 To determine the gender disparity in access to agricultural extension services by smallholder farmers in the cassava value chain in Rongo Sub County;
- 4 To determine the gender disparity in access to credit by smallholder farmers in the cassava value chain in Rongo Sub County.

1.5 Research Hypotheses

Ho1: There is no significant gender disparity in smallholder farmers' access to land.

Ho2: There is no significant gender disparity in smallholder farmers' access to markets.

Ho3: There is no significant gender disparity in smallholder farmers' access to agricultural extension services.

Ho4: There is no significant gender disparity in smallholder farmers' access to credit.

1.6 Significance of the Study

The findings of this study provide information which is vital and useful to cassava value chain actors in carrying out SWOT analysis before making decisions on helping smallholder farmers in access agricultural productive resources. The study helps in informing the restructuring of the access to agricultural productive resources by smallholder farmers to improve gender equality and inclusivity in the cassava value chain upgrading programmes. Donors, farmers and other chain actors are informed on disparity issues in the cassava value chain so as to come up with efficient policies that will ensure equal access to agricultural productive resources. Therefore this study is key in the process of achieving three of the seven Sustainable Development Goals (SDGs) which are; gender equality and empowerment, ending poverty in all its forms everywhere, and end hunger, achieve food security and improve nutrition and promote sustainable agriculture.

Providing agricultural extension services and other productive resources under study to farmers will help in poverty reduction of cassava farming households because they will be capable of making informed decisions on the levels of participation and cassava production, cassava

planting time, harvesting time, value addition and market channels. In the process, farmers will practise sustainable farming, increase food production which in turn will reduce hunger and increase food security in Migori County. Moreover, the findings of this study will contribute to the body of knowledge in future research and serve as a source of reference to stakeholders in the cassava sector.

1.7 Scope of the Study

The study focused on the influence of gender disparity on smallholder farmers' participation in the cassava value chain in the four wards of Rongo Sub-county, Migori County. The Sub-county was selected because it is among the leading sub-counties in cassava production in Migori County. Aspects that were investigated in this study were access to land, market, extension, and credit services.

1.8 Limitation of the Study

The limitations of the study were:

1. Language barrier because Rongo is a cosmopolitan Sub-county. Researcher involved a translator who translated English into local dialects where necessary.
2. The findings are limited to Rongo Sub-county and may not be easily generalised to other similar value chain upgrading interventions.

1.9 Assumptions of the Study

The study was guided by a number of assumptions. First, the respondents that were involved would be honest in providing the needed information. Second, all the respondents were aware of issues of gender disparity that affect them.

1.10 Operational Definition of Terms

Access: The ability to use a resource by taking advantage and opportunity (Anigbogu et al., 2018). In this study, it is the ability to use a productive resource by taking advantage and opportunity in the cassava value chain.

Credit: Defined as a type of financing meant for agricultural producers (Fischer et al., 2018). In this study, it refers to a type of financing used to fund men and women smallholder farmers for cassava production, processing, and marketing.

Disparities: The practice of treating a particular group of society less fairly than others because of their sex (Torre-Perez et al., 2022).

Extension Services: The application of the new knowledge and scientific research to farming practices through farmer education. The domain of ‘extension’ now comprises a broader range of learning activities and communication planned and organised for farmers by educators from various disciplines such as agriculture, business studies, health and agricultural marketing (Njuki et al., 2021). In this study, it is the application of new knowledge and scientific research to farming practices through farmer education by extension agents in study area.

Gender: Refers to the socially constructed status and roles of men and women, boys and girls. It is a set of culturally constructed characteristics which define the social behaviour of men and women, as well as the relationship between them. Gender status, relations and roles differ with locality (villages, regions, and countries), stages, groups and generations of the individual’s lifecycle. Thus, gender does not concern women, but the relationship between men and women (Adam et al., 2020). In this study, it refers to socially and culturally constructed characteristics defining status, relations and role of smallholder women and men farmers in the study area.

Land: Refers to the amount of land devoted to agriculture (Boone et al., 2019). In this study, it refers to the amount of land devoted to cassava production by men and women smallholder farmers.

Market: Refers place where producers buy agricultural inputs, sell products and use income for things such as non-agricultural products to purchase food needed for consumption (Kangile et al., 2021). In this study, it refers to a place where men and women farmers sell cassava products to buyers.

Parity: The fact of being equal in opportunities, rights and advantages.

Smallholder farmer: A farmer who usually cultivates less than 2.5 acres of land (Njuki et al., 2021). In the study, it refers to an average land size of less than 2.5 acres under cassava production that is owned by either smallholder male or female farmer.

Value Chain: Refers to all the activities performed to bring a product from its beginning to final use and disposal (Quisimbing et al., 2021). In this study, it refers to all the activities undertaken by smallholder farmers to bring cassava products from production to consumption and final disposal.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section presents literature on cassava value chain, gender and cassava value chain, gender and access to land, gender, and access to market, gender, and access to extension services, gender, and access to credit, theoretical framework, conceptual framework and knowledge gap.

2.2 Cassava Value Chain

Cassava is among the most vital food crops worldwide, with global production of about 298.8 million tonnes in 2020 and forecasted to reach a volume of 342.0 Million Tonnes by 2026 (Detera et al., 2018). According to FAOStat (2019) report, Africa contributes to approximately 64% (192 million MT) of the world's cassava production, with Nigeria taking the lead with a production of more than 59 million MT in 2019 followed by Democratic Republic of Congo (40%), Thailand (31%), Ghana (22.4%), Brazil (17.4%), Indonesia (14.5%), Cambodia (13.7%), Viet Nam (10%), Angola (9%) and United Republic of Tanzania (8%).

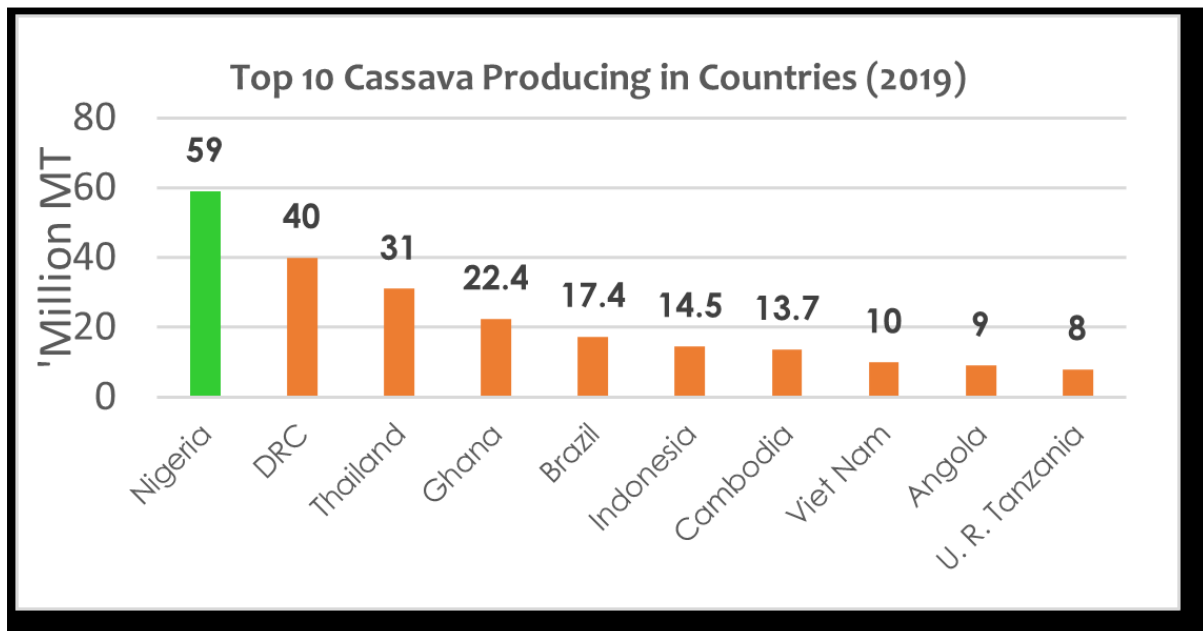


Figure 1: Top Ten Cassava Producing Countries Globally

Source: FAOStat, 2019

Global demand for cassava has been increasing significantly between 2013 and 2020 because of its attraction as food security crop for the rapidly increasing number of consumers in the expanding markets, and the rising demand for processed industrial cassava products (Agada et al., 2018). Cassava is a solid source of livelihood for over 300 million people. Nearly 90% of cassava produced in Africa is utilised as food, providing calories for approximately 500 million persons and constitutes about 37% of the population's dietary energy needs (FAO, 2021). Besides, cassava crop is perceived as a food security crop and raw material for different types of industrial products in many African countries. In certain countries, combined efforts are being implemented, sometimes robust political backing at the top levels to make cassava an instrument of economic growth (World Bank, 2021).

According to FAO (2021), cassava is a multiuse tuber crop that is used to produce industrially processed derivatives such as animal feed, sorbitol, high quality flour and ethanol, and traditional foods. It can also be source of domestically produced products to supplant for imported commodities to decrease food imports, to ameliorate foreign exchange balances and to make available domestic earning potential within African countries, including Kenya (Kidaso et al., 2021). Study of the World Bank (2021) on Root and Tuber Crops and FAO, IFAD and WFP (2021) on Global Cassava Development Strategy emphasised great potential of cassava to raise rural incomes, catapult rural industrial development, and contribute to food security. The FAO (2021) report also recognises cassava as a strong poverty fighter in Africa and endorsed a Pan-African Cassava Programme centred on transformation strategy which stressed better private sector participation, better markets, as well as better producer organisation for collective action. Nevertheless, to be a contributor to development, demand for cassava must increase rapidly (Detera et al., 2018). This can be feasible through initiating and promoting novel uses for cassava. Even with the extensive production of the crop in Africa, cassava's products have vast potential for utilisation in industrial processing (Onyalo). In the view of cassava's versatility and high content of starch, it can be converted into a myriad of useful derivatives (FAO, 2021). Cassava products can be majorly categorised into four derivative areas: high quality cassava flour (HQCF), cassava chips, ethanol and starch. Cassava products are already being utilised worldwide, demonstrating cassava's high potential for industrial use and value-addition (World Bank, 2021). Lessons can be borrowed from success stories of cassava value chain transformation in such countries as Vietnam, Thailand and Nigeria (FAOStat, 2019). In 2017, the Government of Kenya launched Food Security Pillar in its 'Big Four Agenda' which recommends cassava as an agribusiness-based and driven

development of agricultural value chain to achieve industrialisation, create employment and wealth, and sustain livelihoods (Bor, 2019). Based on the ambitious food production, Kenya could meet the Kenya's Vision 2030 and Sustainable Development Goal of having the number of hungry people (SDG 2 – zero hunger, and 1 – no poverty) in 2026 (World Bank, 2021). The developments of the cassava value chain has been targeted on the following Africa's top twenty cassava producing countries in the descending order of annual production: Nigeria, Democratic Republic of Congo, Angola, Ghana, Mozambique, Uganda, Malawi, United Republic of Tanzania, Cameroon, Sierra Leone, Benin, Madagascar, Rwanda, Cote d'Ivoire, Burundi, Congo, Guinea, Kenya, Zambia and Togo (Masamha et al., 2017).

Quisimbing et al. (2021) who referred to a value chain as, “a full range of activities essential to bring a product or service transient through the intermediary stage of production to distribution to consumers and last disposal after use”. Likewise, the value chain addition concept is an important constituent of the general strategy for addressing worldwide food security, post-harvest losses as well as market competition (Johnny et al., 2019). A visual illustrative value chain can be symbolised as follows:



Figure 2: The Core of an Agricultural Value Chain

Source: CGIAR, 2021

A value chain is a linked sequence of resources, organisations and knowledge streams geared toward value generation and conveyance to the consumer. It has various components that need a lot of resources, including time to be studied adequately (Kumari et al., 2021). Thus, studying, discussion and analysis of a value chain of a definite commodity in which time and requisite resources are constrained is demanding. This study focussed on the access to agricultural productive resources component of the chain which included smallholder men and women farmers and their respective differences in access to land, market, agricultural extension services in the cassava value chain.

Cassava value chain mapping is a functional tool of analysis used to demonstrate the functions of different actors along the value chain (Osuji et al., 2017). The cassava value chain map is done by identifying and plotting the existing actors and value chain nodes. Cassava value chain

mapping aims to identify roles and relationships between actors involved in the chain including positions and activities they perform, track down the flow of cassava products across the chain, identify opportunities and constraints within the value chain, identify resources and suggest necessary interventions (FAO, 2018). The following is a typical example of value chain map (Fig. 3).

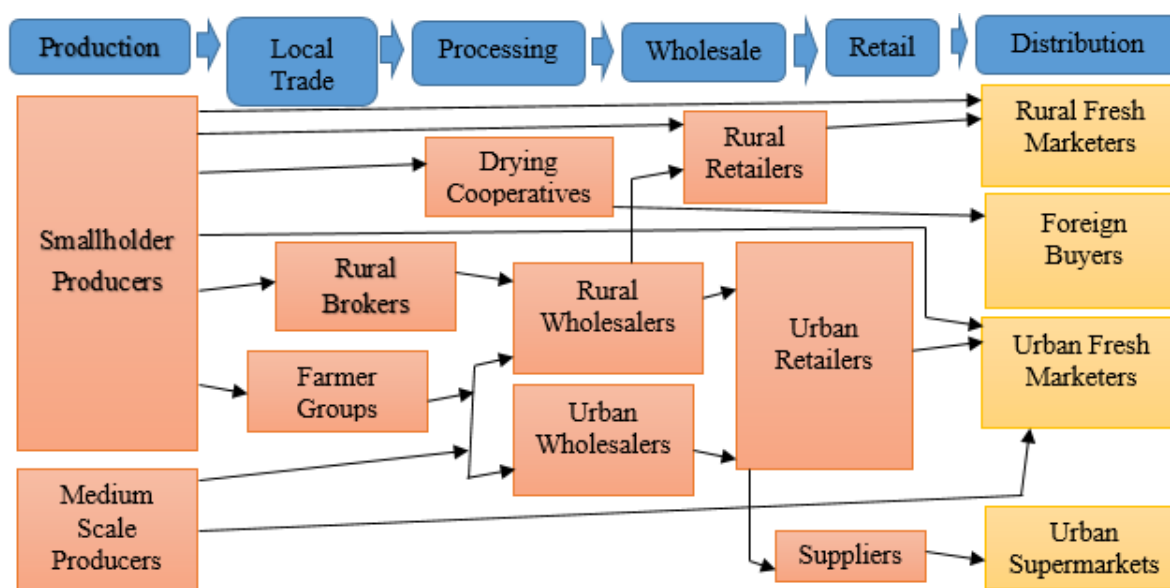


Figure 3: Cassava Value Chain Map

Source: Masamha et al, 2018

Given its importance, cassava value chain upgrading intervention have implemented cassava value chain development projects to improve cassava production and productivity and livelihoods in Rongo Sub-county. These interventions were aimed at empowering smallholder farmers to produce, process, utilise and market cassava products for socio-economic development. It also aimed to empower farmers at different cassava value chain nodes ranging from production, post-harvest handling, processing, utilisation and marketing through training, field days, demonstrations, exhibitions and market surveys (Masamha et al., 2018).

2.3 Gender and Cassava Value chain

In Africa, fruitful and efficient value chains bear a critical role in reducing poverty. Smallholder women farmers make the bedrock of Africa's cassava value chain including Kenya (Kidaso et al., 2021). Though men traditionally participate more in income-generating crop endeavours, which provide them with the upper hand of higher income (Otunba-Payne, 2020; Sell & Minot, 2018), the Kenya's cassava value chain is put up on the women's labour for both production

and value addition at farm level. Nevertheless, these female farmers are often left out in most of the financial benefits, hence receive fewer proceeds than male actors within the cassava value chain (Apata, 2019). Women are constrained by a myriad of biased government policies, as well as socio-cultural norms at the larger society, community and household levels (Liverpool-Tasie et al., 2020; Masamha et al., 2018). Eichsteller et al. (2021) and Onyalo (2019) pointed out that women account for about 80% of the agricultural workforce in the sub-Saharan Africa. Agricultural value chain upgrading programmes are being encouraged as a means of connecting smallholder women, men and youth farmers to market that aim to enhance productivity and effectiveness of actions and organisational connections which mobilise a service or product from beginning through a range of stages which involve production, processing, marketing and distribution to end consumers as well as finally via consumption and discarding (Jessica & Pricilla, 2021; Visser & Wangu, 2021; Fischer et al., 2020,).

Empirical studies by Ankrah et al., (2020) and Visser & Wangu (2021) indicated that the role played by women in agricultural value chain in Kenya cannot be undervalued. Both rural and national developments can rarely be attained with ignorance of this pivotal and considerable section of the society. In acknowledging the serious requirement to respond to the various opportunities and limitations offered by gender relations in Kenya, the government has prioritised women inclusion in attempt to revolutionise agricultural sector as well as devoted to removing the hindrances that impede women from wholly contributing to food and income security (Eichsteller et al., 2021; Anderson et al., 2021). Regardless of women farmers' contribution to national food security, they are often undervalued and passed over in the strategic development initiatives. Significant contribution of women farmers is increasingly being undervalued in conventional farming, economic policies and analyses, while contribution of men farmers remains the dominant, always the sole target of attention (Masamha et al., 2018). Failure to embrace gender inequalities holds a great cost to country attempt to achieve sustainable growth and an individual's wellbeing and thereby alleviate poverty. Overlooking gender issues could make technically successful projects negatively impact on women and men propagating economic and social stratification. Giving equal resources and education to women and men farmers can increase yields and incomes by 20% (Anderson et al., 2021). Finally, if women enjoyed the same level of capital investment in farm inputs and land as men, productivity could increase up to 15 percent in Zambia (Osuji et al., 2017).

Cassava is both crucial food crop and major source sources of financial income for households that produce it. As cash crop, cassava generates cash income for many households compared

to other food crops hence significantly reducing poverty (Kidaso et al., 2021; Agada et al., 2018). Women play a significant role in production, processing and marketing of cassava contributing to approximately 58% of the total agricultural labour in the world, 67% in Africa and 58% in Kenya (Detera et al., 2018). Virtually, they are nearly responsible for all activities such as hoeing, weeding, harvesting, processing, storing, transporting, marketing and domestic chores which offer them extra income-generation opportunities as well as enhances their capacity to contribute food security for their households (Masamha et al., 2017).

2.3.1 Gender and Access to Land

In African communities the presentation of gender disparity starts at the household where members of the family are born. The household acts as an enclave in which gender norms are first introduced and are later reflected and reflected in the broader society as traditional cultural practices and beliefs (Visser & Wangu, 2021; Akter et al., 2017). Consequently, persons born into households as well as the broader society grow to comprehend the dissimilar roles and responsibilities given to men and women as a normal way of things (Ankrah et al., 2020; FAO, 2019). Hence, the instantaneous household which manifests the society's micro unit, serves a substantial role in conveying gender-related prejudices, values and norms across generations. Consequently, this breeds the development of gender relations where it is believed that men are naturally entitled to more rights, opportunities and powers than women (Boone et al., 2019).

The outcome is a patriarchal society blended with gender disparity in the supremacy structure in which the final control over productive resources and means of generating wealth domiciles with men (Awuor et al., 2021; Boone et al., 2019; Masamha et al., 2018). Thus, gender disparity in that favours men compromises women's ability to own, have control over and unlimited access to managing productive resources such as land for economic empowerment and creating wealth (Akter et al., 2017). In Kenya, the feebleness position attached to women is not forced but it is both initiated and fostered by traditional customary practices, cultural norms and beliefs which view women as lesser than men. Regardless of laws keeping out gender disparities such as the provided in the Kenyan Constitution of 2010, the traditional cultural practices and beliefs still exist and have aggravated gender disparity (Anderson et al., 2021; Boone et al., 2019).

Apart from the sway of cultural practices and traditional belief, gender disparity is also promoted by statistical inequality and social identity vulnerability such that certain studies have indicated impact women's productive results (Lusasi & Mwaseba, 2020). Disparity not only

influence opportunity structures open to a disadvantaged social group such as Kenya women, and also that social status and meanings are attached to those social groups as their identities. Despite categorising persons and forming category-exact rules, disparity regimes also spend those groups with social meaning and craft a description to validate the discrimination. Consequently, the social identities generated affect behaviour that persist even if attempts are by policies and laws to offset their influence (Boone et al., 2019). The discriminatory regime in this study refers to traditional cultural practices and beliefs that bring up gender disparity in the life of woman from girl-child to womanhood (Ankrah et al., 2020).

Commercial farming generates income for many households compared to other staples. Though land is essential for agriculture, it is usually difficult to access, own and control by women than men because of legal and cultural restrictions (Kidaso et al., 2021). This menace is widespread as women hold title to about 2 per cent of land globally and are always denied the right to property inheritance while the rest is owned by men (Onyalo, 2019). Gender disparity in the cassava value chain will remain a threat if no action is taken to improve both the operating environment and socio-economic conditions of the smallholder farmers in terms of asset holding, credit availability and welfare. The men farmers tend to have more access to cassava farmland than women by approximately 0.85 hectares of farm size in Nigeria (Njuki et al., 2021). Various studies, Ankrah et al. (2020), Boone et al. (2019), Masamha et al. (2018) and Akter et al. (2017) have been carried out on gender disparity in access to land but none has touched on participation in the cassava value chain and so was the aim of this study to bridge this knowledge gap in the study area.

2.3.2 Gender and Access to Market

Building up a gender standpoint on value chains and markets helps in the development of an incorporated agricultural value chains from production, processing, marketing, delivery, and consumption (Qing, 2020; Masamha et al., 2018). Gender viewpoint encourages identifying the gaps and constraints vis-à-vis women's access to market. Market refers to place where producers purchase agricultural inputs, sell products and use income for things such as non-agricultural products to purchase food needed for consumption (World Bank, 2021). In this study, it refers to place where men and women farmers sell cassava to buyers. Rural women's access to agricultural markets helps reduce malnutrition, poverty and guarantee food security in rural households and communities (Wikacsono, 2022). FAO (2021) revealed that not only do women contribute to the agricultural workforce but also work as decision makers and

managers in the agricultural production. Smallholder women are at the stage of life where agricultural productivity can be capitalised on; excluding their potential is translates to wastage of crucial productive resource (Fischer et al., 2018). The female farmers desire they could ameliorate agricultural income earning and productivity so as to achieve better life (Onyalo, 2019). A study by (Detera et al., 2018) revealed that in the fishing community of Oriental Mindoro, fisher wives often have control over the fish and its products. Fisher wives accompany their husbands to aid cleaning the fishing gears and transporting fish though they are not virtually involved in fishing. They also assist in sorting the fish and preparing them for wholesaling. In addition they are responsible for fish marketing and vending. Fisher wives add to welfare and development of the country through engagement in undertakings in the coastal resource management, as well as teaching their children care, awareness and concern for the environment (Detera, et al., 2019).

As revealed by Gachuri et al. (2022) and Muriithi and Kabubo-Mariara (2021), the capacity of women's achievement in high value farming relies on their capacity to participate effectively in marketing in various ways and at different degrees. In sub-Saharan Africa, women in marketing traditional crops such as cassava, maize, leafy vegetables and sorghum, primarily in the local markets with no intention for export markets (Fischer et al., 2018). The purpose of this study was to document gender differences in smallholder cassava farmers' access to markets in the study area.

2.3.3 Gender and Access to Extension Services

Agricultural extension is aimed at increasing both farm productivity and improving farmers' welfare through education on new farming technologies and the promotion of innovative environments (FAO, 2018). In general, the designing, and crafting as well as implementation of the agricultural extension services have been intended to target the male household head as the intended clientele, and have failed to acknowledge that women are also active and engaged economic key players with their personal financial challenges and needs (Kiptot & Franzel, 2021; Williams & Taron, 2020). Even though a plethora of in-depth studies from South Asia, Latin America and Africa show that rural women are predisposed to disadvantages in accessing agricultural extension services than men of the same socio-economic circumstances, millions of them are accountable for food security and agricultural production globally (Witinok-Huber et al., 2021). Hence, the tendency of women's minimal contact with agricultural extension services compared to men, and in general, use lower levels of technological knowhow as a

result of challenges of access and cultural limitations on use or lesser enthusiasm about carrying out research on women's livestock and crops (Ankrah et al., 2020). Extension services, therefore, should be made equally accessible for both men women smallholder farmers in agricultural value chains (Kiptot & Franzel, 2021).

Such partiality in providing services and assets in good will of men has cultural and institutional ground work (Danso-Abbeam et al., 2018). A lot has been on paper regarding past let-downs of government agricultural extension services to target and reach female farmers as well as their cultural prejudice that has thwarted women's active involvement in agricultural extension meetings, group training, and most significantly, accessing inputs such as credit and fertiliser in most parts of the world (FAO, 2021; Danso-Abbeam et al., 2018). Similarly, agencies for providing agricultural extension services in most cases have been mainly dominated by male figure – that is, only 25% of agricultural extension service providers were women (Forbang et al., 2019). In the last few decade, only 13% of agricultural extension agents were women in the developing countries, and the figure was only 7% in Africa (Kiptot & Franzel, 2021). Surprisingly, majority of agricultural extension agents were male in rural areas where women form majority of agricultural producers (Visser & Wangu, 2021). These male agricultural extension agents usually seem to focus their services to men farmers and/or female household heads, exclusive of female members in these households (Akter et al., 2017).

Recently, researchers, state governments and global development agencies have acknowledged the key part played by women in agricultural development (Masamha et al., 2018). While the inputs of men and women farmers were significant and necessary for agricultural advancement, the gender-labour differential in agricultural activities has plagued women's admittance to agricultural extension services (Lagat & Maina, 2017). This is the why efforts to attaining agricultural development goals have waned since extension services often target men farmers in the developing world (Masamha et al., 2018).

Ineffective extension services is a substantial issue in Kenya's agriculture sector. The reason is extension services are proven one of the most crucial instrumental means to access agrarian households in the rural areas (Torvikey, 2021; Masamha et al., 2018). The role of men and women in rural agricultural upgrading initiatives through agricultural extension service should similarly be both complementary and competitive. Additionally, initiatives that fail to pay attention to gender inclusivity in their activities, normally exacerbate the existing disparities between women and men (Forbang et al., 2019). Williams and Taron (2020) observed that

agricultural extension initiatives which overlook roles of women in agriculture water down agricultural production and equivalent let-down in attaining agricultural development objectives.

Previously, the important farming role of women in agriculture did not matter to be recognised in government data and decision-making process (Lagat & Maina, 2017). This scenario has gradually changed of the past couple of decades and a lot has been attained in acknowledging the significance of women's role in the agricultural sector in most developing countries including Kenya. So far, no study has been carried out in the study area on gender difference in smallholder farmers' access to agricultural extension services in the cassava value chain for improved income.

2.3.4 Gender and Access to Credit

Women's access to agricultural services including credit services helps them sustainably manage their socio-economic and environmental problems in farming (Shibata et al., 2020; Fischer et al., 2018). Among the constraints faced by women include the transaction cost of credit, property rights and poverty. Though men face these challenges, those faced by women in the rural agricultural communities are acuter. Microfinance programmes are focused on women so as to improve their access to credit in Ghana. Among these are Microfinance and Small Loans Centre (MASLOC) and Rural Banks. The amount is small and repayment conditions are unsuitable especially where women access to credit, making them reject financial arrangements. (Torvikey, 2021; Shibata et al., 2020; Mannah-Blankson, 2018; Agada et al., 2017).

Poor access to credit services exclude women from procuring the required inputs for farming purposes. Therefore, Fischer et al. (2018) observed that women have access to only one per cent of credit in agriculture. Where appropriate tools for women are available, most of them are neither aware of such tools nor have enough money to buy them. Therefore, they progressively use the old manual methods that lower their work speed and productivity (Akrah et al., 2020; Akter et al., 2017).

Increasing realisation of the significant role of agriculture and gender empowerment is important for efficient achievement of sustainable development. Women access less than 1 per cent of the credit services for smallholder farmers and only one per cent of the gross credit is directed to the agricultural sector in Malawi, Zimbabwe, Kenya and Zambia (Fischer et al.,

2018; FAO, 2018). A study on gender influence on participation in the cassava value chain in smallholder farming sectors in Kigoma, Tanzania by Masamha et al. (2018) found no significant relationship in access to credit and holding a bank account among men and women involved in the cassava value chain. This is because both women and men get it hectic to access credit since many financial institutions assume that crop production is of high risk hence reluctant to give credit for agricultural production. Anderson et al. (2021) revealed that only 3.7 per cent and 2.4 per cent of respective women and men headed household had access to credit and only 7.9 per cent of the male household heads had bank accounts, a suggestion that households taking part in cassava value chain did not save the income generated from cassava sales. This implies that smallholder farmers live on a hand-to-mouth lifestyle, yet some may know the advantages of saving income in the bank. Various studies have been carried out on gender difference in access to credit services but none has touched on participation in the cassava value chain, therefore, the study aimed to close this knowledge gap in the study area.

The financial inclusion gender gap (FIGG) is defined as ‘the proportion unequal access to and utilisation of wide spectrum of financial services (Adegbite & Machete, 2020). In Nigeria for instance, the FIGG (see Figure.1); in smallholder farming has been steadily progressive in past years, increasing from 7% in 2011 to 24% in 2017 and continues to rise (Mbah, 2020). There is higher

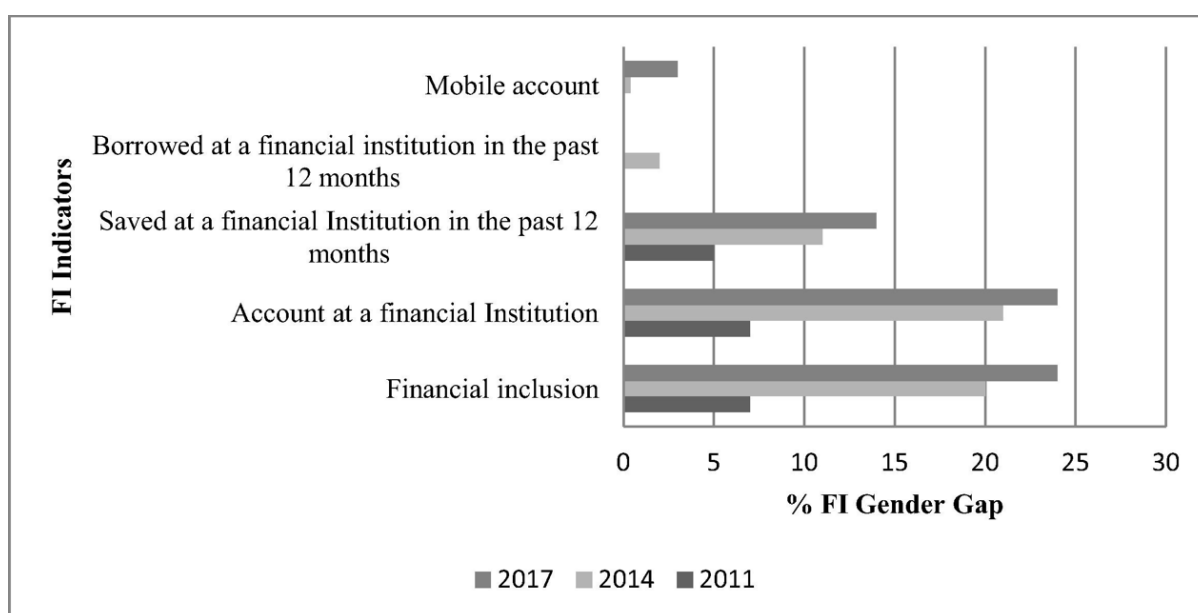


Figure 4: Trend in Financial Inclusion Gender Gap (FIGG) in Nigeria

Source: Adegbite and Machete, 2020)

Likelihood of excluding women from the formal financial domain and as a consequence, settle on the informal financial sector hence in general, have poorer financial terms than men. As a result, this can retain them within the poverty cycle (Adegbite & Machete, 2020). This study by (Ankrah et al., 2020) indicates that ownership of account ownership at financial institutions enables the access to formal financial services. On the same, owning mobile account helps straight access to financial services via digital financial inclusion. Women trail back in the access and use of digital and formal financial products and advantages of owning savings account. In all these indicators about financial inclusion, women smallholder farmers are underprivileged and do not have enough access (Detera et al., 2018).

2.3.5 Knowledge Gap

From different studies such as Ankrah et al. (2020) and Masamha et al. (2018) revealed that men have more access to land, lucrative markets, extension services and credit services than smallholder women cassava farmers. Thus, women's access to these resources is restricted by custom and policy implementation. Studies that have been carried out in the study areas such as Gikunda et al. (2013) have only looked at the effects of integrated cassava value chain intervention on socio-economic development of smallholder farmers, however, gender disparity in participation smallholder farmers in the cassava value chain has not been considered. Therefore, the purpose of this study was to determine gender disparities in smallholder farmers' access to agricultural productive resources in the cassava value chain in Rongo Sub-county.

2.4 Theoretical Framework

For this study, a Feminist Political Ecology Theoretical perspective was used. According to Resurreccion (2017), Political Ecology establishes a vital feature in human environment that strives to fundamentally comprehend multifaceted relationships between natural built surroundings and humans. This is disaggregated into a mixture of access to and control over productive resources and their crucial consequences for sustainable livelihoods. To political economy, Rocheleau (2016) report added a gendered lens in creating the Feminist Political Ecology concept. Their conception think through gender as significant aspect in investigating into access and control of productive resources. It provides an all-inclusive view by examining a gender and its intersection with race, culture, class and ethnicity.

Feminist Political Ecology (FPE) was backed by Resurreccion (2017) and Rocheleau (2016) as a valuable framework which permits exploring intra-household decision-making and relationships, as well as gendered politics surrounding sharing out of resources. Moreover, (Slavchevska, Doss, Campos & Brunelli, 2021) indicated that political ecologists thought through the term “access” to embrace gendered politics of control and allocation of productive resources with households. Their model elucidated what they termed “access” via social identity which provided differential power (Akter et al., 2017). They clarified that differential power apprehended by persons is essentially defined access to, control over as well as mediation of the access of others. Access and control involves strategies which limit and control. This could be influenced by power differential attributable to gender (Ankrah et al., 2020).

This study focuses on access to agricultural productive resources within farming households. The FPE theoretical framework claims that women and men have differential rights to productive resources via their distinctive family ranked structures and gender roles (Resurreccion (2017). Advancing taking motivation from the feminist post-structural viewpoint, FPE gives emphasis to the household concept to be a composite unit rather than a lone cooperative non-sophisticated unit involved in both production and consumption (Rocheleau, 2016). This standpoint thinks through a household as more nuanced compared to the old unitary one. The FPE theory treats women as a non-homogenous group having varied interests in terms of access to as well as control over productive resources. Akinola (2018) showed that FPE puts a lot of stress on existing differential access to agricultural productive resources from a viewpoint of more intersection that recognises disparity between women and men within households. The intersectional approach gives a more in-depth analysis that transcends examining gender as a binary option (Resurreccion, 2017).

The FPE permits researchers to particularly understand the gendered politics related to access to productive resources. Therefore, this study applied this theory to close the longstanding gap by considering gender as binary choice in most gender addresses. Inspired by (Akinola, 2018; Rocheleau, 2016), this study determined the gender politics related to agricultural productive resources access via a FPE lens in a study. This study intended to determine how access to land, market, agricultural extension services and credit is gendered with smallholder farmers in the cassava value chain in Rongo Sub County

2.5 Conceptual Framework

The framework showed the relationship across the independent, dependent and intervening variables related to gender disparities in smallholder farmers' access to agricultural productive resources in the cassava value chain in Rongo Sub County. Independent variables of this study were the access to agricultural productive resources, including land, market, agricultural extension services and credit that is perceived to affect the likelihood of smallholder farmers' involvement in the cassava value chain development initiatives in Migori County's Rongo Sub County. Particularly, access to land-related factor included; frequency of access; market-related factors included frequency of access to market information, control over income and major challenges in cassava marketing; access to extension services included; frequency of access, and sources of agricultural extension services. Access to credit included; frequency of access and ownership of bank account.

The dependent variable of this study was smallholder farmers' involvement in the cassava value chain. This was measured by looking at the engagement of smallholder men and women farmers in different nodes of the cassava value chain which included; production, processing, marketing and consumption. The strength of the relationship between the independent and dependent variables was regulated by the moderating variables, which include marital status and off-farm activities. Moderator variables were tested using frequencies in socioeconomic characteristics of the respondents. Marital status and off-farm activities influences farmer's decision-making access and ownership of productive resources as well as involvement in cassava value chain initiatives in the study area. This is summarised in figure 5.

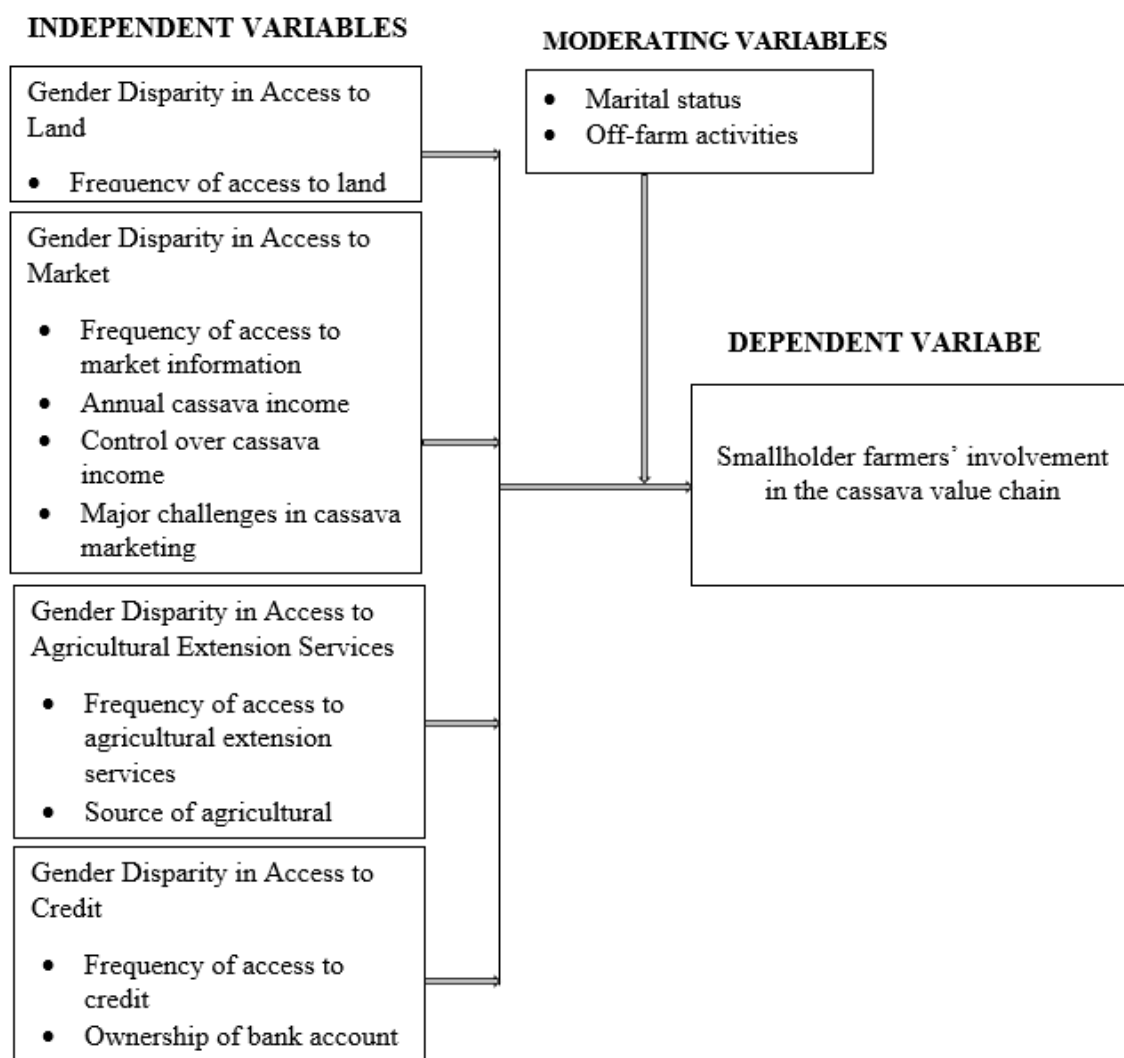


Figure 5: Conceptual Framework: Gender Disparities in Smallholder Farmers' Access to Agricultural Productive Resources in the Cassava Value Chain in Rongo Sub County, Migori County, Kenya.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents methods that were used in the sampling and development of tools that were used in collecting and analysing data from smallholder cassava farmers of Rongo Sub County, Migori County. It begins with the research design and study area, after which it explains the sampling techniques and the sample size from which the data was collected. This chapter also describes the data collection methods and further explains the tool which was used for data collection. The analytical framework and the model for data analysis are also presented in this chapter.

3.2 Research Design

This study employed a correlational research design which enabled researcher to investigate relationships between variables without controlling or manipulating any of them. Correlational research is ideal for collecting data quickly from natural settings and generalising findings to real-life situations in an external valid way (Lillykutty & Samson, 2018; Watres, 2017). The study used a cross-sectional research design. The cross-sectional research design enabled the researcher to collect data at one point in time while saving time during data collection process. The research design was also suitable as it never allowed manipulation of variables (Kothari, 2007). The researcher was able to select participants for this study, collected data at one point at a time, analysed data, then measured relationships among variables, and made inferences of the likelihood of relationship. The researcher then generalised the results to the population from which the sample came.

3.3 Study Area

The survey was conducted in Rongo Sub County of Migori County, Kenya over a two-week period in July 2019. It involved 92 cassava farmers, who benefited from the interventions, spread within four administrative wards namely Central Kamagambo, East Kamagambo, North Kamagambo and South Kamagambo. The study was conducted in these four wards of Rongo Sub County of Migori County, Kenya. The Sub County covers an area of 208.40 Km². The region was purposefully selected since it is one of the largest cassava producing sub-counties in Migori and also has potential for the expansion of cassava production. Economic activities

in Rongo Sub County is mainly crop production with some livestock keeping activities and off-farm business ventures which generate household income. The major cash crops grown Sub-county are sugarcane, groundnuts, and cassava. Other crops are beans, bananas, sorghum, millet, and vegetables. About 90 percent of the sub-county's population is engaged in smallholder agriculture. Cassava farming activities in the Sub-county is done by both men and women, (MCIDP, 2018). Inasmuch as smallholder farmers practise cassava production, they do not fully participate in all the stages of the cassava value chain, hence low returns coupled with low livelihoods. The researcher involved 92 smallholder cassava farmers who benefitted from the cassava value chain upgrading interventions, spread across four administrative wards of Rongo Sub-county namely.

3.4 Population of the Study

The current population of Rongo Sub-county is 124, 587 (Kenya Population and Housing Census, 2019). The target population was 1,080 smallholder cassava farmers in Rongo Sub-county as estimated by the Sub-county Ministry of Agriculture, Livestock and Fisheries (MoALF), and the accessible population was 120 registered non-group smallholder cassava farmers (MoALF, 2018) in the Sub-county.

Table 1: Registered Smallholder Cassava Farmers by Ward

Rongo Sub-county	Registered Smallholder Farmers by Ward
Wards	
Central Kamagambo	26
East Kamagambo	28
North Kamagambo	30
South Kamagambo	34
Total	120

3.5 Sampling Procedure and sample size

Rongo Sub-county was purposively selected for the study because it is one of the top cassava producing sub counties in Migori County and has high potential for expansion. The researcher used proportionate stratified random sampling procedure to determine farmers expected to have relatively similar characteristics to be involved in the study across four administrative wards. These similar characteristics included; growing cassava, land use, access to extension services, same location, and access to market and credit loans among others. A stratified sample refers

to one resulting from the classification of population into mutually exclusive groups, called strata, and choosing a simple random sample from each stratum. The main objective is for improved efficiency for sampling (Waters, 2017). Using Yamane formula, researcher compiled a list of 92 farmer's names and gender identity with that was divided into two homogenous subgroups known as strata, namely female and male. The sample size of each stratum was equal to the subgroup proportions which was 46 women and 46 men. A probabilistic simple random sampling was then used to choose respondents from each of the two homogenous subgroups in each ward. Data collection was then collected on level of farmer engagement in the cassava value chain nodes, access to land, access to market, access to agricultural extension services and access to credit. The analysis was conducted. Yamane (1967) mathematical formula was applied to calculate the sample for this study.

$$n = \frac{N}{1 + N(e)^2}$$

Where N is the total population size, e is the error or confidence level. A confidence level of 95% was used to ensure a more accurate result from the sample. The error term was equal to 0.05 based on this. Using the total population of 120 and error margin of 0.05, the sample size was calculated as follows:

$$n = \frac{120}{1+120(0.05)^2} = 92$$

The calculated sample size from 120 cassava farmers based on the formula was 92.

Table 2: Sample Distribution across the four wards of Rongo Sub County

Wards	Registered Smallholder Farmers by Ward	Sample Distribution by Ward	Strata Sample Size	
			Women	Men
Central Kamagambo	26	20	10	10
East Kamagambo	28	22	11	11
North Kamagambo	30	24	12	12
South Kamagambo	34	26	13	13
Total	120	92	46	46

3.6 Instrumentation

Primary data was collected using a farmer questionnaire with closed-ended and open-ended items that were personally administered to the respondents by the researcher. The questionnaire was based on the four objectives of this study. The questionnaire was suitable for the study according to Mugenda & Mugenda (2003) who observed that questionnaire is commonly used to get important information regarding a population. Open-ended items were coded according to the themes which arose. The instrument had six sections; A, B, C, D, E, and F. Section A of the questionnaire collected data on socio-economic characteristics of farmers. Gender, age, education level, household size, cassava farm size, experience in cassava farming, and membership of social organisation. Farmers' age was polytomous, gender of respondent was treated as dichotomous (male=1 and female=0), while, education level, household size, and experience in cassava farming were polytomous. Cassava farm size and membership to social organisation were dichotomous.

Section B collected data on participation in cassava value chain nodes with Likert items rated as Never=1, rarely=2, occasionally=3, and often=4. Section C collected data on access to land measured in a Likert scale; 1=Never, 2=Rarely, 3=Occasionally, and 4=Often. Section D collected data on access to market information. Control over income from cassava was treated as dichotomous (Yes=1 and No=2), while challenges were treated as polytomous. Section E collected data on access to agricultural extension services which was measured in terms of frequency of access and treated as Likert item and measured in terms of Never=1, Rarely=2, Occasionally=3 and Often=4, while sources of agricultural extension services was treated as polytomous. Section F collected data on access to credit loan which was treated as frequency of access in Likert items scaled as Never=1, Rarely=2, Occasionally=3 and Often=4, while ownership of bank account was dichotomous (Yes=1 and No=2).

3.6.1 Validity of the Instrument

To guarantee content validity of the research instruments, the tool was developed in line with the study objectives. The instrument was also given to the experts in the Department of Applied Community Development Studies (ACDS) and Department of Crops, Horticulture, and Soils (CHS) for review and advice and the researcher made corrections as advised. The experts checked whether the instrument would generate valid data that would truly represent the phenomenon under study through a rational analysis to review its readability, clarity, and comprehensiveness and agreed on final items to include. According to Mugenda & Mugenda

(2007) face validity is where researchers applies a superficial and subjective assessment of whether or not the tool measures what it intends to measure, while content validity refers to the extent to which the items on a tool are fairly representative of the whole domain the test seeks to measure. The tool instrument was also subjected to content and face validity scrutiny to determine whether the data collected would realistically and fully reflect the indicators or content of concepts relevant to the study.

3.6.2 Reliability

The reliability of the questionnaire was determined through pilot testing and analysis of the results. A pilot study was conducted with a view to collecting data from a smaller proportion of the population size prior to investing resources in actual study (Thompson, 2016). A pilot test is beneficial since it helps in discarding unclear or problematic questions or adjusting items in the tool. The pilot test for this study was carried out on 30 respondents in the North Sakwa Ward of Awendo Sub County, Migori County. This was informed by Lillykutty and Samson (2018) who recommended a range of 10 – 30 respondents as being satisfactory to participate in a pilot study. The farmers included in the pilot test were representative of the target population but did not form part of the sample population for the actual study. Awendo County's North Sakwa Sub County was selected because of common farmer characteristics such as cassava farming, same communities, women and men are involved in the cassava value chain programmes and implementation of cassava value chain programmes takes place in both sub counties.

According to Lillykutty and Samson (2018) and Thompson (2016), internal consistency, or reliability, is the measure of the extent to which a research instrument tool produces stable, reliable and consistent results after repeated trials. In this study, Cronbach's alpha coefficient was used to measure reliability which is a measure that determines the internal consistency of a scale. It was therefore fitting in determining the reliability of a Likert-type items which make up a scale. When using Cronbach's alpha, the closer the alpha is to 1, the more dependable the research tool. If a Cronbach's alpha indicates a value of 0.7, then it would be said the research tool is reliable (Wellington, 2000). Cronbach's alpha was specially subjected to all Likert items in section B of the research instruments, frequency of access to land, frequency of access to market, frequency of access to agricultural extension services and frequency of access to credit.

The Alpha Cronbach's Test Output

Table 2: Reliability Test Output

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	No. of Items
.805	.925	8

Conclusion – the research tool was considered reliable given that its normal coefficient was above the .7 threshold.

3.7 Data Collection Procedure

The researcher sought an introductory letter from Egerton University Graduate School to facilitate the acquisition of a research permit from the National Commission for Science Technology and Innovation (NACOSTI). After obtaining the permit, the researcher presented it to Rongo Sub County Education Officer (SCEO) seeking permission to undertake the research. The SCEO then introduced researcher to the Sub County Agriculture Officer (SCAO) who attached four Agriculture Extension Officers to the researcher. The agriculture extension officers of Rongo Sub-county assisted in identifying the selected respondents. Questionnaires were then taken to the participants in their homes. The researcher introduced himself and the purpose of the research and sought participants' consent to participate in the research. The respondents were assured of the confidentiality of their information and identification. They were also informed that the information given was purely for academic purposes and participation in the study was voluntary. The questionnaire was researcher-administered.

3.8 Ethical Issues

This study was guided by a number of ethical considerations. These included;

- i. The researcher sought the respondent's consent prior to the interview.
- ii. Participation of respondents was purely voluntary and there was neither payment nor coercion of respondents.
- iii. Participants were free to withdraw from participation in case they felt to. Respondents' identities were kept secret and their responses were recorded and used for the purposes of this study and were not disclosed.

- iv. Respondents were assured of these considerations before the researcher got information from them.

3.9 Data Analysis

Data analysis for this study was done using descriptive and inferential statistics using Statistical Package for Social Sciences (SPSS) version 25. Specifically, frequencies was used to summarise the socio-economic variables of the sample. The Chi-Square Test Model and bar graphs was used to analyse data on access to land, market, extension services, and credit. The Chi-Square Test of independence was used to determine whether there was as a significant relationship between the nominal (categorical) variables under study. The frequency of each category for one nominal variable was compared across the categories of the second nominal variable. The model was used to test the hypotheses of this study at α significance level of 0.05.

$$\text{Chi Square Test } \chi^2 = \sum (O_i - E_i)^2 / E_i$$

Where O_i is the observed frequency of the variables, E_i is the expected frequency of the variables, (χ^2) is the chi-square statistic and n is the number of observations. Table 3 summarises data analysis for this study.

Table 3: Summary of Data Analysis

Research Hypotheses	Independent Variable	Dependent Variable	Statistic Test
<i>H₀₁</i>: There is no significant gender disparity in farmers' access to land	Gender disparity in access to land • Access to land	Smallholder Farmers Engagement in the Cassava Value Chain	Chi-square Frequency
<i>H₀₂</i>: There is no significant gender disparity in smallholder farmers' access to market	Gender disparity in access to market • Frequency of access to market information • Annual cassava income • Control over income • Major challenges in cassava marketing	Smallholder Farmers Engagement in the Cassava Value Chain	Chi-square Frequency
<i>H₀₃</i>: There is no significant gender disparity in smallholder farmers' access to agricultural extension services.	Gender disparity in access to extension services: • Access to agricultural extension services • Source of agricultural extension service	Smallholder Farmers Engagement in the Cassava Value Chain	Chi-square Frequency
<i>H₀₄</i>: There is no significant gender disparity in smallholder farmers' access to credit.	Gender disparity in access to credit • Access to credit • Ownership of bank account	Smallholder Farmers Engagement in the Cassava Value Chain	Chi-square Frequency

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents a summary of the results and discussions of analysed data. The results are presented based on the objectives of the study which aimed at finding out how gender disparity influences smallholder farmers' participation in the cassava value chain in Rongo Sub-county in Migori County, Kenya. The findings were organised under the following categories, socioeconomic characteristics, gender relations in participation in the cassava value chain, gender relations in access to land, gender relations in access to markets, gender relations in access to extension services, and gender relations in access to credit loan. The data were analysed with the aid of the Statistical Package for Social Sciences (SPSS) version 25. The data analysed is presented using tables.

4.2 Questionnaire Response Rate

All the 92 questionnaires issued were returned, therefore a return rate of 100%. Data collection process was carried out by a researcher who directly administered questionnaires to the respondents. The response rate was arrived at by taking the number of response returned (92) and divide it by the number of questionnaires sent out (92), and multiply by 100. Data collection was carried out by the researcher who directly administered the questionnaires to the respondents. The response rate was shown in Table 5.

Table 4: Questionnaire Response Rate

Administered	Returned	Percent (%)
92	92	100

n=92

4.3 Demographic Information

Demographic data was collected in relation to age, education, household size, cassava farm size, experience and membership to social organisations. These results are presented in the following sub-sections.

4.3.1 Age (years)

Table 5: Age of Respondents

Age (Years)	Male		Female	
	Frequency	Percentage	Frequency	Percentage
17 – 30	7	15.2	18	39.1
31 – 45	26	56.5	15	32.6
46 – 59	5	10.9	7	15.2
>59	8	17.4	6	13.0
Total	46	100.0	46	100.0

Results in Table 5 reveal that 15.2% and 39.1% of the male and female farmers, respectively were within the age bracket of 17 – 30 years, while 56.5% and 32.6% of the male and female respondents fell within the age bracket of 31 – 45 years, respective. Similarly, 10.9% and 15.2% of male and female respondents, respective fell within the age bracket of 46 – 59 years. In addition, 17.4% of the male and 13.0% of the female farmers were more than 59 years old. The average age for the respondents was about 24 years and 38 years female and male farmers, respectively. This implies that women in the cassava value chain were younger than their male counterparts. Also, it implies that the population was composed of young farmers whose agility and strength are significant in production, processing, marketing and utilisation of cassava. The finding of this study disagrees with Agada et al. (2018) who opined that the average age for the respondents was about 46 years and 37 years for men and women, respectively in the cassava value chain in Nigeria. The results of this study is supported by finding of Bor (2019) who indicated the average age of farmers in Kenya is 34 years.

4.3.2 Education

Table 6: Educational Level of Respondents

Level of Education	Male		Female	
	Frequency	Percentage	Frequency	Percentage

None	1	2.2	9	19.6
Primary	28	60.9	27	58.7
Secondary	9	19.6	7	15.2
Tertiary	3	6.5	2	4.3
University	5	10.9	1	2.2
Total	46	100.0	46	100.0

The result in Table 6 show that majority of the male (60.9%) and the female (58.7%) farmers had attained an appreciable level of primary education while 19.6% of men and 15.2% of women had attained and appreciable secondary level of education. Moreover, 6.5% of males and 4.3% of females had tertiary education, whereas 10.9% of male respondents compared to only 2.2% of their female counterparts had attained university level of education. However, while 19.6% of female farmers had no formal education, only 2.2% of males had no formal education. This implies that this population can efficiently learn and provide communication platform for technology and innovation transference about better ways of cassava production, processing, marketing and utilisation. The results of this study divulge that a higher proportion of the respondents had achieved an appreciable level of formal education, hence farmers can effectively adopt technologies and innovations in the study area (Onyalo, 2019).

4.3.3 Household Size

Table 7: Respondents' Household Size

Household Size	Male		Female	
	Frequency	Percentage	Frequency	Percentage
1 – 4	6	13.0	5	10.9
5 – 8	28	60.9	38	82.6
>8	12	26.1	3	6.5
Total	46	100.0	46	100.0

In Table 7, the study findings revealed that 60.9% of the male and 82.6% of the female farmers had household size ranging between 5 and 8 persons, whereas 13.0% of the male and 10.9% of the female respondents had a household size ranging between 1 and 4 people. Further, while 26.1% of the males had a household size of more than 8 persons, only 6.5% of the females fell with this category. This reveals that women had larger household size than males. The finding of this study agrees to the overall practice of communal lifestyle common in the study area. This can be a sign of available family labour for production, processing, marketing and utilisation of cassava for both women and men with in view of the fact that labour is the main factor of agriculture production (Onyalo, 2019; Masamha et al., 2018). The results of this study is corroborated by the study of Otekunrin and Sawicka (2019) who reported that 50% of men and 60% of women involve in the cassava value chain had a household size between 6 and 10 people with an average household size of 8 people and 6 people for male and female respondents, respectively.

4.3.4 Cassava Farm Size (Ha)

Table 8: Cassava Farm Size of Respondents

Farm Size	Male		Female	
	Frequency	Percentage	Frequency	Percentage
</=2.5	28	60.9	38	82.6
>2.5	18	39.1	8	17.4
Total	46	100.0	46	100.0

In Table 8, the findings revealed that majority of the respondents (women = 82.6% and men = 60.9%) had farm sizes amounting 2.5 hectares and below. While 39.1% of males had farm sizes amounting more than 2.5 hectares, only 17.4% of females fell within this category. The finding of this study implies that most of the respondents were smallholder female and male cassava farmers and this could have a negative impact on their productivity. Further, it revealed that there was difference between female and male respondents with regard to the land area under cassava farming. The finding of this study is contradicts the study of Agada et al. (2018) who reported that majority of the smallholder farmers (male = 60% and female = 56.7%) had farm sizes ranging 2 – 2.99 hectares with a mean farm size of 1.8 hectares for both smallholder female and male farmers in the cassava value chain in Nigeria.

4.3.5 Experience in Cassava Farming

Table 9: Respondents' Experience in Cassava Farming

Experience (Years)	Male		Female	
	Frequency	Percentage	Frequency	Percentage
<2	10	21.7	9	19.6
3 – 5	13	28.3	15	32.6
6 – 10	3	6.5	9	19.6
>10	20	43.5	13	28.3
Total	46	100.0	46	100.0

The results in Table 9 shows that, 43.5% of the male and 28.3% of the female respondents had farming experience of less than 2 years, whereas 28.3% of the male and 32.6% of the female respondents had cultivated cassava for 3 to 5 years. In addition, 21.7% of the male and 19.6% of the female respondents had produced cassava for only 2 years and below, while 6.5% of the male and 19.6% of the female respondents had spent a period of ranging between 6 – 10 years in cultivating cassava. Overall, majority of the respondents in the study area were adequately experienced in cassava farming since they had more than 10 years in the production of cassava. Eichsteller et al. (2021) and Lagat & Maina (2017) observed that about 45% of the smallholder cassava farmers had farming experience of over 10 years. Given age bracket of farmers as 31 – 45 years and 17 – 30 years for male and female respondents, respectively, it infers that the respondents began growing cassava early in life. Therefore, it may be assumed they are experienced in cassava production. Hence, this experience becomes important in guaranteeing sustainable cassava productivity and production. Besides, efficient use of agricultural productive resources by smallholder farmers can be enhanced by long years of production (Torvikey, 2021; Ankrah et al., 2020).

4.3.6 Membership of Social Organisations

Table 10: Respondents' Membership to Social Organisations

Membership	Male		Female	
	Frequency	Percentage	Frequency	Percentage
Yes	24	52.2	33	71.7
No	22	47.8	13	28.3
Total	46	100.0	46	100.0

The finding in Table 10 revealed that 71.7% of the female and 52.2% of the male respondents belonged to one organisation or another while 47.8% and 28.3% of the female respondents were not members of any organisation. This implies that majority of the smallholder men and women farmers in the cassava value chain were members of social associations where they come together for reciprocated benefits. Farmer groups become indispensable institutions for empowerment, relieving poverty, as well as the development of smallholder farmers and rural poor households and communities. The percentage of women in social groups was higher than men's despite both gender belonging to such social associations. This is anticipated as women are increasingly forming social groups and having free time than men that could be spent in attending group meetings. The finding of this study contradicts Mgbakor and Nwamba (2020) who observed that 71.1% of the men and 56.7% of the women cassava farmers were affiliated to one social organisation or another while 28.3% of the men and 43.3% of the women did not belong to any organisation.

4.4 Level of Gender Involvement in the Cassava Value Chain

It is perceived that the level of participation depends on the benefits accruing from a particular chain node and gender roles and responsibilities. The study sought to know the respondents' level of participation in various cassava value chain nodes, namely production, processing, marketing, and consumption.

4.4.1 Level of Gender Involvement in Production of Cassava

The involvement of men and women farmers in cassava production are presented in Table 11.

Table 11: Respondents' Involvement in Cassava Production

Cassava Production	Gender (%)		df	Chi – square	p - value
	Male	Female			
Often	32.6	84.8	3	27.618	.000
Occasionally	19.6	8.7			
Rarely	32.6	2.2			
Never	15.2	4.3			
N(92)	100.0	100.0			

The finding of this study in Table 11 showed that 84.8% of women often took part in cassava production activities compared to 32.6% of men who took part in the same activities. The results also revealed that while 19.6% of men occasionally performed activities in cassava production, only 8.7% of women performed the same activities. In addition, while 32.6% of men rarely participated in cassava production, only 2.2% of women rarely took part in the same. Furthermore, the results of the study showed that 15.2% of men and 4.3% of women rarely participated in cassava production operations. Overall, female farmers were the majority of respondents engaged in the cassava production node, $\chi^2 (3, N = 92) = 27.618, p < .001$. This implies that both smallholder men and women farmers were engaged in the cassava production activities. Nonetheless, the female respondents recorded higher involvement in the cassava farming operations compared to the men. Women dominated the production of cassava tubers due to increased demand for income and food. Mgbakor and Nwamba (2020) observed that more than 50% of cassava production processes are performed by women. Ejike et al. (2018) reported that cassava production is dominated by women, hence considered 'women's crop'. Lagat and Maina (2017) also indicated that number of women participating the cassava production by women doubled men's. Further, the findings of this study agreed with Ejechi (2015); Adeoye and Ugala (2017) who indicated that women dominate cassava production in the Nigeria's cassava value chain. Therefore, more women than men are involved in the

cassava value chain in Rongo Sub County. The findings contrast earlier report by Agada et al. (2018) that men often dominate cassava production activities such as weeding, planting and harvesting. This has implication for research and extension agents to reach out to both women and men in the cassava value chain in the study area with suitable technologies and information.

4.4.2 Level of Gender Involvement in Processing of Cassava

The responses of men and women to participation in cassava processing were subjected to Chi-square test and the results presented in Table 12.

Table 12: Respondents' Involvement in Cassava Processing

Cassava Processing	Gender (%)		df	Chi - square	p - value
	Male	Female			
Often	17.4	89.1	3	49.164	.000
Occasionally	17.4	6.5			
Rarely	15.2	2.2			
Never	50.0	2.2			
N(92)	100.0	100.0			

The result on participation of smallholder male and female farmers in cassava processing in the study locale showed that all 89.1% of women often took part in cassava processing activities compared to only 17.4% of men who performed similar activities. In addition, 6.5% of women and 17.4% of men occasionally performed cassava processing activities, while 2.2% of women and 15.2% of men rarely took part in cassava processing operations. Though only 2.2% of women never participated in cassava processing activities, the majority (50.0%) of men never engaged in cassava processing node. More women compared to men were involved in cassava processing, $\chi^2 (3, N = 92) = 49.164, p < .000$. The results imply that both female and male respondents participated in cassava processing in the study area. Nevertheless, the involvement of women in cassava processing node was higher than that of men. This was anticipated because crop processing is among the major preoccupations of women in Kenya. The finding of this study agrees with the results of Williams and Taron (2020) who opined that smallholder cassava processing is the main field of women. Yet, the more cassava processing node becomes

more lucrative, the men are increasingly participating. Some researchers have shown that the tendency of men running processing equipment and managing such enterprises as processing became progressively mechanised as well as commercialised (Adam et al., 2020). The finding of this study implies that agricultural value chain upgrading interventions and extension service providers need to equally provide appropriate training and information on advanced cassava processing to both smallholder women and men cassava farmers in the study area. Moreover, agricultural extension agents should inspire both men and women to organize themselves in groups for easy access support service such as credit which would facilitate them in acquiring equipment for processing quality cassava products to meet market demands (Mgbakor and Nwamba, 2020; Lagat & Maina, 2017).

4.4.3 Level of Gender Involvement in the Marketing of Cassava

The respondents were asked to indicate how often they involved in the marketing of cassava and the results were presented in Table 13.

Table 13: Respondents' Involvement in Cassava Marketing

Cassava Marketing	Gender (%)		df	Chi-square	p- value
	Male	Female			
Often	15.2	93.5	3	57.738	.000
Occasionally	4.3	2.2			
Rarely	13.0	0.0			
Never	67.4	4.3			
N(92)	100.0	100.0			

The finding of this study on involvement of female and male smallholder farmers in cassava marketing showed that nearly all female farmers (93.5%) often participated cassava marketing operations compared to only 15.2% of their fellow male farmers in the study area. Only 2.2% of women and 4.3% of men occasionally took part in cassava marketing. Also, while 13.0% of men rarely participated in cassava marketing, none of women (0.0%) rarely took part in similar cassava processing activities. Moreover, the majority (67.4%) of men never took part in

cassava marketing compared to only 4.3% of their female counterparts. Generally, involvement of women in selling cassava was higher than that of men, $\chi^2 (3, N = 92) = 57.738, p = .001$. The implication of the finding of this study is that despite both smallholder women and male farmers engaged in the marketing of cassava produce and products, more women than men were more involved in the marketing of cassava produce and its products. Agada et al. (2018) and Tufan et al. (2021) support this finding by reporting that women play a leading role in marketing of crops including cassava. In most scenarios, women often purchase farm produce and products from other farmers and their male spouses and sell this for profit. Mostly, they purchase cassava tubers in the soil, harvest, process and market (Torvikey, 2021; Masamha et al., 2018). Hence, female farmers would require access to markets within their reach where they can efficiently sell their cassava produce and products and foil perishing that will decrease their food security and income (Kidaso et al., 2021).

4.4.4 Level of Gender Involvement in Cassava Consumption

The responses of women and men based on their utilisation of cassava in was subjected to Chi-square and the result was summarized in Table 14.

Table 14: Respondents' Involvement in Cassava Consumption

Cassava Consumption	Gender (%)		df	Chi-square	p- value
	Male	Female			
Often	82.6	100.0	3	8.762	.033
Occasionally	8.7	0.0			
Rarely	2.2	0.0			
Never	6.5	0.0			
N(92)	100.0	100.0			

In Table 14, 100.0% of women and 82.6% of men often used cassava for food, 8.7% of men occasionally used cassava, 2.2% of men rarely used cassava and 6.5% of men never used cassava for food in their households. Overall, all women in the study area used cassava for food in their households, $\chi^2 (3, N = 92) = 8.762, p = .033$. Subsistence crops such as cassava

are often considered women's crops with the standard explanation that women are responsible for feeding their family and thus prefer to grow crop for the household (Makcit et al., 2021). Mahama et al. (2021) and Olaosebikan et al. (2019) revealed that all women eat cassava products for breakfast or lunch, while some reported that they eat it twice per day. Generally, from the analysis above, the positive impacts of women involvement in cassava production, processing, marketing and utilisation has emerged where the majority of women than men were involved in the process. Therefore, the results imply that the fight against hunger can be achieved through women involvement in cassava value chain processes as they are responsible for meeting family food and nutrition requirements. Thus, the husbands should give more support to their wives (Torvikey, 2021; Ao et al., 2019).

4.5 Access to Agricultural Productive Resources

Access to agricultural productive resources for cassava value chain activities was analysed and presented under access to land, market, agricultural extension services and credit. The analysis and results allowed a clearer understanding of the differences and similarities that exist between men and women concerning access to productive resources for cassava value chain activities.

4.5.1 Gender and Access to Land

Table 15: Access to Land by Gender

Access to Land	Gender (%)		df	Chi-square	p- value
	Male	Female			
Often	60.9	19.6	3	34.761	.000
Occasionally	32.6	15.2			
Rarely	2.2	19.6			
Never	4.3	45.7			
N(92)	100.0	100.0			

As shown in Table 15, the study found out that 60.9% of men and 19.6% of women often had access to land, 32.6% of men and 15.2% of women occasionally, 2.2% of women and 19.6% of women, and had access to land, 4.3% of men and 45.7% of women never had access to land for cassava production in Rongo Sub County. Both gender have access to land with men dominating in the study area. The study showed that men (60.9%) have more access to land than women (19.6%). The Chi Square analysis showed a significant relationship between gender and access to land, χ^2 (3, N = 92), 34.761, $p = .000$. That is, access to land was reliant on gender in favour of men cassava farmers. The null hypothesis is rejected. Therefore, the exists gender disparity in access to land for cultivation in the cassava value chain in Rongo Sub County. Akinola (2018) indicated that the male land inheritance regime denies women opportunity to inherit land since these land rights could be transferred their families in the event of a husband's death or when the female gets married in a different family. Torvikey (2021) and Boone et al. (2019) also confirms that when it comes to accessing land, men are given priority over women in such patrilineal settings. Moreover, Ankrah, Freeman & Afful (2020) opined that land is majorly accessed by male members of the family due to the cultural practices and customary laws that cause subordination of women in economic, social and political life. About 28% of Kenyan women jointly own land with men mainly through the marriage process. In conjunction with gender equality, cultural norms still remain the basic influence on daily life, though Kenya has adopted many conventions and passed gender positive constitution (Ao

et al., 2019; Onyalo, 2019). Therefore, there is a need for land reforms to favour women in access to land.

4.5.2 Gender and Access to Market Information

The responses of men and women to market access were subjected to Chi-square test and the results were presented in Table 16.

Table 16: Access to Market Information by Gender

Access to Market Information	Gender (%)		df	Chi-square	<i>p</i> - value
	Male	Female			
Often	56.5	28.3	3	13.533	.004
Occasionally	23.9	19.6			
Rarely	8.7	8.7			
Never	10.9	43.5			
N (92)	100.0	100.0			

The results of the study show that 56.5% of men cassava farmers often had access to market information compared to only 28.3% of their female counterparts. Besides, 23.9% and 19.6% of men and women cassava farmers, respectively occasionally accessed market information in the study area. While equal percentage of men and women cassava farmers who rarely accessed market information was equal (8.7%), 10.9% and 43.5% of these farmers never had access to market information on cassava produce and products in the study. The Chi Square analysis showed a significant relationship between gender and access to land, χ^2 (1, N = 92), 8.425, p = .004. The null hypothesis is therefore rejected. Therefore, there exists gender disparity access to market information in the cassava value chain in Rongo Sub County. Overall, more men than women farmers had access market information on cassava produce and products. This implies that majority of women farmers have tendency to sell their farm produces at the nearby markets or farm gate where produce is sold at poor prices because of lack of information on lucrative markets. Thus, women cassava farmers generate less profits from cassava sales. According to Ampaire et al. (2020), rural women are often constrained when in terms of

accessing to timely market information, face challenges in negotiating prices with buyers and have difficulties accessing markets due to limited transport opportunities and restrictions on their mobility. (Fischer et al. (2020); Meinzen-Dick et al., 2019) opined that men are said to have more dominance on access to markets than women. Excluding women is said to be inadvertent, but due to rules and regulations which inadvertently ignore women because of lack of proper gender analysis of agricultural value chains. Issues to do with the lack of appropriate transport infrastructure, location of markets and involving middlemen to broker deals for women serves as a constraint for women's market accessibility on equal measure with men. The lack of access to market information by women, compounded by inadequate appropriate technology, poor access to farm inputs and land further exacerbate the women's inability to access markets.

4.5.2 Gender and Income from Cassava

The results of income from cassava were presented in Table 17.

Table 17: Distribution of Respondents in Cassava Income by Gender

Annual Cassava Income (KES)	Male		Female	
	Frequency	Percentage	Frequency	Percentage
<= 50,000	25	54.3	33	71.7
50,000 – 100,000	19	41.3	11	23.9
>100,000	2	4.3	2	4.3
Total	46	100	46	100

The finding of this study indicated that 71.7% of female and 54.3% of male farmers generated less or equal KES 50,000 annual income from cassava sales. Moreover, 23.9% of female and 41.3% of male farmers earned between KES 50,000 and 100,000 from annual cassava sales. However, the percentage of male and female farmers who earned more than KES 100,000 from sold cassava in one year was equal (4.3%). The results of this study imply that the annual income from cassava for men was higher than for women. It indicated that the percentage of women and men who earned more than KES 50,000 was equal (4.3%). The involvement of men increases as in an agricultural enterprise becomes more commercialised. This infers that

both female and male farmers in the study locale were smallholder farmers. Given such income, the nonstop involvement of the farmers in the cassava value chain might be discouraging to the farmers. The finding of this study is corroborated by Fischer et al. (2020) and Lecoutere (2017) who reported low income from sold farm produce and products might intimidate progressive engagement of men and women in the cassava value chain.

4.5.3 Control over Annual Cassava Income

The results of farmers on control over income from cassava were presented in Table 18.

Table 18: Control of Income from Cassava by Gender of Respondent

Control Over Cassava Income	Male		Female	
	Frequency	Percentage	Frequency	Percentage
Yes	26	56.5	41	89.1
No	20	43.5	5	10.9
Total	46	100	46	100

The results of this study indicated that 89.1% of female respondents has control over revenue from cassava produce and product sales compared to 56.5% of their male counterparts. Yet, only 10.9% of the female respondents compare to 43.5% of their male counterparts had control over income from sold cassava produce and products in the study area. The finding of this study contrasts Fischer et al. (2018) which revealed that 47.9% of men compared to only 21.9% of women had control over had control over income from the crop produce sales (Ao et al., 2019).

4.6.4 Major Challenges in Cassava Marketing

The responses of men and women to major challenges in cassava marketing were summarised in Table 19.

Table 19: Major Challenges in Marketing by Gender

Major Challenges	Male		Female	
	Frequency	Percentage	Frequency	Percentage
Poor roads	13	28.3	1	2.2
Distance to market	6	13.0	2	4.3
Poor price	9	19.6	27	58.7
Post-harvest losses	18	39.1	16	34.8
Total	46	100	46	100

Majority of women (58.7%) compared to only men (19.6%) reported poor prices. Majority of men (39.1%) compared to women (34.8%) reported postharvest losses. Men (28.3%) compared to women (2.2%) reported poor roads. Men (13.0%) and women (4.3%) reported long distance to market. Ampaire et al. (2020) indicated that challenges such as impassible rural roads, distance to market, low prices, and postharvest losses are some of the major constraints faced by men and women in the agricultural value chains. While there exists a range of improved post-harvest technologies, both the smallholder male and female farmers face constraints to adoption and use. Specifically, women face constraints such as technology design as well as access to it in terms of credit, land and credit (Sell & Minot, 2018). Restricted access to information for enlightening about and procure improved technologies is another challenged faced by women (Ho et al., 2019; Sell & Minot, 2018). In addition, women are constrained by intra-household constraints which deter them from engaging in decision-making to adopt new improved technologies within household (Ankrah et al., 2020). To effect impact in decreasing post-harvest losses, agricultural value initiatives should concentrate on gender dimensions of post-harvest technologies, as well as addressing gendered deterrence (Agada et al., 2018). Transport infrastructure is vital in reducing women isolation from markets by increasing access. Lower transportation costs and less time spent on roads facilitates women to care of

other responsibilities such as attending to their families (Otekunrin & Sawicka, 2019). Good and passable roads not only reduce transportation costs, but also facilitates investors to access farmers, especially women in the rural areas. This has potential to enable women to have access to institutions that empower them since they will be efficiently accessible (Apata, 2019; Otekunrin & Sawicka, 2019; Sell & Minot, 2018). Shibata et al. (2020) indicated that distance to markets is capable to cause monopolistic and uncompetitive markets that are harmful to women's financial freedom. According to Adam et al. (2020), accessing markets is more challenging for women than men, especially when markets are located far away from rural areas and involves travelling as their mobility is cultural checked by men and household tasks. Household tasks can be a constraint as women have the potential to could be taken advantage of by men to control women's mobility unless women have better bargaining powers within the household (Agada et al., 2018).

4.6 Gender and Access to Agricultural Extension Services

Agricultural Extension Services are meant to help farmers adopt improved farming practices resulting in amelioration in their output and successive wellbeing.

Table 20: Access to Agricultural Extension Services by Gender

Agricultural Extension Services	Gender (%)		df	Chi-square	p - value
	Male	Female			
Often	43.5	23.9	3	13.817	.003
Occasionally	28.3	10.9			
Rarely	15.2	23.9			
Never	13.0	41.3			
N(92)	100.0	100.0			

Results in Table 20 show that more men (43.5%) than women (23.9%) often had access to agricultural extension services. 28.3% of men and 10.9% of women occasionally accessed agricultural extension services, while 15.2% of men and 23.9% of women rarely accessed agricultural extension services. However, more women (41.3%) than men (13.0%) never had access to agricultural extension services in the study area. The Chi Square Analysis showed a

significant relationship between and smallholder farmers' access to agricultural extension services, $\chi^2 (1, N = 92) = 13.817, p = .003$. The null hypothesis is therefore rejected. Therefore, there is gender disparity in access to agricultural extension services in the cassava value chain in Rongo Sub County. Generally, it has been recognized that agricultural extension services are less available to women than men and the well-resourced farmers. This is because there are more men conducting delivery of agricultural extension services than women in most parts of the developing world, including Kenya (Makcit et al., 2021). Despite the observation that agricultural extension services disfavoured women more than men (Williams & Taron, 2020; Forban et al., 2019). According to Tufan et al. (2021) and Danso-Abbeam et al. (2018), in Kenya, women farmers in female-led households have less contact with agricultural extension officers, while women farmers in male-led households have equal contact. Conversely, Eichsteller et al. (2021) observed that agricultural extension agents have tendency to approach female farmers less often than men due to general misunderstanding that women are not farmers and that a trickle-down effect would take place from male household heads. Consequently, Shibata et al. (2020) that men are more likely to access agricultural extension services than women to have access to or be visited by extension service providers. Witinok-Huber et al. (2021) indicated that low number of women accessing extension services may because of their productive and reproductive roles within the household. The timing of extension service sessions usually occurs in the morning hours when majority of women are still engaged in their domestic chores, hence low attendance by women in extension service meetings (Tufan et al., 2021). This is a clear indicator of lacking gender responsive policies that address gender-related issues in cassava value chain development projects.

4.6.1 Source of Agricultural Extension Service

Table 21: Source of Agricultural Extension Services by Gender

Source of Agricultural Extension Services	Male		Female	
	Frequency	Percentage	Frequency	Percentage
Government Extension Agents	2	4.3	2	4.3
Research Institutions i.e. KALRO	3	6.5	2	4.3
Universities/Colleges	2	4.3	1	2.2
NGO/Cooperatives	9	19.6	10	21.7
Fellow Farmers	18	39.1	12	26.1
None	12	26.1	19	41.3
Total	46	100.0	46	100.0

In Table 21, the percentage of the male and female respondents who received agricultural extension services from the government extension agents was equal (4.3%), while 6.5% of the male and 2.2% of the female respondents received such services from the research institutions such as KALRO. extension services. Furthermore, 4.3% of the male and 2.2% of the female respondents received agricultural extension services from universities and colleges, whereas 19.6% of the male and 21.7% of the female farmers received agricultural extension services from NGO and private extension agents. Majority of the smallholder farmers (males = 39.1% and females = 26.1%) received agricultural extension services from their fellow farmers in the study area. On the other hand, an appreciable proportion of the male (26.1%) and the female (41.3%) respondents reported that they never received extension services from and source in the study area. This implies that the government and research institution extension agents are performing dismally in dissemination of agricultural extension services to farmers in the study area. Also, it implies that cooperatives and non-governmental organisations form the major extension service providers in the study area. In addition, most farmers still source agricultural extension services from their fellow farmers, and majority of women have nowhere to source such services. Mbabazi (2020) indicated that 15% of men and 24% of women successfully

managed to access agricultural extension services from either a cooperative or a local based development organisation, while 9% of men and women managed to access these services from government extension agents. Ankrah et al. (2020) noted that some section of farmers never found agricultural extension services valuable. They preferred fellow farmers as they alleged that peer-to-peer extension worked better due to easy access, and therefore unreceptive to extension services (Kwapong et al., 2020).

4.7 Gender and Access to Credit

One of the fundamental productive assets essential for any meaningful agricultural production is access to credit by smallholder farmers.

Table 22: Access to Credit by Gender

Access to Credit	Gender (%)		df	Chi-square	p - value
	Male	Female			
Often	45.7	23.9	3	11.525	.009
Occasionally	15.2	6.5			
Rarely	13.0	8.7			
Never	26.1	60.9			
N (92)	100.0	100.0			

From Table 22, men (45.7%) often had more access to credit than women (23.9%), while 15.2% of men and 6.5% of women occasionally, 13.0% of men and 8.7% of women rarely accessed credit. However, the majority (60.9%) never had access to credit compared to on 26.1% of their male counterparts. Despite the fact that there is access credit in the study area, less than 50% of respondents in each category had access to it signifying that credit access miserably inadequate. Result of the Chi Square analysis indicated that there was significant difference between gender and access to credit by smallholder cassava farmers, $\chi^2 (3, N = 92) = 11.525$, $p = .009$. The null hypothesis is rejected. Therefore, there exists gender disparity in the cassava value chain in Rongo Sub County. Research on access to credit by women and men gave mixed outputs. Supporting this finding, Linh et al. (2019), revealed that credit markets are not gender

neutral. Globally, 36% of women working agriculture are said to have less access to financing than men. Some women are unable to access credit because of cultural or legal constraints in their countries, and if women do afford to access credit, they are often smaller than the credit accessed by men for similar reasons (Basiglio, De Vincentiis & Isaia, 2022; Adegbite & Machethe, 2020). For instance, out of thousands of farmers who got credit in Rwanda in the year 2020, only a quarter of these farmers were women despite the fact that 80% of Rwandese farmers are women compare to 55% of Rwandese men. Regrettably, this is the truth about women farmers in many parts of the world (Mannah-Blankson, 2018). Another barrier is women farmers are often unbanked and lack collateral. According to Adegbite & Machethe, (2020), 72% of men versus 65% of women have bank accounts. A banking account is the initial step towards financial services, hence without one, accessing credit becomes difficult. Inadequate financing accounts has negative effects on smallholder women farmers and their capability to have access to financial services (Andres, Gimeno & Cabo, 2020). Another constraint women face when trying to access credit is a lack of collateral. A bank will always ask for collateral prior to granting credit when one attempts to apply for credit (Perrin & Weill, 2022). Land is a common form of collateral in agricultural sector. Nevertheless, there is a significant gender disparity in agricultural land ownership (Perrin & Weill, 2022; Seema, Seyyed & Shehzad, 2021). If a woman lack control of or ownership of land she farms, Women will never offer land as collateral for credit if they lack control or ownership on it. If these women are likely to have nothing else to offer up in form of collateral, there is a likelihood that they will not access credit (Singh & Dash, 2021).

4.7.1 Ownership of Bank Account

Table 23: Ownership of Bank Account by Gender

Bank Account	Male		Female	
	Frequency	Percentage	Frequency	Percentage
Yes	31	67.4	21	45.7
No	15	32.6	25	54.3
Total	46	100.0	46	100.0

As shown in Table 23, 67.4% of the male and 45.7% of the female respondents reported that they own a bank account, whereas 54.3% of the female respondents never had a bank account

compared to only 32.6% of their male counterparts. The results of this study clearly shows that there still exists gender disparity in account ownership in Rongo Sub County. Surprisingly, the figures show that the gap becomes wider, with men having greater access to formal financial accounts than women. A study by Mbah (2020) revealed a clear gender disparity in account ownership in West Africa. More men are financially included than women. Nigeria is leading in disparity (24%), while Ghana, Guinea and Sierra Leon having the least gender disparity (8%) each. Therefore, gender disparity exists in bank account ownership among smallholder farmers in the cassava value chain in Rongo Sub County.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Research Findings

This chapter highlights summary of findings, conclusions and recommendations made on the findings in line with the objectives of this study which are meant to ensure gender equality in access to agricultural productive resources among smallholder farmers in the cassava value chain in Migori County's Rongo Sub County. Demographic information showed that majority of the female respondents fell within the age bracket of 31 – 45 years, while majority of the male respondents fell within the age bracket of 31 – 45 years. Being within this age bracket suggests that the respondents are still in the productive age and their agility and strength is significant in cassava value chain. Consequently, most respondents had a considerable level of primary education, hence the respondents can easily learn and give an efficient communication platform for the transferral of technologies and innovations regarding how better cassava can be produced, processed and marketed. Additionally, most of the female and male respondents had household sizes ranging between 5 and 8 persons signify availability of family labour for cassava value chain activities for both men and women farmers. Majority of the female and male respondents had farm sizes amounting 2.5 hectares and below implying that most of the respondents were smallholder farmers and this may impact negatively on cassava productivity. Most of the female respondents produced cassava for 3 to 5 years, while majority of the male respondents had cultivated cassava for over 10 years in cassava farming signifying that the male respondents were more experienced in cassava production than their female counterparts. This experience is vital in ensuring cassava productivity and production. Finally, most of the female and male respondents belonged to one social organisation or another implying that they were members of social associations where they come together to obtain mutual benefits. The percentage of women in social groups was higher than men's despite both gender belonging to such social associations.

On the level of gender involvement in the cassava value chain nodes, majority of women often were involved in cassava production activities compared to men who took part in the same activities. Women dominated the production of cassava tubers due to increased demand for income and food. In addition, the proportion of women who often participated in the cassava processing activities was higher than that of men who performed similar activities. This

signifies processing of cassava as one the main preoccupations of women in Migori County's Rongo Sub County. In the cassava marketing node, nearly all female farmers often participated with fewer male farmers getting involved. All the female respondents reported that they often used cassava for food in their households compared of men because women are responsible. Therefore, the fight against hunger can be achieved through involving women in the cassava value chain processes since they are responsible for meeting household food and nutrition requirements.

According to objective one, more men had more access to land than women, implying that access to land was gendered in favour of male farmer. The relationship between gender and access to land was statistically significant. That is, access to land was reliant on gender in favour of men cassava farmers. The null hypothesis is rejected. On the second objective, more men than women often accessed market information on cassava sales. Relationship between gender and access to market information was statistically significant. The null hypothesis was rejected. More smallholder male than female farmers often had access market information on cassava. This implies that majority of women farmers tend to sell their farm produces at nearby markets or farm gate where produce is sold at poor prices because of lack of information on lucrative market. Moreover, when it comes to annual income-generated from cassava, majority of the respondents earned KES 50,000 were women, while most of the respondents who earned between KES 50,000 and 100,000 were men. The annual income from cassava for men was higher than women's since the tendency of participation of men increases as farming becomes more commercialised. Regarding control over income from cassava, more women than men had control over cassava income. More women than men reported constraints poor prices in the cassava marketing. More men than women reported postharvest losses thwarting their attempt to access cassava marketing. Furthermore, more men and women reported poor road networks limiting their access to market. Finally, more men than women reported facing long distances from their farms/ homes to cassava marketplace.

According to objective three, more men than women often had access to agricultural extension services. The relationship between gender and access to agricultural extension services was statistically significant, and null hypothesis was rejected. male and female respondents who received agricultural extension services from government extension agents was equal, while the female respondents who received such services research institutions such as KALRO were more than the smallholder male farmers. Besides, the percentage of smallholder farmers who

received agricultural extension services from universities and colleges was greater than that of the females, whereas men who received agricultural extension services from NGO and private extension agents were more than women. Most of the respondents who received agricultural extension services from their fellow farmers were men in the study area. On the other hand, an appreciable proportion of the more women than never received extension services from and source in the study area.

Regarding objective four, more men than women often had access to credit than women. The relationship between gender and access to credit was statistically significant. The null hypothesis was rejected. Thus, there exists gender disparity in access to credit in the cassava value chain in the study area. The majority of the respondents who owned a bank account were men, whereas more women than men never owned a bank account an implication that there is still gender disparity in account ownership in Rongo Sub County.

5.2 Conclusions

This study concluded that majority of the respondents were in their productive age whose agility and strength are significant in agricultural value chain upgrading activities, had attained formal education necessary for adoption of new technologies and innovation in agricultural value chain developments. The smallholder women farmers were younger than men. Also, the population comprised young farmers whose agility and strength are significant in production, processing, marketing and utilisation of cassava. This study also concluded that majority of the respondents were smallholder female and male cassava farmers in terms of size of farms and this might have a negative impact on their productivity. Furthermore, it concluded that there exist differences between female and male respondents regarding the land area under cassava farming. Consequently, this study concluded that majority of the respondents in the study area had an appreciable large household sizes of at least 5 persons a sign of availability of family to perform respective activities within the cassava value chain bearing in mind the reality that labour force is a major aspect of agriculture production. Accordingly, this research concluded that the majority of the respondents in the study area were adequately experienced in cassava farming because they had more than three years in the production of cassava crop. Most of the smallholder men and women farmers were members of social associations where they come together for reciprocated mutual benefits. The percentage of women who were members of these social associations was higher than men's despite both gender belonging to such social associations. Women are progressively and increasingly forming social groups and having free

time than men that could be spent in attending group meetings. Lastly, this research concluded that both male and female farmers actively participate in the production, processing, marketing and consumption of cassava with women dominating the nodes under investigation in Migori County's Rongo Sub County.

The study assessed smallholder farmers' access to agricultural productive resources such as land, market information, agricultural extension services and credit. It was observed that for all the variables studied, there was statistically significant relationship between gender and access to agricultural productive resources under investigation. Men were found to have more access to land, market information, agricultural extension services as well as credit than women. With regard to land accessibility, the study concluded that more men have more access than women in Rongo Sub County. There is still lack of adequate provision for women to hold land rights independently of their husbands or male relatives. Statutory law often fail to give women right to access and ownership of land, and where such law is non-existent, enforcement strategies are normally missing. Further, this study concluded that the majority of smallholder farmers who access information on cassava marketing are men in Rongo Sub County. Majority of smallholder men farmers still earn lower income from cassava than women in a single harvest. This research also concluded that women have more control over income from cassava than men. Consequently, this study concluded that more women have more dominance over income earned from cassava. More men farmers are constrained by poor road access to market, long distance to market and postharvest losses. However, majority of smallholder farmers who sell cassava at poor prices are women. These constraints negatively impact on gender participation in the cassava value chain in Rongo Sub County. Fewer women than men still access credit, and more men than women still own bank accounts, hence negatively impacting gender parity in involvement in the cassava value chain in the study locale. Access to land, market information, agricultural extension services and credit has often been the preserve of men and it was not surprising that the finding was still in favour of men. Based on the findings of this study, it was concluded that for women make meaningful contributions in cassava value chain, it is imperative that more agricultural productive resources be provided to women smallholder farmers and their accessibility increased in Rongo Sub County of Migori County.

5.3 Recommendations

The government and private organisations should empower men and women who are already involved in cassava value chain through the provision of improved production and processing

technologies so as to reduce drudgery and enhance food security and income-generation in the study area. They should encourage farmers to expand land acreage under production so as to enhance cassava productivity, bolster their income generation and ameliorate their living standard through giving them fertilisers, improved certified planting materials, farm machinery and herbicides at subsidised prices. In view that both men and women were engaged in the cassava value chain nodes, it is recommended that research should develop gender-responsive appropriate technologies for dissemination to both smallholder male and female farmers to enhance quality of cassava processed products, productivity as well as production. It is also suggested that cassava value chain development actors establish nearby markets at which cassava produce and products can easily be sold and prevent accumulation and deterioration that could decrease farmers' food security and revenue causing disinterest in growing the crop.

This study recommends that more attention be paid to smallholder women farmers, specifically by reducing retrogressive cultural barricades that lend them less access to land. Consequently, promote gender equitable market information systems to benefit both women and men. Women ought to be empowered with market information and technologies to assist them in controlling production, processing and marketing of cassava produce and products. Training need to focus on aspects such as reading market needs, marketing, financial management and pricing. Women need to be categorically targeted for inclusion in lucrative markets, hence it compels for the establishing special markets that focus on women's agricultural produce and products. Agricultural extension and advisory services are significant for women because they also need to learn new techniques and skills to enhance their yields. The unequal distribution of labour within households has been proven to negatively impact women's involvement in the economic sphere since they have to distribute their between reproductive and productive tasks. Therefore, there is need to promote access to agricultural extension services to enable women farmers to venture into commercial cassava farming. More consideration should be given to access to information through ICTs by first of all, ameliorating agricultural extension and advisory services, and then giving advice to both smallholder men and women cassava farmers on how to access agricultural information through mobile phones, radio and television platforms. Access to credit is remains low in the study area even though men were found to have more access than women. Rural financial institutions need to be encouraged to lower some of their restrictions with attention on the tiresome and complex procedures and processes which discourage majority of the smallholder farmers, especially female farmers from taking their products. Generally, this study suggests that for women to cassava value chain upgrading

interventions, there is an urgent need for the disparities identified to be addressed and for further studies to be undertaken in the study area.

The contribution of this study to community development is that gendered value chain analyses have produced inadequate evidence regarding access to agricultural productive resources and gender disparity in the root crop value chains including cassava. While it is pronounced that access to land, market information, agricultural extension services and credit favoured men, it is clear that women have control over income from sold cassava produce and products within the households. The findings of this study contribute to rethinking of approaches to research and intervention to promote gender equality and transformation.

5.5 Areas for Further Research

To enhance gender disparity awareness, researchers may carry out research on first, the role played by financial institutions in reducing gender inequality among smallholder farmers and second, the strategies put in place by extension service providers to promote extension services among smallholder farmers in Migori County?

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APPENDICES

Appendix 1: Research Permit

 REPUBLIC OF KENYA	
Ref/No: 272467	Date of Issue: 26/July/2019
RESEARCH LICENSE	
	
This is to Certify that Mr. Joseph Odiambo Awuor of Egerton University, has been licensed to conduct research in Migori on the topic: INFLUENCE OF GENDER DISPARITY ON SMALLHOLDER FARMERS PARTICIPATION IN THE CASSAVA VALUE CHAIN IN RONGO SUB COUNTY, MIGORI, KENYA for the period ending : 26/July/2020	
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Appendix 2: Farmer Questionnaire

Dear Respondent,

My name is Joseph Odhiambo, pursuing a master's degree at Egerton University. I am undertaking a study on gender disparity in smallholder farmers' access to agricultural productive resources in the cassava value chain in Rongo Sub County. You have been selected to participate in this study. The information you give will be treated with utmost confidentiality and will be used for research purpose only. Therefore, do not write your name on any part of the questionnaire. Respond to the items by ticking (✓) or write in the space provided.

SECTION A: SOCIO-ECONOMIC CHARACTERISTICS

Serial No..... Household ID..... Ward..... Date.....

1.1. Gender of respondent. 1=Male [] 0=Female []	1.4. Experience in the cassava value chain (years). 1=2 or less [] 2=3 – 5 [] 3=6 – 10 [] 4=Above 10 []	1.7. Experience in cassava farming (years) 1= <2 [] 2= 3 – 5 [] 3= 6 – 10 [] 4= >10 []
1.2. Age (years) 1=17 - 30 [] 2= 31 – 45 [] 3=46 – 59 [] 4= >59 []	1.5. Household Size 1= 1 - 4 [] 2= 5 – 8 [] 3= >8 []	1.8. Are you a member of any social organisation 1= Yes [] 2= No []
1.3. What is the highest level of education you have attained? 1=None [] 2=Primary [] 3=Secondary [] 4=Tertiary [] 5=University []	1.6. Cassava farm size (Ha) 1= <=2.5 [] 2= >2.5 []	

SECTION B: PARTICIPATION IN CASSAVA VALUE CHAIN

2.1. On a scale of 1 to 4 where 1=never, 2=rarely, 3=occasionally, 4=often, please indicate the frequency of your engagement in the cassava value chain activities.

No	Cassava Value Chain Activity	Often	Occasionally	Rarely	Never
2.1.1	Production				

2.1.2	Processing				
2.1.3	Marketing				
2.1.4	Consumption				

SECTION C: GENDER DISPARITY IN ACCESS TO LAND

3.0 How frequent do you access land for cassava farming?

Never [1] Rarely [2] Occasionally [3] Often [4]

SECTION D: DISPARITY IN ACCESS TO MARKET

4.1. In a scale of 1 to 4, where Never=1, Rarely=2, Occasionally=3 and Often=4 indicate the frequency of your access to market information.

1=Never [] 2=Rarely [] 3=Occasionally [] 4=Often

4.2 What amount of income do you generate from cassava sales per year? (KES)

1= 50,000 and below []

2= 50,000 – 100,000 []

3= >100,000 []

4.3 Do you have control over income accruing from cassava products?

1=Yes [] 2=No []

4.4 What challenges do you face in marketing cassava? Tick three that are mostly faced.

1= Poor roads []

2= Postharvest losses []

3= Distance to market []

4= Poor prices []

SECTION E: DISPARITY IN ACCESS TO EXTENSION SERVICES

5.1. In a scale of 1 to 4 where never=1, rarely=2, occasionally=3, and often=4, please indicate the frequency of accessing extension services.

1=Never [] 2=Rarely [] 3=Occasionally [] 4=Often []

5.2. Where do you access agricultural extension services

1=Government Extension Agents []

2=Research Institutions i.e. KALRO []

3=Universities/Colleges []

4=NGO/Private Extension Agents []

5= Fellow farmers []

6= None []

SECTION F: DISPARITY IN ACCESS TO CREDIT

6.1. In scale of 1 to 4 where never=1, rarely=2, occasionally=3, often=4, please indicate the frequency accessing credit loan services.

1= Never [] 2=Rarely [] 3=Occasionally [] 4=Often []

6.2. Do you own a bank account?

1= Yes []

2= No []

Thank you for your time and cooperation

Appendix 3: Study Area Map

