CLIMATE ADAPTIVE PRACTICES AND WOMEN PARTICIPATION IN MERU COUNTY, KENYA

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A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF LAW, ARTS AND SOCIAL SCIENCES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF ARTS IN PUBLIC POLICY AND ADMINISTRATION OF KENYATTA UNIVERSITY

NOVEMBER 2025

DECLARATION

This research project is my original work and has not been presented for a study program in any other University.

Signature …….. Date……...

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I confirm that the work reported in this research project was carried out by the candidate under my supervision.

Signature……...Date……

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DEDICATION

I dedicate this to my family for their financial and moral support and encouragement that enabled me to write this research project. Thank you very much.

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My gratitude is to the Almighty God for granting me good health and inspiration that was essential for this study. My special thanks go to my lecturer Dr. Wilson Muna, who was always readily available to advice and guide me professionally throughout the study. My gratitude goes to my family for their valuable support (my dad Silas, mum Margaret and my brothers Anthony and Victor) for your support and encouragement. I also appreciate my friends for their support and encouragement throughout the journey. It is my hope that their sacrifice has finally paid off.

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ABBREVIATIONS AND ACRONYMS

FAO - Food and Agriculture Organization

GAD - Gender and Development theory

GDP - Gross Domestic Product

ICARDA - International Centre for Agricultural Research in the Dry Areas

IFAD - International Fund for Agricultural Development

IFPRI - International Food Policy Research Institute

ITCZ - Intertropical Convergence Zone

KALRO - Kenya Agricultural and Livestock Research Organization

KII - Key Informant Interview

MSPs - Multi-Stakeholder Platforms

PBIBD - Partially Balanced Incomplete Block Design

SEM - Social Ecological Models

SRS - Simple Random Sampling

UNFCCC - United Nations Framework Convention on Climate Change

OPERATIONAL DEFINITIONS OF TERMS

Access to Credit: Access to credit refers to ease of access, availability of collateral and favorable terms of payments for loans obtained to boost agricultural production.

Agricultural extension services: Refers to expert advice farmers receive from Government employed agricultural officers.

Climate Adaptive Practices: These are the measures that help women farmers reduce vulnerability to climate change effects.

Decision making: In this study decision making refers to the ability to determine with discretion what, where and when to plant crops.

Market Linkages: This refers to the availability of information on selling points for agricultural produce, access to agricultural inputs and pricing for agricultural produce in the markets.

Women Participation: This refers to involvement of females in agricultural production.

ABSTRACT

The influence of climate adaptive practices and the challenges for women participation is yet to receive comprehensive attention in the academic field. Women remain vulnerable to many challenges due to the key role they play when it comes to farming and the overall food provision in their households. This study was anchored on the Gender and Development (GAD) theory, social ecological model (SEM), and feminist theory. These theories champion gender-sensitive climate change resilience, thereby enhancing women's capabilities in the construction of climate-resilient agriculture. A sample size of 395 was selected from a population of 30429 using the Slovin model. A pilot study was conducted in Gatimbi ward. This study employed descriptive research design to collect data. Quantitative data was analysed using descriptive statistics (mean and standard deviation) as well as inferential statistics using multivariate regression model, Pearson Correlation coefficient, ANOVA and f-test. Qualitative data was collected by use of interview guides for Key Informant interviewees included agricultural extension officers and farmers group leaders. Resultant qualitative data was analyzed by thematic analysis where the data theme was coded and interpreted for meaning. Additionally, an observation checklist was used to complement the questionnaire. This research adhered to research ethics as established by Kenyatta University. Research approval was sought from KU, NACOSTI and other relevant bodies. This study concluded that the participation of female-headed households in climate-smart agriculture in Meru County is significantly influenced by a combination of household-level empowerment and external support systems. The findings confirm that decision-making power, access to credit, market linkages, and agricultural extension services are all vital enablers. The study recommends that the policy makers should facilitate alternative lending models for female farmers lacking traditional collateral. It also recommends that agricultural extension services should be expanded and tailored to meet the specific needs and schedules of female farmers. Additionally, the study recommends that National and County governments and non-governmental organizations should invest more in strengthening farmer cooperatives to improve market access and that there is a need to ensure that the legal frameworks are implemented to formalize women's land tenure rights to increase their economic decision-making power.

CHAPTER ONE

1.1. Introduction

Chapter one details the study's background, states the problem, outlines the study objectives, the research questions and highlights the justification and the value of the study. The scope of the study is also provided as well as the challenges that the study faced, including the respective mitigation strategies.

1.2. Background of the Study

Climate change is a major issue in the global economy, including the agricultural industry. Climate change greatly affects agricultural production in developing countries, especially when compared to developed or advanced nations (Chandio *et al*., 2020). Changes in the global temperature have increased crop pests and Striga weeds, resulting in a significant crop yield reduction. The most affected population by a reduction in agricultural yields are women (Awiti, 2022). As per Habib-ur-Rahman *et al*. (2022), rice and wheat yield in Asia are foreseen to decrease by 15.2% and 14.1% respectively with climate change. The agriculture sector in Africa has also deemed climate changes a setback. According to Awiti (2022), South Africa's crop yield is forecasted to go down by 14% by 2050 and thereafter by 33% by the end of the twenty-first century.

Integrated watershed management in Ethiopia utilizes climate-smart technologies and practices. It consists of various on-farm crop and animal production techniques, not limited to agroforestry, crop rotation, intercropping (CIAT; BFS/USAID, 2018). It is fundamental to mention that many farmers in Ethiopia also practice crop rotation and minimization of tillage to enhance soil conservation. Conservation agriculture

received a packaged message augmented by additional benefits but faced many constraints covering knowledge and technology to awareness, which still needs to be addressed (Diro, Tesfaye & Erko, 2022).

Different kinds of farmers operating in different agro-ecological zones use disparate CSA technologies in Uganda including diversification of crops, agroforestry, crop rotation, green cover crops, mulching, diminished tillage, intercropping coffee and bananas with legumes and other crops, seasonal adjustment of planting time as well as an efficient water management practice in rice production fields (UN, 2023). In the case of livestock, this includes rotational grazing, forage conservation such as silage, and enhancing silvopastoral systems (especially transforming degraded large treeless pastures into productive ecosystems where shrubs and trees are interspersed with fodder crops) (USAID, 2023).

According to Kogo, Kumar, and Koech (2021), Kenya is adversely impacted by change in climate due to its proximity to the equator, the ITCZ. Consequently, the country's agricultural production has reduced substantially. For instance, 2008-2009 resulted in a 6% decline in the country's agricultural sector output (Kogo *et al*, 2021). About a country's major problem nowadays is food security. Agriculture accounts for at least 26% of the annual GDP in Kenya. It employs over 50% of the population, while about 80% of Kenyans directly or indirectly rely on the sector (Kogo *et al*, 2021). Situated in the eastern part of the country, Imenti Central in Meru County is famously recognized for its fertile agricultural land and diverse crop production. In this region, the most common crops are maize, beans, tea, coffee, and bananas. However, the county has struggled with the impact of change in climate which has

reduced crop production, resulting in food insecurity and poverty among the farmers (Karienye *et al.,* 2021).

The population of the agricultural working class comprises women as the majority who remain vulnerable to climate change since they possess limited access to the resources and the decision-making power required to adapt new agricultural practices. Overwhelmingly, women involved in agriculture in Meru County contribute predominantly, with over 60% of women who are directly into farming. Climate change with its erratic rainfall pattern coupled with prolonged drought and flooding occurrence has been one of the major hazards of agricultural activities in the county for the last sixty years, leading to akshai crop production and food insecurity (Kigatiira, 2019).

Specific climate adaptive practices have been developed to suit the management of the adverse impact on agriculture in the County. These practices entail conservation agriculture, agroforestry, crop diversification and water harvesting. They lead to known improvements in soil health, water conservation, higher yields of crops, and ultimately better income and food security. Participation of women in agriculture in the County has been crucial for embracing climate responsive practices. They get training on climate adaptive practices through CBOs such as women's and self-help groups. Also, the women's groups specializing in agroforestry and tree planting have integrated most women in implementing these (Agesa *et al.,* 2019).

One of the challenges women faces is inadequate access to land, credit, and extension services despite the fact that most of them are involved in agriculture. These problems deny the opportune women access to being involved in agriculture and fully

benefiting from the climate -adopted practices. Although women are an important part of agriculture, they still lack participation in decision-making, access to credit, link to the market, and extension services. This study is aimed at the examination of how decision-making affects women's participation in agriculture. The decision-making for women is still restrained, especially in patriarchal contexts where male dominance prevails. Hence, the study will assess the various degrees of women's participation in agricultural decision-making and the subsequent influence it has on their involvement in the sector (Agesa *et al*., 2019). This research will further focus into the impacts of credit availability on women in agriculture.

Getting credit is important to farmers during times of crisis, whether from drought or flooding. Hence, the study will assess the level at which women have access to credit and how it used to affect their use of climate adaptive agricultural practices. Moreover, a major focus of this study is to establish market linkages on women's participation in agriculture. Market linkages are crucial for farmers to sell what they produce and make some income. However, limited mobility, knowledge, and networks hamper the access of women to markets.

The study therefore, looked at how women have access to markets and how their involvement in agriculture is affected (Marete *et al*., 2021). The study also sought to establish how extension services affected the involvement of women in agriculture. Farmers learn the required knowledge and skills on climate-responsive practices through extension services. Indeed, women have a hard time accessing extension services, which hampers their adoption of new behaviours. This research sought to fill the gaps in literature on how women's decision-making power, credit availability,

market linkages, and extension services affect their involvement in agriculture and adoption of climate-responsive techniques in Meru County.

1.3. Statement of the Problem

Climate-smart agriculture (CSA) has now become a panacea in Kenya, where agriculture employs about 75% of the population and significantly takes part in the GDP of the country. Climate-smart strategies will assure increases in agricultural productivity but will also build resilience and minimize greenhouse gas emissions. Unfortunately, though the picture is clear about the contribution of the Kenyan agriculture sector to their economy, it is not free from some climate challenges that have affected crop yield and increased production cost (Marete et al., 2020). CSA practices like soil and water management, improved varieties, and efficient use of resources have been promoted to address these problems, yet smallholder farmers' uptake is still very low, especially in places like Meru County.

Meru County has many challenges surrounding these female heads of households which deter them from practicing CSA and, generally, agriculture. Most of the time, such households have lower access to critical resources for example as land, capital, and agricultural inputs, which limits their productivity and hinders the adoption of climate-resilient practices. Very little decision-making restricts them in gaining the use of income controlled by them, as well as allocations to engage in farm improvements. Poor credit access and weak marketing linkages also limit them in successfully expanding or investing in climate-smart practices. Limited access to agricultural extension services makes all these challenges worse as it confines them in ignorance concerning the access to and knowledge of CSA practices. Here, these

compounded barriers become impediments against female-headed households in Meru County effectively responding to climate change and reducing vulnerability in agriculture.

Various studies have been done about gender dynamics in agriculture, yet very few studies have explored the specific challenges that female-headed households face concerning CSA. For instance, Nyamamba et al. (2020) looked into the subject of gender disparity regarding resource access in Kenyan agriculture but anchored nothing specifically to CSA and households led by females living in Meru County. Kariuki and Mwangi (2019) also examined the obstacles that prevent women from participating in Kenyan agricultural value chains, but they did not focus on the difficulties that female-headed households have in making decisions or obtaining resources. Simultaneously, Okeyo et al. (2021) investigated the effects of climate change on Kenyan agriculture; however, their analysis descended into debate, pointing out a lack of research on gender-specific issues or the uptake of CSA by rural women. Thus, the research endeavored to address these gaps by examining how decision-making power, credit access, linkage to the markets and agricultural extension services affect the participation of female-headed households in the CSA within Meru County. These specific issues will, thus, cause the study to have a more nuanced understanding of barriers to female-headed households' adoption of CSA and, thereby, offer practical insights for policy and development initiatives in similar contexts.

1.4. Research Objectives

i. To determine the extent to which decision-making power affects participation of female-headed households in climate smart agriculture.

ii. To assess the extent to which access to credit affects participation of female-headed households in climate smart agriculture

iii. To establish how market linkages affect participation of female-headed households in climate smart agriculture.

iv. To examine how access to agricultural extension services affects participation of female-headed households in climate smart agriculture

1.5. Research Questions

i. What is the extent to which decision-making power affect participation of female-headed households in climate smart agriculture?

ii. What is the extent to which access to credit affect participation of female-headed households in climate smart agriculture?

iii. How does market linkages affect participation of female-headed households in climate smart agriculture?

iv. How does access to agricultural extension services affect participation of female-headed households in climate smart agriculture?

1.6. Justification of the Study

This research is crucial because it fills in knowledge gaps about women's involvement in agriculture, climate change, and the implementation of climate-responsive practices in Meru County's Imenti Central Sub County. With its insights into the difficulties experienced by women in agriculture and the potential for increasing their involvement in climate-adaptive activities, this research adds more literature on climate change, agriculture, and gender. Numerous parties involved in the agricultural industry in Meru County's Imenti Central Sub County, including the county government, farmers, legislators, development organisations, and non-governmental organisations, will benefit from the study.

1.7. Significance of the Study

The study outcomes will help policymakers in developing policies and programs that promote gender equity and support the adoption of climate-relevant practices in agriculture, while development agencies and Non-Government Organizations will derive value from the study by using the findings to craft interventions that will increase the participation of women in agriculture and foster climate resilience.

This study targets the Government, scholars, researchers, policymakers, development agencies, and Non-Governmental Organizations involved with climate change, agriculture, and gender. The study will make a significant input to the scholarly literature with empirical evidence on the relationship between women's participation in agriculture, climate change, and taking up climate-adaptive practices. Policy relevance and information dissemination will also be enhanced due to the study,

following understandings into the issues faced by women in agriculture and the opportunities for enhancing their participation in climate-adaptive practices.

1.8. Scope of the Study

The research aims at investigating climate adaptive practices and women's involvement in agriculture in Imenti Central Sub County, Meru County. Meru County, in terms of agricultural production, is regarded as one of the most fertile and high-yield counties in Kenya. Imenti Sub County, from among 10 Sub Counties in Meru County, is one among the two highest producers of agricultural outputs. It is, however, important for the study to acknowledge such limitations and elaborate on their possible impacts on the research results. The scope and delimitations of this study include the focus on a well-defined group, namely, women farmers in Imenti Central Sub County, Meru County.

1.9. Limitations of the Study

The research may be limited by availability of data and the resources required to collect it. Other limitations include cultural bias, participant selection, and the potential for self-report bias. Although concerted efforts were made to get a range of women farmers in Meru County to form part of the study, the sample size did not capture in entirety the total array of experiences and practices within the region. This research may therefore be unable to adequately depict variations in climate adaptation strategies and participation level. Some women farmers may have been difficult to contact due to geographical barriers, limited channels for communication, or unwillingness to participate in some aspects of this research. This would thus create a bias in the data collected, representing mostly farmers who were accessible and

willing to take part. Self-reported data collection was heavily relied on, creating room for recall bias or social desirability bias.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

This chapter entails an in-depth assessment of various factors that affect women in adopting climate responsive agricultural practices. These include decision-making power, access to credit, market linkages and availability of agricultural extension services. The chapter will also highlight the research gaps and solutions while reviewing empirical studies around the topic to establish a background on the research topic and to compare findings from previous studies. The final subsection will focus on the conceptual and theoretical framework of the research.

2.2. Empirical Review

2.2.1. Decision-making Power and Women Participation in Climate Smart Agriculture

The study by Khatri-Chhetri *et al*. (2019), seeks to map the relationship amongst poverty, climatic hazards, and women in agriculture within the Rupandehi and Chitwan Districts of Nepal. To identify the appropriate CSA options for gender labor-saving solutions, the mixed-methods study analyzes the role of females in agriculture – related activities. The study further states that women are not very adaptive to climate change, thus inclusion of women in decision-making is very important to ensure gender-sensitive climate-resilient policies are actualized. The study focuses on CSA in the context of Nepal. There is very little evidence about similar dynamics in Kenya particularly among women-headed households. The study aims to close this gap by examining how decision-making authority influences the participation of female-headed families in climate-smart agriculture in Meru County in Kenya. It also

promises some insights into gendered decision-making in a specific cultural and environmental setting.

The study by Antwi and Antwi-Agyei (2023) evidences a linkage between intra-gender dynamics and attitudes and implementation of CSA practices within agricultural operations in Ghana. The adoption of climate-resilient techniques which increased the farming system's overall resistance to climate change, was found to be facilitated by the participation of women in making decisions on agricultural activities. However, since it is a Ghana study, it has no focus on women-headed homes or the specific challenges they have to go through in adopting CSA. This gap was addressed by the current study through analyzing the effects of decision-making power on the participation of female-headed households in climate-smart agriculture in Meru County, Kenya, thus expanding the knowledge of gendered decision-making in CSA to a different geographical context.

Antwi-Agyei and Nyantakyi-Frimpong (2021) undertook a study which entails involvement of women in key and more strategic decision-making related to agricultural activities, and how that would affect their adopting climate-resilient practices in north-eastern Ghana. The study adopts a mixed-method approach and the results showed that the participation of women in the making of decisions in agriculture has significantly enhanced the adoption of climate-resilient practices, thus strengthening the resilience of farming systems at the verge of dynamic climatic conditions. Hence, the study recommends increased efforts at empowerment of women concerning decision making in agriculture as a further support to climate adaptation. However, this investigation seems more generalized-relating to households as a whole, not also taking into consideration the singular plight of

female-headed households. This study addresses this gap by examining how decision-making power influences the participation of female-headed households in climate-smart agriculture within Meru County, Kenya, providing context-specific insights into the barriers faced by these households in CSA adoption.

2.2.2. Access to Credit and Women Participation in Agriculture

Lal et al. (2021) carried out research on the crucial role of soil science knowledge and research in achieving food and nutrition security, human well-being, conservation of nature, and global peace. It notes that restoration and sustainable management of soils are the sine qua non for achieving Sustainable Development Goals (SDGs) by 2030, particularly associating them with climate actions, zero hunger, and gender equality. The findings indicate that credit access was one of the main factors empowering women farmers by equipping them with modern farming as well as climate-friendly agricultural practices. The study covers soil science in great detail, but it did not go deeply into the difficulties faced by female-headed households in obtaining loans for climate-smart agriculture. In order to close this gap, this study evaluated the impact of limited credit availability on the involvement of female-headed households in climate-smart agriculture in Meru County, Kenya. This assessment shed light on the obstacles these households encounter when attempting to implement climate-resilient farming practices.

Kom *et al*. (2020) found that women's adoption of climate-smart behaviors in South Africa has been impacted by loan availability. Data from a survey of 224 smallholder farmers in the Vhembe District was analyzed using a multinomial logit model. According to the study's findings, women who have access to financing are far more

likely to embrace climate-smart practices, which are the foundation of sustainable agriculture including irrigation, rainwater collection, conservation agriculture, and agroforestry. The study, therefore, recommends intensified efforts to provide women with greater access to credit in order to enhance their resilience against climate change. Although the study indicated that credit access has a positive influence on the adoption of agricultural farming practices which were climate smart, it failed to look into the unique challenges found in the credit systems for female-headed households. Hence, the gap will be addressed by assessing how access to credit impacts the involvement of female-headed households in climate-smart agriculture in Meru, Kenya. It attempts to provide useful insights on the obstacles against implementation of sustainable agricultural practices for these households.

Ojo *et al.* (2021) found women to be a force in agriculture, and participatory levels of such are important in sustaining food production and reducing the severity of climatic changes on agriculture through execution of strategies in South Africa. The data was analysed using descriptive statistics specifically through the MVP model and ESRM across four provinces in South Africa. From the results of the MVP model, the decisions by smallholders to institute techniques that helped in adapting to climate change are influenced by a number of factors including geography, income from other sources other than farms, experience and knowledge in farming, production strategies for both livestock and crops, agricultural training and availability to credit.

Korir and Ngenoh (2019) studys the relationship between credit access and adoption of agricultural practices which are climate-smart by women farmers in Narok County. Adopting descriptive design, the outcome shows that most women farmers with access to credit adopted agroforestry, crop diversification and conservation agriculture

increasing yields and production. The study further recommends a stronger drive to increase credit access for women to invest in climate-resilient agricultural practices. Notably, the study established that credit access and climate-smart practice adoption without explicitly examining the challenges that female-headed households face in accessing credit, were positively and significantly related. This gap was addressed by this study by investigating how access to credit undermines the participation of female-headed households in climate-smart agriculture in Meru County, Kenya, thus providing insight into the constraints these households face in implementing sustainable agricultural practices.

2.2.3. Market Linkages and Women Participation in Agriculture

Ayeb and Bush (2019) examines how market linkages were a factor in the adoption of agricultural activities which were climate-smart among women farming communities. They used qualitative and quantitative data collection methods to assess the influence of access to market networks on the extent of participation of women in climate-smart initiatives. The results indicate that women farmers with access to market credit tried to become habitual users of practical climate-smart agriculture approaches which led to improved resilience and productivity in the midst of climate adversities. Even so, the study kept aside an analysis of the challenges that women-headed households have regarding establishing and sustaining such linkages towards climate-smart agriculture practices. This study sought to fill this void by presenting evidence on how market linkages impede female-headed households' participation in climate-smart agriculture in Meru County, Kenya, thus providing clearer understanding of barriers that these households face in terms of accessing markets for sustainable agricultural practices.

Kamara *et al*. (2019) investigates how market linkages impact use of climate-smart agricultural practices among women farmers. Using descriptive statistics with primary data drawn from surveys and structured interviews, the two researchers made an assessment of how market access translates into participation in women's agricultural practices. As per the study, women with access to such market linkages were most likely to practice, among several options, greater crop diversification, improved soil conservation techniques and use of agroforestry. The study established that such gains from market linkages not only enhanced income but also developed better incentives to induce the adoption of sustainable production methods. This observation is not, however, in itself findings of female-oriented issues concerning access to and/or maintenance of such market linkages. The gap was addressed by this study by determining the extent to which market linkages contravene female-headed household participation in climate-smart agriculture in Meru County, Kenya, thus adding more light on limitations these households experience when tapping market opportunities for sustainable agricultural practices.

According to Acosta *et. al.* (2018), the importance of market linkages in strengthening women's powers to adopt climate-safe agricultural practices will be realized through easy access to markets for their produce, avoiding post-harvest losses, increasing income, and enhancing bargaining power. Over a four-year period, engagement with the East African longitudes was undertaken for the analysis of the evaluation of the interaction between MSPs and enabling the proper environment adaptation to and mitigation of different climatic conditions. The results suggest that MSPs very greatly promoted pan-stakeholder ownership, facilitated an exchange of knowledge, and established linkages between various arenas of governance and policymakers to

scientists. Most notably, this study highlighted that these platforms brought improved formulation of policies related to climate adaptation. However, it did not consider the unique conditions of female-headed households regarding the establishment and upkeep of these linkages in the market. It is just for this purpose that this study investigated the extent to which market linkages hinders involvement of female-headed households in climate-smart agriculture in Meru County, Kenya providing critical insight into the barriers faced by these households in accessing markets for sustainable agricultural practice.

Mulyungi and Waswa (2021) examines how access to market credit affected climate-smart agriculture adaptation among the female farmers in Kitui. The research uses survey design collecting data from a sample of 387 respondents mostly small-scale farmers. Findings showed that women farmers with access to market linkages will adopt and plant more conservation agriculture and drought-tolerant crops. It showed that income from such market linkages is a key motivator for women to adopt sustainable production practices. However, this was not specifically about addressing the female-headed houses' struggles with accessing this market linkages for climate-smart agriculture. This study sought to fill this void with the inquiry examining the extent to which market linkages threaten the participation of female-headed households in climate-smart agriculture in Meru County, Kenya thus providing further insights into their barriers in accessing markets for sustainable agricultural practices.

2.2.4. Availability of Agricultural Extension Services and Women Participation in Agriculture

According to a study by Glazebrook *et al*. (2020), extension services are crucial for helping farmers adopt climate-responsive farming methods. Focus groups and farmer interviews were used to gather primary data for the qualitative study which sought to understand farmers' experiences with extension services. The findings demonstrates that agricultural extension services gave farmers the essential knowledge, abilities, and information they required to implement climate-smart practices. There was a gap in the literature as it failed to clarify the barriers that female farmers encounter when trying to receive these services. By examining the relationship between female-headed households' participation in climate-smart agriculture and their access to agricultural extension services in Meru County, Kenya, the gap was filled and the difficulties faced by these women were better understood.

IFPRI (2018) aims to investigate the impact of extension services on women's awareness and adoption of smart agriculture. After conducting a thorough review of a wide range of programs and data sources, the research came to the conclusion that women who had access to and understanding of extension services were more likely to utilize improved seeds, conserve water and soil, and choose a variety of crops. The results highlight how crucial extension services are to enhancing women farmers' farming methods for sustainable land development. The research did not, however, specify the precise obstacles that households headed by women might face while trying to obtain these essential services. By examining the relationship between female-headed households' participation in climate-smart agriculture and their access to agricultural extension services in Meru County, Kenya, the gap will be filled and

the unique opportunities and constraints these women encounter in their farming practices will be clarified.

Extension services are essential to attaining gender parity in agriculture, according to IFAD's 2019 assessment. In order for women farmers to engage in climate-resilient agriculture, extension services significantly enhanced their access to markets, inputs, and information. According to Hariharan et al. (2018), extension services improve the likelihood that women farmers will adopt and implement climate-smart techniques including intercropping and soil conservation. The findings showed that extension services helped women become more resilient to climate change by providing them with information, resources, and funding.

Kamara et al. (2019) evaluates how community-based extension initiatives affected the adoption of climate-smart practices by female farmers. The results showed that women farmers' involvement in community-based extension programs promoted agroforestry and crop diversification. Through peer learning, professional assistance, and the growth of their knowledge and abilities, the extension program significantly benefited women. There was a gap in the study, nevertheless, because it did not adequately address the barriers that prevent women from using these extension programs. In order to close this gap and advance knowledge of the difficulties faced by women in climate-smart agriculture, this study evaluated the effects of agricultural extension services on the participation of male and female heads in climate-smart agriculture in Meru County, Kenya.

The goal of Njeru et al. (2019) is to show how extension services help women farmers adopt climate-smart farming methods. The study uses surveys to collect information

from female farmers who had taken part in the provision of extension services. The findings demonstrate that women who received extension services were more likely to embrace drought-tolerant crops, novel seeds, and inputs as well as conservation agriculture techniques. According to the study's findings, extension programs have significantly improved the knowledge and abilities of female farmers, empowering them to better address the problems posed by climate change. There was a gap in the literature nevertheless as the study did not sufficiently address the unique obstacles that women have while attempting to obtain the essential services. In order to close this gap, an evaluation of how female-headed families' participation in climate-smart agriculture in Meru County, Kenya, is influenced by their access to agricultural extension services was conducted.

2.3. Theoretical Framework

2.3.1. Gender and Development Theory

Gender and Development Theory which aims to highlight important gender interactions within development processes was developed by Naila Kabeer and colleagues in 1994. It demands a thorough understanding of the connections between gender roles, decision-making, and resource access and contends that development is not complete until it addresses systemic disparities between men and women. Kabeer places a strong emphasis on concepts of empowerment and agency, arguing that women must genuinely have the ability to decide the circumstances in which they live. The theory supports the empowering representation of participatory practices that take into account women's opinions and demands by giving women's experiences and insights more weight. The Theory further acknowledges the interlinkages of

gender with other social categories, that also shape women's experiences and opportunities in development.

According to Sumadsad and Tuazon (2016), the approach is linked to four main proponents. The first major proponent is Naila Kabeer, a Bangladeshi-born feminist economist who has concentrated on women's economic empowerment and social justice within development processes (Sumadsad & Tuazon, 2016). The second proponent is Sylvia Chant, who has published widely on intersections between gender and development, with particular attention to the necessity of understanding the complexities of urban poverty and gender relations. The third is economist Raihan Sharif who has worked on gender and development, specifically with emphasis on the economic factors pertaining to women's empowerment and the role of gender in development policies. The last major proponent is Diane Elson a strong proponent for integrating feminist perspectives into economic analysis. She strongly advocates for the adoption of gender-sensitive policies to correct systemic inequities (Sumadsad & Tuazon, 2016). Aside from the four main proponents, international agencies, particularly the UN, through agencies like UN Women, have played a major role in promoting the GAD approach.

This issue deals with empowering women economically, socially, and politically. The Fourth Women Conference on Women (FWCC) in Beijing in 1995 marked a turning point in global acceptance of GAD principles. The resulting Beijing Declaration and Platform for Action recognized the need to include gender perspectives in all public policies and programs. For instance, it was in debates and meetings at both national and international level where it was possible for international organizations, like the UN, to include the GAD principles into the agenda (Domogen et al., 2022). UN

Women, which was founded in 2010, has made tremendous advances in fulfilling the global mandate of gender equality that is aligned with the GAD approach. The GAD approach has thus undergone transformation through addition of intersectionality, recognition of differing experiences of women, and formulation of special provisions. The scenario described by this study fits in the core of the GAD approach that aims at mainstreaming gender considerations in development processes and identifying the needs and challenges of women. The GAD approach states that climate changes affect women and men differently because of the different roles that gender plays in society and the inequalities that arise owing to these roles. Thus, in 1994, Naila Kabeer and others presented Gender and Development Theory, which aims to highlight important gender interactions in development processes. It argues that development is not complete until it addresses systemic disparities between men and women and demands a thorough understanding of the connections between decision-making, gender roles, and resource access. Kabeer believes that women must truly have the ability to select the circumstances in which they live, emphasizing concepts of agency and empowerment. By giving women's experiences and perspectives more weight, the Theory supports the powerful representation of participatory practices that take into account their demands and voices.

Women's economic, social, and political empowerment is the focus of this specific topic. A turning point in the international adoption of GAD principles was the Fourth World Conference on Women in Beijing in 1995. The ensuing Beijing Declaration and Platform for Action underscored the necessity of including gender perspectives into all policies and programs. It was in debates and meetings at both national and international levels where it was possible for international organizations to include the

GAD principles into the agenda (Domogen *et al.*, 2022). The need to establish UN Women in 2010 has proven to gain momentum since it has played a vital role in mainstreaming gender equality across the globe steering towards GAD. Time and again, the GAD approach has shifted by including the intersectionality and realization of the varied experiences of women on different levels. The scenario described by this study fits in the core of the GAD approach that aims at mainstreaming gender considerations in development processes and identifying the needs and challenges of women.

As stated in the GAD perspective, the impact of climate change still differs among the two sexes because of the differences brought by gender inequalities. Herein, therefore, the study will be responding to how climate change impacts agriculture in Meru County and in particular investigate how women experience these changes differently in adapting to them. GAD also looks at women's access to all decision-making and economic activities and thus it also inquires the extent of participation of women in agriculture in Meru County. The GAD approach also invites intersectional analysis, noting that gender does not operate independently from other social categories. For that reason, the GAD approach presents a more comprehensive frame for analyzing complex up-and-down activities characteristic of the interactions among gender, climate change and agricultural practices since the study considers how socioeconomic status can partner with gender.

2.3.2. Social Ecological Theory

The Social Ecological Model (SEM) would soon find itself associated with Urie Bronfenbrenner as the 1970s opened into its last year. It is a theoretical model built

into an all-embracing understanding of the complicated interplay that exists between individuals and their social and physical environments (Caperon et al., 2022). It later borrowed from public health to study many aspects of society. SEM recognizes that health and behaviour result from many factors operating at different levels-from those relating to the individual, through social factors, to broader societal structures. According to Caperon et al. (2022), SEM has roots in multiple disciplines and has grown thanks to a number of pioneers from diverse domains. The ecological systems theory developed by Urie Bronfenbrenner in the 1970s established the foundation for the knowledge that environmental systems impact human development, even though he was not directly responsible for the current SEM.

The origins of the SEM can be found in Bronfenbrenner's ecological systems theory, which was first presented in the 1970s. Bronfenbrenner proposed an ecological framework that focused on how environmental systems affect human growth. According to Kilanowski (2017), this ecological systems theory cleared the path for a deeper comprehension of the dynamics of human-environment interaction. Its role in health promotion was brought to light in the late 1980s and early 1990s when Green and other academics started to make the case for a comprehensive model to direct interventions meant to promote health-related behaviors. With a strong focus on health disparities, the model was widely used in the medical field. Researchers who looked at the various levels at which interventions could be made in relation to health behaviors and outcomes found the model useful (Kilanowski, 2017). The SEM was initially used in public health, but from 2000 onward, it gained recognition in other fields like psychology, sociology, education, and community-centered development. SEM is dynamic, not static; it continuously evolves in response to the fresh

perspectives produced by academia, which improve its conceptualization and makes it suitable for use in other novel contexts.

SEM's emphasis on multilevel analysis is one of its main features. It makes the assumption that a variety of factors, ranging from the individual to larger societal systems, have an impact on behavior and health (Kilanowski, 2017). SEM also postulates that changes may have reverberating effects at different levels of impact since these levels are interactive and reciprocal. This integrated approach to behavior modification and health promotion is firmly supported by the model. The SEM asks for interventions that take into account the much broader social and environmental contexts in which an individual lives, as opposed to concentrating only on individual-level factors (Kilanowski, 2017). Individuals within larger social systems are noted in the model which also emphasizes the importance of a system thinking approach. The interactions and feedback loops between various levels of impact are prompted by those systems thinking frameworks (Arnold & Wade, 2015). As a result, it suggests a comprehensive, multidimensional, context-sensitive method of understanding and promoting behavior and health that places an emphasis on the interdependence of environmental and personal elements.

SEM provides a more comprehensive framework for comprehending the various degrees of influence on women's involvement in climate-adaptive farming practices in this study. At the individual level, SEM takes into account elements like knowledge, attitudes, abilities, and the ability of women in the home to make decisions about agricultural methods. The SEM will evaluate the impact of community and family interactions on women's engagement in climate-adaptive practices at the interpersonal level (Chisale et al., 2024).

SEM provides this level of definition for peer networks, family relationships, and community customs. Third, the study sought to focus on comprehending how social norms, cultural customs, and local resources influence women's roles in agriculture at the local level. Designing interventions that are compatible with the dominant social structures and allow women to actively participate in climate-resilient farming requires an understanding of community dynamics. Thus, SEM allows the researcher to see the intricate factors that influence women's engagement in climate-adaptive practices especially in Kenya's Meru County.

Academic frameworks start with environmental layers, which include peer networks, family dynamics, and community customs as crucial elements. However, the third area that needs attention is how women in agriculture are shaped locally by social norms, cultural customs, and available resources. The development of integrated interventions in physical environments within contemporary social structures that actively encourage women to engage in climate-resilient farming methods requires an understanding of such community dynamics. Therefore, SEM will make it possible to comprehend the intricate factors that influence women's adoption of climate-adaptive activities in Meru County, Kenya.

2.3.3. Feminist Theory

The theory is originally linked to a French philosopher and writer Simone de Beauvoir who is often regarded as one of the foundational figures in feminist philosophy (Jiang, 2021). It emerged as a response to the historical and systematic marginalization of women and the recognition that traditional theories often neglected or misrepresented women's experiences. Her groundbreaking work, *The Second Sex*

(1949), critically examined women's subordination and explored the ways in which societal structures and expectations shape women's identities. It is important to note that the feminist theory has evolved over time, and many influential figures have contributed to its development.

Kotef (2009) states that the first wave of feminism was primarily concerned with legal matters, especially the right to vote for women, and began in the late 19th and early 20th centuries. An expression of that first wave was Mary Wollstonecraft, Susan B. Anthony, and Elizabeth Cady Stanton fighting against the idea that women were legally and socially inferior to men. The second wave arose during the 1960s and lasted until the 1980s. This wave broadened the concerns of feminism beyond legal issues into a full-fledged social and cultural movement (Kotef, 2009). It took its inspiration from civil rights movements and from leaders who included Betty Friedan, Simone de Beauvoir, and Gloria Steinem advocating for reproductive rights, workplace equality, and elimination of gender-based discrimination. The 1990s and beyond saw the emergence of the third wave of feminism. In acknowledging that women's lives vary according to their ethnicity, class, sexual orientation, and ability, this wave incorporates diversity and intersectionality (Weldon *et al*., 2023). In recent years, feminist philosophy has become more involved with queer and transfeminism. This ongoing and intense discussion has accompanied the development of feminist theory, enabling the creation of numerous schools of thought that capture the fluidity of gender relations and social structures.

According to them, gender inequality stems from a patriarchal system in which men hold all the power and control. These systems can take many forms in social, political, economic, and cultural institutions (Weldon et al., 2023). Moreover, feminists

maintain that women have always been denigrated and sidelined, and that whatever they have done has been totally undercut. This in and of itself is a critique of the power dynamics ingrained in society and a challenge to the patriarchal norms that impede women's autonomy. Since gender is not a separate identity but rather is understood in conjunction with other social categories including race, class, sexual orientation, and ability, the theory also highlights the use of intersectionality (Weldon et al., 2023).

This argument stands for the oppressed or privileged being classified in multiple and intersecting forms. Moreover, feminists do not believe in a unified understanding of women's experiences. Mostly, this theory aims to bring about social and political changes for gender equality by empowering and liberating individuals beyond the traditional way of understanding gender duality (Adak & Çağatay, 2023). Further on, the theory often questions the traditional gender roles and the less significant position of women's unpaid work; this study should look at how gendered expectations frame women's roles in climate-adaptive practices.

The scope of examination in accordance with the Feminist Theory would include patriarchal structures and gender dynamics in agriculture in Meru County. It included looking into how the power dynamics and prevailing traditional gender roles and access to resources contributed to the marginalization of women in climate-adaptive practices. Also, by applying an intersectional lens from feminist theory, the study analyzeed how intersecting factors such as age, ethnicity, and socio-economic status impact women's participation in climate-adaptive agriculture. Feminist theory advocates for women's empowerment and social change, and the study explored how

climate-adaptive practices contribute to or hinder women's empowerment within the agricultural context.

2.4. Summary of Reviewed Literature and Gaps to be filled by the Study

Table 2:1: Summary of Literature and Research Gaps

Author	Focus of the study	Methodology	Findings	Knowledge gaps	The focus of this study
Ampaire et al. (2019)	Gender in climate change, agriculture, and natural resource policies; Insights from East Africa	Systemic Review of 155 policy documents.	82% of the sample national level policies integrated gender.	Poor development of agricultural policies and minimal budgets for enhancing women participation in agriculture.	Ensuring effective gender integration in the agricultural sector to accelerate climate adaptive practices
Gumucio et al. (2019)	Gender-responsive rural climate services: a review of the literature	Systemic Review and Interviews	Availability of extension services to women in East Africa to enhance agricultural productivity.	There are minimal policies on Gender factors influencing the beneficial effects of adopting climate responsive agricultural practices.	Enhancing access to information on climate smart agriculture through offering and enhancing provision of extension services example via ICT.
Acosta et al. (2019)	Discursive translations of gender mainstreaming norms	Systemic Review, Participant observation and meeting minutes,	Gender mainstreaming among women enhanced	Poor discourse policies in the district levels in improving women	International norm for examining sustainable agricultural policies.

		Questionnaires and Social network analysis (SNA)	crop yields in Uganda.	agriculture	
Glazebrook et al. (2020)	Gender matters: Climate change, gender bias, and women's farming in the Global South and north	Descriptive and analytical techniques.	Investing in women's agriculture increases production.	Gender biases and cross barriers affecting equity in women's agriculture	More investments accorded to women agriculture.
Kamara et al. (2019)	The relevance of smallholder farming to African agricultural growth and development.	Descriptive and analytical techniques.	Small holder farmers drive the economic growth and development of Africa	Constraints in acquiring farm inputs and credit.	Adequate investments among women smallholder farmers.

Source: Researcher (2024)

2.5 Conceptual Framework

The conceptual framework identified three key types of variables influencing women's participation in adopting climate-responsive agricultural practices. The independent variables include women's decision-making power, access to credit, market linkages, and agricultural extension services. The dependent variables reflect the outcomes of women's participation in adopting climate-responsive practices, which encompass improved agricultural productivity, enhanced income, resilience to climate change impacts, and contributions to sustainable agricultural development and food security.

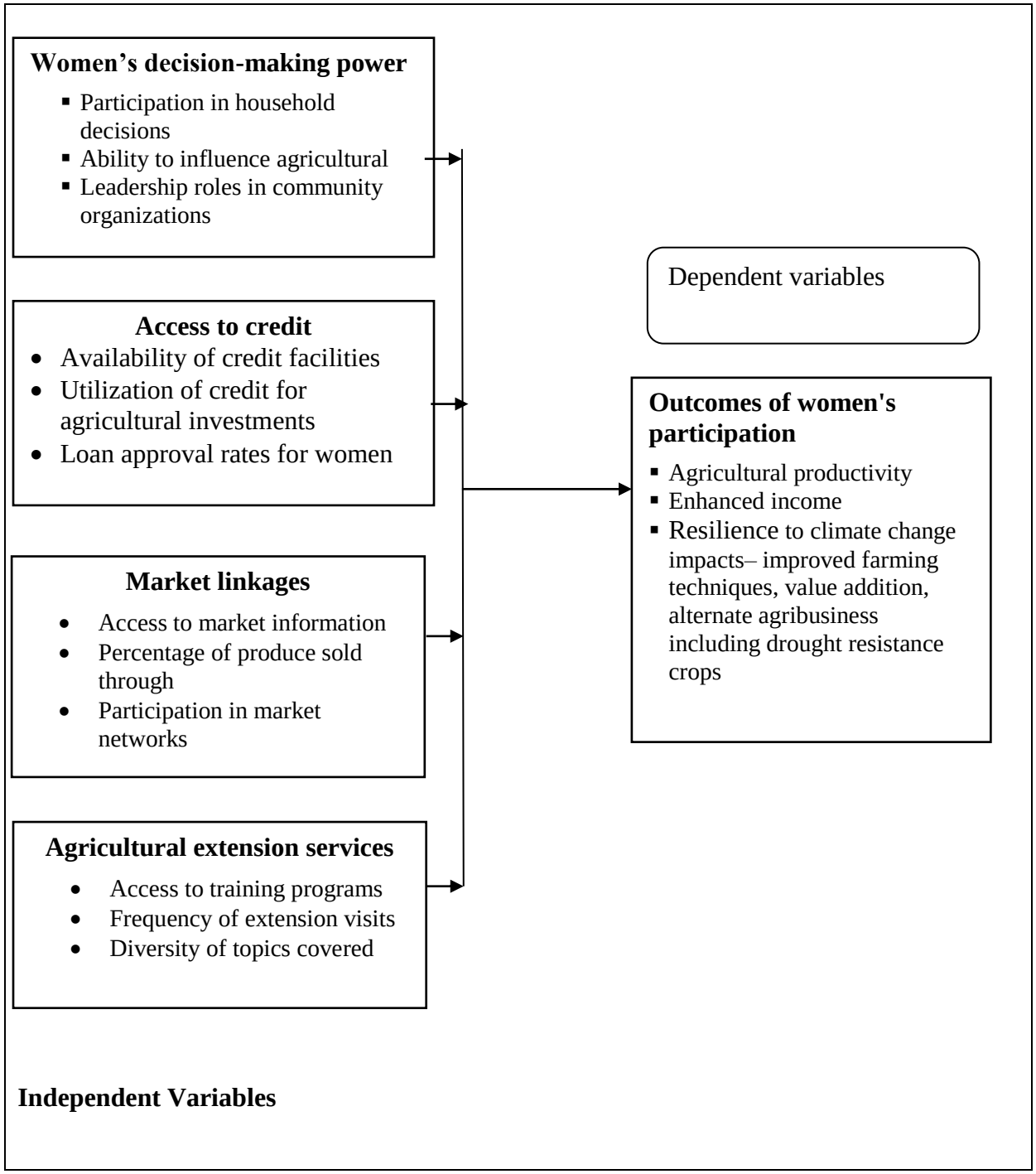


Figure 2:1: Conceptual Framework

Source: Researcher (2024)

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Introduction

The chapter discusses the research design of the variables of analysis and previews the research site, the target population, sampling techniques and sample size. This chapter also describes the instrument used in research, piloting, validity, reliability and procedures for collecting information. This chapter ends with a description of data analysis, presentation, and considerations for logic and ethics.

3.2. Research Design

So as to assess the influence of climate-adaptive practices on the participation of women in agriculture in Imenti Central Sub County-Meru County, the study adopted descriptive research design. Descriptive research is best understood as applied to giving statistical data on concerning aspects of interest to educators and policymakers by merely describing and reporting things as they are (Mugenda & Mugenda, 2003). This is best fit for this study as it involves gathering data, compiling, presenting the findings as well as interpreting them for clarity.

3.3. Description of Variables

The study examined climate adaptive practices and how they influence women participation in agriculture in Imenti Central Sub County, Meru County. The independent variables of the study are decision-making power, access to credit, market linkages and agricultural extension services. They were measured through qualitative and quantitative analysis, content analysis and regression. The dependent

variable women participation was measured through descriptive statistics and correlation.

Table 3:1: Description of Variables

Variable	Indicators	Category of analysis	Dependent variable	Category of analysis	Test
Decision-Making Power	● Participation in household decisions ● Ability to influence agricultural ● Leadership roles in community organizations	Ordinal Nominal Nominal	**Women's Participation** ● Agricultural productivity ● Enhanced income ● Resilience to climate change impacts – improved farming techniques, value addition, alternate agribusiness including drought resistance crops	Ordinal Ratio Ordinal	Descriptive statistics Regression Analysis Pearson Coefficient Correlation ANOVA
Access to Credit	● Availability of credit facilities ● Utilization of credit for agricultural investments ● Loan approval rates for women	Ratio Ordinal Ratio			Descriptive statistics Regression Analysis Pearson Coefficient Correlation ANOVA
Market Linkages	● Access to market information ● Percentage of produce sold through ● Participation in market networks	**Nominal** Ratio Ordinal			Descriptive statistics Regression Analysis Pearson Coefficient Correlation ANOVA
Agricultural Extensio	● Access to training programs	**Interval** Interval Ordinal			Descriptive statistics Regression

n services	• Frequency of extension visits • Diversity of topics covered				Analysis Pearson Coefficient Correlation ANOVA

Source: Research (2024)

3.4. Site of the Study

The scope of the study was Imenti Central, Meru County because it is among the top contributors of agricultural produce in the country. It can be safely labelled as a food basket for the country. Imenti Central Sub County is among top agricultural high yield Sub County in the County.

3.5. Target Population

This research focused on female headed households in the Sub County. There are 30429 female headed households in Imenti Central Sub County according to the KNBS Statistics (2019). In addition, Key Informant respondents will be included in the study. They included agricultural extension officers and farmers group leaders in the 4 wards of Imenti Central Sub County. All KII respondents were included in the sample. Female-headed households were subjected to the sampling method as suggested by Slovin's formula as presented below.

3.6. Sampling and Sampling Design

Sampling is the process of selecting several elements, which is considered a fair representation of the whole population. Organizers analyze the people based on their work responsibilities, clearly dividing them into strata (Kish-Gephartet.al., 2023). Purposive sampling will be deployed to choose key informants from the agricultural

extension officers and farmers groups leaders because of their knowledge and expertise. The sample size was determined by applying Slovin's formula as below:

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

where n is the size of the sample needed, N is the total size of the population and e is the error term, given as 5%

$$n = \frac{30429}{1+30429(0.05)^2)} = 395$$

Table 3:2: Sample Distribution Table

Category	**Frequency**	**Percentage (%)**
Decision Making Power (Female headed households)	323	81.8
Farmers groups leaders	20	5.1
Agricultural extension officers	32	8.1
Observation	20	5.1
Total	**395**	**100%**

Source: Researcher (2024)

3.7. Research Instruments

The study employed several research instruments to collect comprehensive data from participants. A structured questionnaire was used to gather quantitative data on critical variables, such as women's decision-making power, access to credit, market linkages, and agricultural extension services. The questionnaire included closed-ended questions, which facilitated efficient data analysis and comparison across participants. Likert scale items were included in an effort to gauge attitude, perception, and experience by participants, mainly in the context of their engagement in climate-smart agricultural practices. This enabled gathering quantifiable data for trend identification and pattern recognition over a larger population sample. For an in-depth understanding of qualitative data, semi-structured interviews were used. The use of an interview guide with open-ended questions allowed participants to talk about personal experiences, impediments, and motivations with regard to their involvement in climate-responsive practices. This tool stands in contrast to the structured questionnaire; it permits elaboration of individual responses, nuanced perspectives, and contextual details which would not come up during quantitative research. By putting the emphasis on individual stories, interviews aimed to reveal and elucidate variables at play in decision-making and adaptation strategies of women.

Having focus group discussions (FGD) strengthened the qualitative aspect of the study by exploring collective viewpoints. Using a focus group discussion guide, FGDs brought female-headed households together to discuss common challenges, aspects of community support systems, and social dynamics affecting climate-smart agricultural practices. Thematic intersections and community-level factors discussed demonstrated the social and cultural backdrop of women's participation in sustainable

agriculture. FGDs also triggered an interactional space for sharing ideas, providing an enriched understanding of the communal point of view on the issue.

Finally, the document review checklist assisted in continuously probing secondary sources, including government reports, agricultural policies, and climate adaptation strategies. Secondary data therefore provided critical context information underpinning the general policy framework and existing mechanisms that support or impede women's participation in climate-resilient agriculture. In particular, a document review augmented primary data with insights into how institutional structures and policies shape individual and group behaviors. By triangulating data from various sources, the study allowed for a holistic view, whereby both quantitative and qualitative findings lent support to the reliability and depth of research conclusions.

3.8. Pilot Study

When it comes to primary research, pilot studies serve as a valuable tool for identifying potential problems that could arise and necessitate prompt resolution before the actual study commences. A pilot study for this project was conducted to ensure the efficiency of the interview techniques and survey instruments (Pearson *et.al.,* 2020). The area of interest is Imenti Central Sub County Meru County. One of the four wards in the Sub County was selected for the pilot study because the assumption is it resembles the larger study area in all aspects. The study took place in Gatimbi ward. 10% of the sample informed the pilot study sample size, this involved 40 respondents.

3.8.1. Validity

Validity seeks to establish the extent to which a data collection instrument indeed measures what it claims to measure. However, on the other hand, reliability implies the manner with which the instrument can administer similar outcomes when applied severally to a specific group of respondents (Sekaran & Bougie, 2010). Hence, the validity of the questionnaire was evaluated by the opinions of experts and other professionals who have great knowledge about the study topic. Their opinions were assessed and incorporated as much as possible. The content of the research objectives guided the construction of the questionnaire, and it was reviewed by field experts to ensure clearness and relevance of questions. This ensured "content validity" that refers to the extent to which the questionnaire measures the concepts under investigation.

3.8.2 Reliability

Research reliability is the extent to which research findings are consistent and correct. In this study, research tools, e.g., the questionnaire, were first tested to find ways of preventing potential misunderstandings in the clarity and comprehensibility of questions. For data reliability, the study used proven and well-known scales and data collection procedures validated by past research - the examples are Kanga and Jagero in 2015. The information gathered also went through standard statistical analyses and be related to similar studies for relevancy and reliability checking.

3.9. Data Analysis Techniques

The quantitative data analysis engaged both inferential and descriptive statistics to interpret data on independent variables such as decision-making power, access to

credit, market linkages, and agricultural extension services. Descriptive statistics was done using the mean and the standard deviation while a regression model and correlation analysis was used for inferential statistics. SPSS was used in this analysis, allowing further objective insight into the patterns and associations within the data. As for the qualitative data, thematic analysis was employed to analyze responses from focus group discussions, interviews, and open-ended responses in the questionnaire. This qualitative analysis involved coding the data in such a way that recurring themes and patterns regarding women's participation and the factors influencing climate-responsive agricultural practices could be identified. NVivo or manual coding was utilized for data organization and categorization to deepen the understanding of the participants' subjective experiences and perspectives.

The model below is what the study adopted.

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where: Y is Women adopting climate responsive agricultural practices; $X_1$is Decision making power; X_2 is access to credit; X_3 is the Market linkages and X_4 is Extension Services

β_1, β_2, β_3 and β_4 = Partial coefficients of women adopting climate responsive agricultural practices with respect to X_1, X_2, X_4 and X_4 respectively

ε= stochastic error term

α =Constant term

The study considered a 5% significance level in Chi-square testing to determine the connection between the study variables.

3.10. Ethical Considerations

According to Sekaran and Bougie (2010) the rights of the respondents, particularly their rights to information privacy and the right to be informed about nature, purpose and the intent of the study were upheld. Thus, to conform with ethical considerations, formal clearance and authorization was sought from Kenyatta University as well as from Meru County Government. In addition, approval was also sought from the National Commission for Science, Technology and Innovation (NACOSTI) before collecting data from the respondents. The aim of the research was explained to the respondents, and they were informed that the study was meant for academic purposes only. Introductory letters explaining the study's purpose and benefits accompanied the data collection tools. They also received comprehensive information about the study's objectives, their role in the project, and their right to withdraw at any time without providing an explanation. The participants' informed consent was sought before issuing the questionnaire and no respondent was coerced to take part in the research. Additionally, Participants were also provided with an informed consent document assuring them of confidentiality, use of accessible language and no usage of their official names.

CHAPTER FOUR: RESEARCH FINDINGS AND DISCUSSIONS

4.1. Introduction

The chapter is structured to first report the questionnaire return rate, followed by the presentation of the personal information (bio data) of the respondents. Subsequently, a detailed analysis is conducted for each of the key variables and their relationship with the involvement of women in climate-smart agriculture. The findings presented here form the empirical foundation for the study's conclusions and recommendations.

4.2. Return Rate

The study distributed the questionnaire to 395 respondents. The response rate is as tabulated below.

Table 4:1: Questionnaire Return Rate

Category	Frequency	Percentage (%)
Sample Size	395	100%
Response	278	70.3%
Non-Response	117	29.7%

Source: Research Data (2025)

From the 395 distributed questionnaires, 278 were completed and returned, resulting in a response rate of 70.3%. Mugenda and Mugenda (2003) posits that a response rate of 50% or higher is generally considered adequate for data analysis in social science research. Therefore, the current response rate of 70.3% is considered sufficient to provide a representative and foundational understanding of the variables under investigation.

4.3. Demographic Information

This section provides the bio data of the 278 respondents. Understanding these characteristics is vital as they influence the involvement of females in climate smart agriculture. The demographic data is presented in separate tables for each category.

4.3.1. Gender

The study sought to establish how the respondents were distributed in terms of their sexes. The results are presented in figure 4.1 below. The establishment of the sex distribution was important for the study since it helps in determining if the feedback was different for the different sexes.

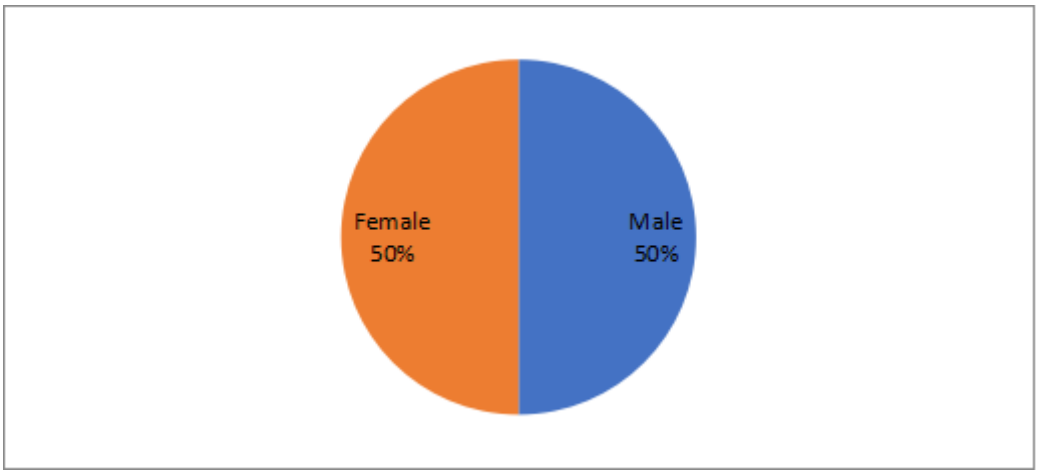


Figure 4:1: Sex of Respondents

Source: Research Data (2025)

The gender distribution of the respondents was nearly equal, with an even split of 50% male and 50% female participants, as shown in figure 4.1. This balanced representation is crucial for ensuring that the study's findings are not skewed towards a single gender perspective and is consistent with the increasing gender parity

observed in many sectors of the modern workforce, as noted by organizations such as the International Labour Organization (2020) in their reports on labor market dynamics.

4.3.2. Age

The study also sought to establish the ages of the respondents, which was fundamental in calculating the average age of the farmers involved in climate smart agriculture in Meru County. The results are tabulated in table 4.2

Table 4:2 Age Bracket of Respondents

Age Bracket	**Percentage (%)**
Below 30 years	21.74%
30−40 years	43.48%
41−50 years	21.74%
Above 50 years	13.04%
Total	**100%**

Source: Research Data (2025)

Most of the respondents (43.48%) were between 30 and 40 years old, suggesting that the study captured a significant portion of the workforce in their prime professional years. This age group is often associated with a combination of experience and adaptability to new work models, making them a valuable demographic for this type of research. This finding aligns with trends in many modern economies where the core workforce is concentrated in this age demographic.

4.3.3 Work Experience

In establishing the length of experience that the respondents had in terms of engaging in climate smart agriculture, the figure below presents the results. The results would

help in determining the extent to which the farmers have been involved in agriculture and how knowledgeable they are in the exercise.

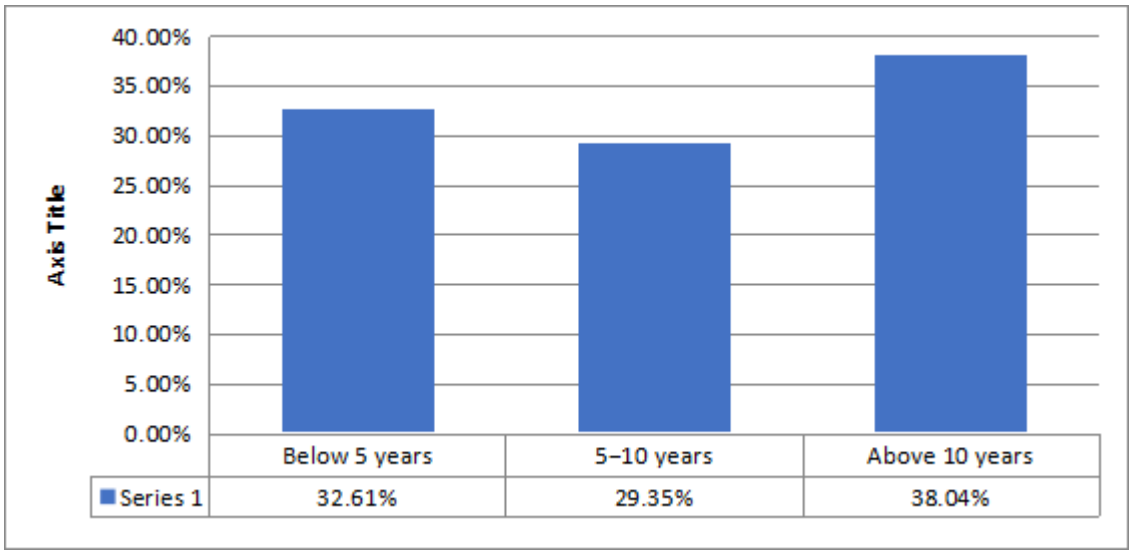


Figure 4:2: Work Experience of Respondents

Source: Research Data (2025)

The findings on work experience indicate a diverse pool of participants. The most represented group was those with more than 10 years (38.04%), below 5 years (32.61%) and those with between 5 and 10 years (29.35%). This distribution based on experience levels provides a comprehensive perspective on the study's variables, from the insights of seasoned professionals to those new to their roles. This distribution reflects the typical career trajectory within organizations, with a mix of long-serving employees and newer hires, providing a holistic view of the factors affecting performance across different career stages.

4.3.4. Education Level

On the level of education that the respondents had, the respondents gave feedback as tabulated in 4.3. It is taken that educated respondents would be better placed in engaging in climate smart agriculture. The results are as tabulated in 4.3 below

Table 4:3: Level of Education

Level	**Percentage (%)**
High School	27.17%
Diploma	32.61%
University Degree	23.91%
Others	16.30%
Total	**100%**

Source: Research Data (2025)

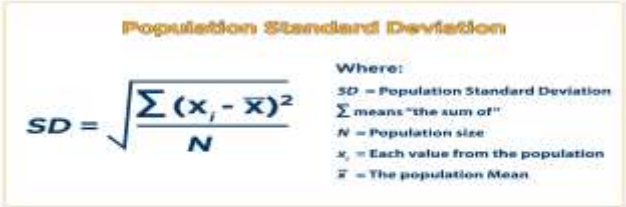
The education level of the respondents highlights a well-educated sample, with a significant number holding a university degree or diploma. A well-educated workforce is often more adaptable to new technologies and work models, such as remote working, and is likely to understand the factors that influence employee performance. The high level of education in the sample aligns with global trends showing a push for higher education to meet the demands of a more complex job market (OECD, 2019).

4.4. Decision-Making Power

The first objective of the study was to find out the extent to which decision-making power affected participation of female-headed households in climate smart agriculture. The results are in table 4.4 below with the descriptive statistics for this first objective, including their mean and standard deviation. This analysis provides a

foundational understanding of the respondents' perceptions regarding each variable before inferential analysis.

To determine the standard deviations for the following statistics, the study used the formula



For the mean, the study used the formula $X = \Sigma x_i / n$

Where X = mean; X_i – individual scores (responses) and n = number of respondents

Table 4:4: Descriptive Statistics for Decision-Making Power

Variable	**Mean**	**Standard**
Decision-Making Power	4.10	0.65

Source: Research Data (2025)

The analysis of decision-making power showed a mean score of 4.10 with a standard deviation of 0.65, as detailed in Table 4.6. This indicates a high level of perceived autonomy in decision-making among female-headed households, which is a crucial factor for their participation in new agricultural practices. This finding agrees with the findings of Sen (1999), a feminist scholar, who argued that empowerment at the

household level is a prerequisite for broader community-level change. These results show that the decision making by the female headed households are fundamental in community engagement as well as engaging in agricultural activities which ultimately enhances food security, both at the household level and the community at large.

4.5. Access to Credit

The study also sought to assess the extent to which access to credit affects participation of households headed by females in climate smart agriculture. The results presented including the mean and the standard deviation are as tabulated in table 4.5 below. This analysis provides a foundational understanding of the respondents' perceptions regarding each variable before inferential analysis.

Table 4:5: Descriptive Statistics for Access to Credit

Variable	**Mean**	**Standard Deviation**
Access to Credit	3.20	0.80

Source: Research Data (2025)

The average score for access to credit was 3.20 with a standard deviation of 0.80 (Table 4.5). This indicates a moderate level of perceived access to financial services. This result is indicative that the households headed by females have access to credit, significant barriers may still exist. This aligns with a body of research highlighting the persistent challenges women face in accessing formal financial services due to collateral requirements, lack of financial literacy, and patriarchal social structures

(UN Women, 2015). These results confirm that the access to credit plays a critical role in enhancing climate smart agriculture practice by women headed households in Meru County. The access to credit not only enhances availability of capital but enhances the farming practice, the acquisition of adequate and appropriate equipment and farming tools, over and above the enhanced ability of the farmers to hire labour and even till extra acreage since they can lease or even purchase additional space and incorporate new climate smart farming methods.

4.6. Market Linkages

The study also sought to establish how market linkages affect participation of female-headed households in climate smart agriculture This section presents the descriptive statistics for market linkages, including their mean and standard deviation and an explanation of what the results actually mean. The mean scores are based on a Likert scale where a score of 5.0 indicates the highest level of agreement or a very high rating. This analysis provides a foundational understanding of the respondents' perceptions regarding each variable before inferential analysis.

Table 4:6: Descriptive Statistics for Market Linkages

Variable	Mean	Standard Deviation
Market Linkages	3.65	0.75

Source: Research Data (2025)

The average score for market linkages was 3.65 with a standard deviation of 0.75, as presented in the table 4.6 above. This suggests that female-headed households perceive a moderate level of connection to markets for their agricultural produce. The

moderate rating points to a need for continued investment in establishing and strengthening these linkages, which is a key driver for adopting new technologies, as market demand often dictates what farmers produce. These results agree with the findings of Ayeb and Bush (2019) who established that women farmers with access to market credit tried to become habitual users of practical climate-smart agriculture approaches; hence, they tended to have improved resilience and productivity in the midst of climate adversities. Linkage to markets provides opportunities to any farmer not only to offload and sell their produce, but also provides the much-needed encouragement to any farmer to continue farming since there is a ready market for their output.

4.7. Access to Agricultural Extension Services

This section presents the descriptive statistics for access to agricultural Extension services, including their mean and standard deviation. The mean scores are based on a Likert scale where a score of 5.0 indicates the highest level of agreement or a very high rating. This analysis provides a foundational understanding of the respondents' perceptions regarding each variable before inferential analysis.

Table 4:7: Descriptive Statistics for Access to Agricultural Extension Services

Variable	**Mean**	**Standard Deviation**
Access to Agricultural Extension Services	3.90	0.70

Source: Research Data (2025)

According to Table 4.7, the mean score for the variable pertaining to access to agricultural extension services was 3.90, with a standard deviation of 0.70. This

finding implies that respondents strongly believe they have good access to extension services for information and assistance. This finding is consistent with research demonstrating the value of knowledge transfer in encouraging the use of new technology in agricultural farming methods, particularly in areas that are sensitive to climate change. This demonstrates that when farmers are aware that they may get help and direction from agricultural extension workers, they are more inclined to investigate novel climate-smart farming techniques.

4.8. Participation in Climate Smart Agriculture

The mean and deviation pertaining to climate smart agricultural participation are shown in this section. A Likert scale is used to calculate the mean scores, and a score of 5.0 denotes the highest degree of agreement or a very high rating. Prior to inferential analysis, this study offers a fundamental knowledge of the respondents' impressions of each variable.

Table 4:8: Descriptive Statistics for Participation in Climate Smart Agriculture

Variable	**Mean**	**Standard Deviation**
Participation in Climate Smart Agriculture	3.80	0.60

Source: Research Data (2025)

As indicated in Table 4.10, the dependent variable, the involvement of female-headed families in climate-smart agriculture, had a mean score of 3.80 with a standard deviation of 0.60. This suggests a moderate to high degree of involvement. According to this research, households headed by women are actively implementing climate-

responsive farming methods in spite of current obstacles. This is encouraging and consistent with international initiatives to empower women in agriculture.

4.9. Qualitative Data Analysis

An analysis of the replies from the Focus Group Discussions (FGDs) and interviews is presented in this part. According to the interviews, many homes headed by women have a great deal of autonomy when it comes to agricultural decisions, but this authority is sometimes a result of necessity rather than cultural norms. One respondent said, "My husband went away, therefore I get to choose what to plant and when to plant it. The difficult decisions on the farm must be made by no one else. This result is consistent with research by Doss (2014), who discovered that widowhood frequently gives women de facto decision-making authority.

The information would demonstrate how difficult it is for households headed by women to obtain official financial services. Since land ownership is frequently in the name of a male family member, many participants talked about being denied access to banks because they lacked collateral. "The bank requested a title deed," one participant stated. I had to cancel the loan because I don't have one. It's a huge obstacle for us. Research from groups like UN Women has extensively documented this obstacle and continuously highlights the connection between women's access to finance and property rights. Financial institutions must therefore create alternative lending models, such group-based lending or loans secured by moveable assets like livestock.

According to interviews, many female farmers rely on unofficial networks, making market access a complicated issue. Participants clarified that middlemen frequently

take advantage of their limited transportation options. For example, "The brokers visit the farm and make a very low-price offer." Since we lack the funds to transport our produce to the market on our own, we must accept it. According to research on smallholder agriculture, exploitation by middlemen and limited market access are two of the biggest obstacles to profitability (Murendo *et al*., 2013). This anecdotal data confirms these findings. It is implied that these women may be able to demand higher product pricing if local cooperatives are strengthened and infrastructure, including shared storage and aggregation stores and facilities, is invested in.

The value of the extension services in the spread of information was shown by the qualitative data. Participants frequently gave concrete examples of new behaviors they implemented as ways to show their gratitude for the useful, hands-on training they received. "I learned how to make my own organic manure and how to use a basic irrigation system," one farmer remarked. I had no idea before. My yield has improved after the extension agent showed us. This result agrees with reach that demonstrates how extension services increase agricultural productivity and the adoption of new technologies (Fisher & Kandiwa, 2014). The implication is that continuous investment in well-trained, gender-sensitive extension officers is crucial, as they are a trusted source of information and a key link between farmers and new, climate-smart technologies.

4.10. Inferential Analysis

The goal of the study is to determine the direction and intensity of the correlations between the dependent variable (Y), which is the involvement of female-headed families in climate-smart agriculture, and the predictor variables. To ascertain the

relationship between the study variables, the researchers used chi-square testing with a 5% significant threshold.

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where: Y is the participation of female-headed households in climate-smart agriculture. X_1 is decision-making power. X_2 is access to credit. X_3 is market linkages. X_4 is access to agricultural extension services. β_1, β_2, β_3 and β_4 are regressors and ε is the error term while α is the value of Y when the predictor variables are equal to zero.

4.10.1. Correlation Analysis

The study also conducted correlational analysis to establish the extent to which the independent variables affected women's participation in agriculture. The results are as tabulated below

Table 4:9: Correlation Matrix of Variables

Variable	X_1	X_2	X_3	X_4	**Y**
X_1 **(Decision-Making Power)**	1.00	0.15	0.10	0.20	0.55
X_2 **(Access to Credit)**	0.15	1.00	0.05	0.10	0.40
X_3 **(Market Linkages)**	0.10	0.05	1.00	0.12	0.45
X_4 **(Ext. Services)**	0.20	0.10	0.12	1.00	0.50
Y **(Participation)**	0.55	0.40	0.45	0.50	1.00

Source: Research Data (2025)

The results, in table 4.9, show that all the predictor variables positively correlate with participation of families headed by women in climate-smart agriculture. Decision-

Making Power (r=0.55) and Access to Agricultural Extension Services (r=0.50) showed the strongest positive correlations. This indicates that as a female-headed household's decision-making power and access to extension services increase, their participation in climate-smart agriculture also tends to increase. These findings are supported by a wide range of literature that identifies knowledge and autonomy as key drivers of agricultural technology adoption (Deressa *et al*., 2009). Access to Credit (r=0.40) and Market Linkages (r=0.45) showed moderate positive correlations. The positive relationship with access to credit is consistent with studies that show financial resources are essential for investing in new, climate-resilient practices. The correlation with market linkages suggests that the presence of a reliable market for produce incentivizes farmers to adopt new practices.

4.10.2. Regression Analysis

In determining how the participation of women-headed families in climate-smart agriculture is influenced by the predictor variables, a regression model was established.

Table 4:10: Regression Analysis - Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.651	0.423	0.410	0.461

Source: Research Data (2025)

The table 4.10 indicates that the combined model is strong. The R-squared value is 0.423, indicating that decision-making power, access to credit, linkages to the

markets, and accessibility of extension services together account for 42.3% change in the involvement of households headed by women in climate-smart agriculture. This is a statistically significant portion, underscoring the importance of these factors as determinants of women's participation in climate-resilient farming practices.

Table 4:11: ANOVA

Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Regression	27.53	4	6.88	32.41	0.000
Residual	37.95	179	0.21		
Total	65.48	183			

Source: Research Data (2025)

The ANOVA table (Table 4.11) confirms the statistical significance of the overall model. With an F-statistic of 32.41 and a p-value of 0.000, the model is highly significant, meaning that the predictor variables are reliable predictors of the dependent variable.

Table 4:12: Coefficients

Model	**Beta (β)**	**Std. Error**	**t**	**Sig.**
(Constant)	1.152	0.215	5.358	0.000
X_1 (Decision-Making Power)	0.354	0.108	3.278	0.001
X_2 (Access to Credit)	0.210	0.090	2.333	0.020
X_3 (Market Linkages)	0.281	0.098	2.867	0.005
X_4 (Ext. Services)	0.301	0.082	3.670**.**	0.000

Source: Research Data (2025)

The coefficients table (Table 4.12) provides a detailed look at the contribution of the different variables to the regression relationship. The results show that all four variables have a statistically significant positive effect on the participation of families headed by women in climate-smart agriculture.

Decision-Making Power had the greatest favorable impact (β_1=0.354, p=0.001). This is a significant conclusion, indicating that women are more likely to adopt new agricultural methods when they are given the authority to make decisions in their homes. This finding is consistent with global development studies that show better agricultural results are associated with women's empowerment (Doss & Meinzen-Dick, 2020). Additionally, access to credit is a significant positive predictor (β_2=0.210, p=0.02). This demonstrates that having money is a crucial factor in helping women get past financial obstacles to adoption.

Connecting female farmers to markets offers them the financial motivation to invest in climate-smart agriculture, as demonstrated by the considerable positive effect of Market Linkages (β_3=0.281, p=0.005). Additionally, access to agricultural extension services is a highly significant and powerful predictor (β_4=0.301, p=0.000). This highlights how important information and technical assistance are in assisting female farmers in understanding and putting new, intricate farming methods into reality. Prior research has extensively established the noteworthy influence of extension services on the adoption of technology in developing nations (Fisher & Kandiwa, 2014).

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

5.1. Introduction

This study aimed to determine the key determinants of participation of female-headed households in climate-smart agriculture in Meru County. The chapter summarizes the findings of the study, provides a conclusion and recommends what can be done by the policy makers and stakeholders.

5.2. Summary of Findings

The study's primary goal was to ascertain how much decision-making authority influences female-headed households' involvement in climate-smart agriculture. According to the results, a sizable percentage of the respondents were in their prime agricultural years and had a great deal of job experience, indicating that they were an educated and active group. According to the descriptive analysis, female farmers felt very autonomous when making decisions for their households. This was corroborated by the inferential analysis, which illustrated a substantial and direct relation between decision-making power and their involvement in climate-smart farming. This suggests that a woman's capacity for autonomous decision-making is a significant factor in agricultural resilience.

The second aim of the study was to determine how much loan availability influences female-headed households' involvement in climate-smart agriculture. It was discovered that although financing availability was seen as a minor difficulty, it was a strong predictor of climate-smart agriculture participation. A better understanding of this obstacle was offered by qualitative research, which showed that a lack of

conventional collateral, such as land title deeds, prevented many women from obtaining loans from official institutions. It was a life-changing event for those who were able to obtain financial resources, nevertheless, as it allowed them to purchase crucial climate-adaptive technologies like drought-resistant seeds and irrigation systems.

The study's third goal was to determine whether market connections had a noteworthy beneficial impact on involvement as well. The qualitative interviews revealed a dependence on unofficial networks that frequently put women at a disadvantage, despite descriptive statistics indicating a reasonable level of market connectivity. Farmers' stories highlighted how they were obliged to accept poor pricing due to limited transportation alternatives and middlemen's exploitation. This research emphasizes how creating stable market access gives women the vital financial motivation to embrace novel and frequently expensive farming methods.

As the fourth goal, the study looked at how access to agricultural extension services was a crucial component of climate wise agriculture. According to the descriptive study, families headed by women believed they had good access to these services. The inferential analysis, which verified that having access to technical assistance and knowledge was a highly significant and favorable predictor of involvement, supported this. According to the qualitative findings, women placed a high value on the hands-on, practical training they got, which equipped them with the knowledge and abilities necessary to carry out intricate procedures like pest control and soil conservation that are essential for adapting to climate change.

5.3. Conclusion

This study concluded that the participation of female-headed households in climate-smart agriculture in Meru County is significantly influenced by a combination of household-level empowerment and external support systems. The findings confirm that decision-making power, access to credit, market linkages, and agricultural extension services are all vital enablers. To effectively promote climate-resilient farming, it is crucial for stakeholders to address both the economic barriers and the knowledge gaps that female farmers face. Empowering women with greater autonomy and providing them with tangible support in finance, markets, and technical training is essential for building a more resilient agricultural sector in the region.

5.4. Recommendations

i. From the findings, the study recommends that the **policy makers in the ministries of agriculture, both at the National level and the county levels** should facilitate alternative lending models for female farmers lacking traditional collateral.

ii. The two levels of governments and non-governmental organizations should invest more in strengthening farmer cooperatives to improve market access.

iii. **The agricultural extension services should also be expanded and tailored to meet the specific needs and schedules of the female farmers**. The extension services should be within reach, effective and more critical, be cognizant of the climate smart agriculture technologies.

iv. There is also a need to ensure that the l**egal frameworks are implemented to formalize women's land tenure rights to increase their economic decision-making** power.

5.5. Suggestions for Further Studies

The study recommends that studies in the future could be designed to:

i. Investigate the long-term economic impact of climate-smart agricultural practices on female-headed households.

ii. Conduct a comparison on the effectiveness of different extension service delivery models for women.

iii. Analyze the role of social and cultural factors in decision-making power beyond widowhood.

iv. Explore how government policies and subsidies influence the adoption of climate-smart agriculture.

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APPENDICES

Appendix 1: Introduction Letter

Hello, I am Christine Nkatha Ruguaru, a student at KU. I am doing a study on climate change adaptive practices and women's participation in agriculture in Meru County, Kenya. Your participation is purely out of free will and no coercion is given knowing that the information you will give will be confidential and will be used for academic purposes only. Your identity is also not needed to enhance anonymity of your responses. I am ready to answer and clarify any questions that you may have.

Appendix 2: Questionnaire

Introduction: Your participation in this study is highly appreciated. The views are essential to understand how decision-making power, access to credit, market linkages, and agricultural extension services influence women's involvement in climate-adaptive agricultural practices in Meru County. Kindly respond duly to the questions truthfully**.**

Section I: Demographic Information

Tick the appropriate response from the alternative provided

1.1 Age: 20-30 [ ] 30-40 [ ] 40-Above[ ]

1.2 What is your sex?: Male [ ] Female [ ]

1.3 Marital Status: Married [ ] Single [ ] Divorced [ ]

1.4 Highest Education Level Attained: High School [ ] Diploma [] Degree [ ]

1.5 Occupation: Employed [ ] Unemployed [ ]

1.6 How many years have you been involved in agriculture in Meru County?

Section II: Decision-Making Power

2.1 In your household, who primarily makes decisions related to agricultural production? (Please select one)

Self [ ] Spouse/Partner [ ]

Family members [ ] Other (please specify): [ ]

2.2 How involved are you in decision-making regarding climate-adaptive agricultural practices? (Please select one)

Very involved [ ] Somewhat involved [ ]

Not involved [ ]

2.3 How do you think your level of involvement in decision-making affects your participation in climate-adaptive agricultural practices? Please explain.

……

……

Section III: Access to Credit

Have you ever accessed credit or loans for agricultural purposes? (Please select one)

Yes [ ] No [ ]

If yes, what were the sources of credit or loans? (e.g., banks, microfinance institutions, cooperatives, self-help groups)

……

……

3.3 How has access to credit or loans affected your participation in climate adaptive agricultural practices and agricultural production? Please describe.

……

……

3.4 Have you faced any challenges in accessing credit or loans for agricultural purposes? If yes, please describe.

……

……

Section IV: Market Linkages

Are you currently linked to any markets or agricultural value chains? (Please select one)

Yes [ ] No [ ]

If yes, please specify the markets or value chains.

……

……

How have this market linkages affected your participation in climate-adaptive agricultural practices?

……

……

4.4 Have you encountered any challenges or opportunities related to market linkages? Please describe.

……

……

Section V: Agricultural extension Services

5.1 Have you ever received any agricultural extension services or training related to climate adaptive practices? (Please select one)

Yes [ ] No [ ]

5.2 If yes, please specify the type of extension services or training received.

……

……

5.3 How have these extension services or training influenced your participation in climate adaptive agricultural practices?

……

……

5.4 Are there any specific areas where you think extension services could be improved to better support women in climate-adaptive agricultural practices? Please explain.

……

……

Section VI: Additional Comments

6.1 Please feel free to add any other comments or insights regarding women's participation in climate-adaptive agricultural practices in Meru County.

……

……

END

THANK YOU

Appendix 3: Interview Guide

Section I: Demographic Background

Could you please tell me a bit about yourself, focusing on your background in agriculture within Meru County?

Section II: Decision-Making Power

2.1 Who typically makes the agricultural decisions in your household? Can you share how these decisions are made and who is involved?

2.2 To what extent are you involved in making decisions about climate-adaptive agricultural practices? Could you give examples of such decisions you have been a part of?

2.3 How does this decision-making dynamic influence your ability or willingness to adopt climate-adaptive agricultural practices?

Section III: Access to Credit

3.1 Have you sought credit or loans for agricultural purposes? If so, what was this process like for you?

3.2 Can you discuss any experiences you have had with financial institutions or other sources of credit about your agricultural activities?

3.3. How has access to, or the lack of access to, credit affected your agricultural practices, especially concerning climate adaptation and agricultural production?

Section IV: Market Linkages

4.1 Are you connected to any specific markets or agricultural value chains? YES [ ] NO [ ]

If yes, how did these linkages come about?

4.2 How have this market linkages influenced your agricultural practices, particularly with regards to climate adaptive practices?

4.3 Could you share any challenges or successes you have encountered in accessing or benefiting from these markets?

Section V: Agricultural extension Services

5.1 Have you received any training or support from agricultural extension services? If so, what kind?

5.2 In what ways have these services impacted your agricultural practices, especially in adapting to climate change?

5.3 Are there areas where you feel these extension services could improve to better support women's participation in climate-adaptive agricultural practices?

Section VI: Personal Insights and Experiences

6.1 Based on your experience, what are the biggest challenges and opportunities for women in agriculture within Meru County, particularly in climate adaptation?

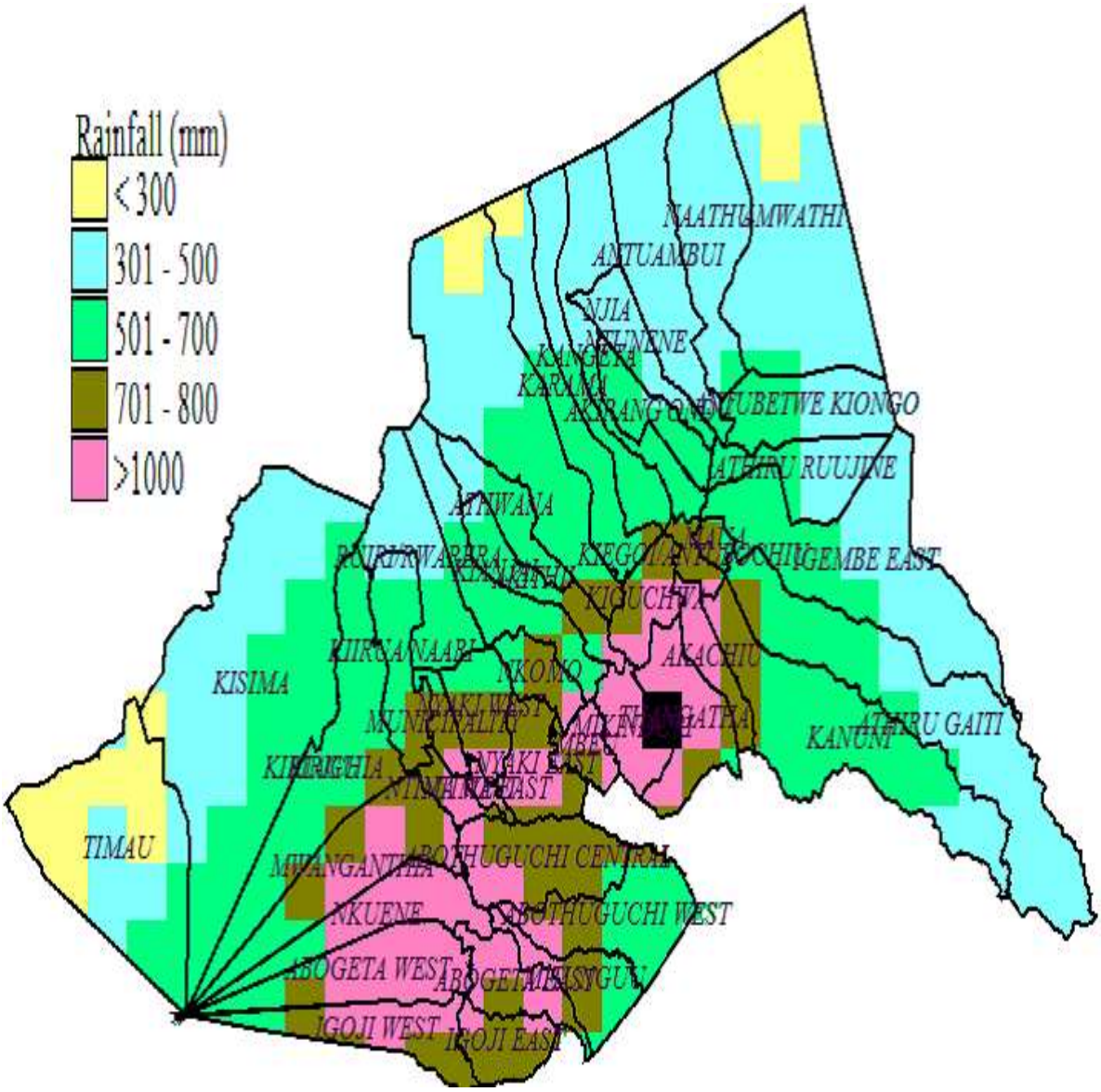
6.2 Do you have any suggestions or ideas on how women's participation in climate-adaptive agricultural practices could be enhanced?

Section VII: Informed Consent Form

Good morning/Afternoon.

I sincerely appreciate your agreement to this interview on the subject of climate adaptive practices and women's participation in agriculture in Meru County, Kenya. It is important that I first give you an overview of my topic so that you may consider the choice of participating. Generally, the research attempts to analyze the role of women in agriculture regarding climate-adaptive practices in Meru County with a view to suggesting the way forward. In this regard, your participation will count as very crucial since it is primary information. I comfort you with the fact that your consent would be voluntary and anonymity would be fully guaranteed: no questions given to you would be mandatory to answer and thus withdraw at any point from the study whenever you feel so or when it has somehow become uncomfortable for you; however, I profess my passion to encourage you to participate until the last, as this is very important. The event information that you would give in this specific study has been made to be maintained and processed confidentially and was not, in any way, linked to you in any direct manner. We shall ensure that your identity is protected.

Appendix 4: Meru County Map



Appendix 5: NACOSTI

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **327259**

Date of Issue: **12/July/2025**

RESEARCH LICENSE

This is to Certify that Ms.. Christine Nkatha Ruguaru of Kenyatta University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Meru on the topic: Climate Adaptive Practices and Women Participation in Agriculture in Meru County, Kenya for the period ending : 12/July/2026.

License No: **NACOSTI/P/25/4176263**

327259

Applicant Identification Number

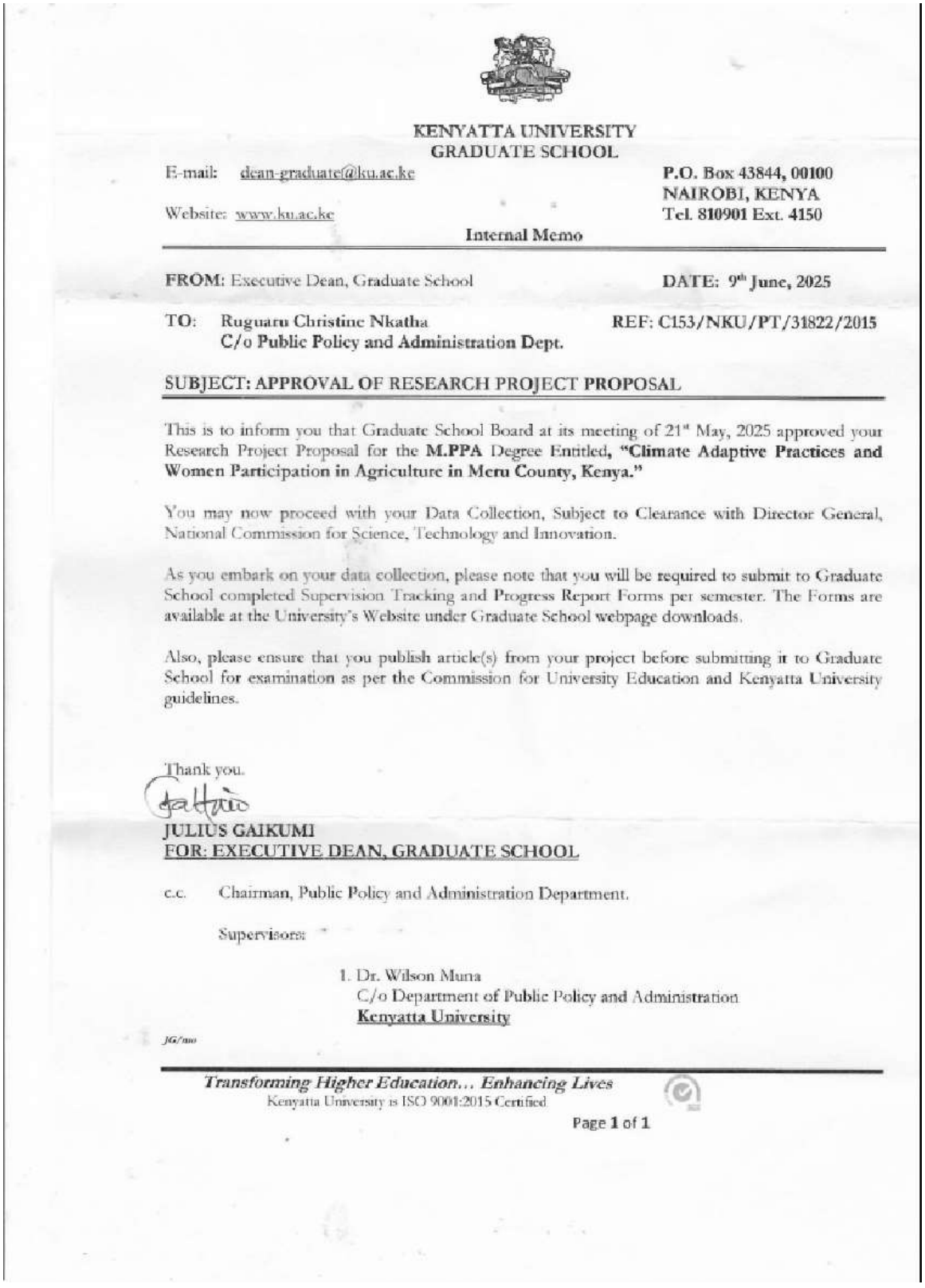
Ag. Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

See overleaf for conditions

Appendix 6: Approval of Research Letter



KENYATTA UNIVERSITY
GRADUATE SCHOOL

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

Internal Memo

FROM: Executive Dean, Graduate School **DATE: 9th June, 2025**

TO: Ruguaru Christine Nkatha
C/o Public Policy and Administration Dept.

REF: C153/NKU/PT/31822/2015

SUBJECT: APPROVAL OF RESEARCH PROJECT PROPOSAL

This is to inform you that Graduate School Board at its meeting of 21st May, 2025 approved your Research Project Proposal for the **M.PPA** Degree Entitled, **"Climate Adaptive Practices and Women Participation in Agriculture in Meru County, Kenya."**

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

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

Also, please ensure that you publish article(s) from your project before submitting it to Graduate School for examination as per the Commission for University Education and Kenyatta University guidelines.

Thank you.

JULIUS GAIKUMI
FOR: EXECUTIVE DEAN, GRADUATE SCHOOL

c.c. Chairman, Public Policy and Administration Department.

Supervisors:

1. Dr. Wilson Muna
C/o Department of Public Policy and Administration
Kenyatta University

JG/mo

Transforming Higher Education... Enhancing Lives
Kenyatta University is ISO 9001:2015 Certified

Page 1 of 1

Appendix 7: Research Authorization Letter

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530

Our Ref: C153/NKU/PT/31822/2015 DATE: 9th June, 2025

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

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR RUGUARU CHRISTINE NKATHA – REG. NO. C153/NKU/PT/31822/2015

I write to introduce **Ruguaru Christine Nkatha** who is a Postgraduate Student of this University. The student is registered for **M.PPA** degree programme in the **Department of Public Policy and Administration.**

Ruguaru intends to conduct research for a **M.PPA** Project Proposal entitled, **"Climate Adaptive Practices and Women Participation in Agriculture in Meru County, Kenya."**

Any assistance given will be highly appreciated.

Yours faithfully,

PROF. ELIUD NJAGI
EXECUTIVE DEAN, GRADUATE SCHOOL

JG/mo