DEVOLUTION OF AGRICULTURE AND ITS EFFECTS ON MANGO MARKETING BY SMALL SCALE FARMERS IN MAKUENI COUNTY, KENYA

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other university.

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Declaration by supervisors

We confirm that the work in this thesis was done by the candidate under our supervision

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DEDICATION

For their financial and moral support during the full Master's programme, I devote this project to my mother Jenester Vamba, my father Geoffrey Vamba and my son Nathaniel Kyalo.

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ABBREVIATIONS AND ACRONYMS

ASALS	**:**	Arid and Semi-Arid Lands
ASDS	**:**	Agricultural Sector Development Strategy
CVI	**:**	Content Validation Index
EU	**:**	European Union

OPERATIONAL DEFINITION OF TERMS

Devolution – In According to the Fourth Schedule of the Kenyan Constitution, devolution in this research refers to the transfer of authority, duties and resources from the national government of Kenya to local governments. This strategy prioritises the distribution of public resources to improve local production and economic growth, ensuring local participation in decision-making and empowering Makueni County to govern its own agricultural sector, including mango production.

Economic Effects - In the study, it refers to the financial impact of costs of equipment such as the mango planting machine and mango harvester, supplies to the nearest markets as well as exports, labour costs and administration costs for mango farmers in Makueni County.

Marketing– The process by which individuals, groups, government industries (such as the mango processing plant), partners, marketing agents and other entities must transfer ownership of mangoes from the place where they are grown to the place of utilisation in Makueni County is referred to in this study.

Pricing – For the purpose of this study, pricing means deciding the amount required as payment for mangoes offered for sale in Makueni County.

Processing – In this study, processing refers to performing a series of mechanical or chemical operations on mangoes in Makueni County in order to transform them into value-added products or to preserve them for extended shelf life. This includes activities such as cleaning, peeling, slicing, drying, juicing and packaging.

Social Effects - The impact on people and communities that happens as a result of mango farming in Makueni County.

Small Scale Farmers-Are the producers of mangoes in Makueni County having fewer assets and cultivating mangoes in acreage of less than 5.

ABSTRACT

Many mango farmers face significant post-harvest losses due to poor logistics, insufficient government support and limited market access, leading to unproductivity, unsustainability and increased poverty due to reliance on middlemen. This study sought to establish the indicators of agricultural devolution, assess the benefits of devolution to mango farmers, examine the challenges faced by mango farmers in selling their produce despite devolution and investigate the coping strategies on challenges faced by mango farmers in Makueni County. Mango farming has been a source of misery for many farmers owing to its huge post-harvest losses that have resulted from limited market access, low prices and lack of proper farmers' management organizations. The study pre-tested the research tools for validity and reliability, data gathered during the pilot guided in further improving the research tools. Quantitative data underwent cleaning process before sorting and entry into SPSS (V27) package which helped in analysis. Descriptives were used to descriptively analyze the data based on the specific objectives, while correlation analysis was used to test the hypothesis formulated. Graphs and tables presented the data. Qualitative data from interview guides was analyzed through thematic analysis. This involved identifying patterns or themes in the data by systematically coding and categorizing responses. The findings were significant to policy makers, the farmers and researchers in the same field of study. The study found that the indicators of devolution included better marketing guidelines (40.2%), promotion of farm cooperatives (36.7%), processing of farm produce (15.3%), better infrastructure (16.6%), better bargaining power (14.1%) among others. The findings also demonstrated a strong positive correlation between agricultural devolution and mango marketing ($r = 0.572$, $p = 0.000$). The study concluded that though mango marketing cooperatives helped the farmers to market their products, the Makueni County government did not have enough marketing options for its farmers in their mango produce. Consequently, the County Government has not made significant investments in more effective marketing frameworks, which has resulted in poor prices for their produce, restricted access to finance and a lack of markets. The report suggests that in order to boost mango demand and marketing strategies, the Makueni County administration and mango growers should collaborate. This can be done by promoting mangoes and the benefits of consuming them, finding new markets for mangoes, improving the quality and quantity of mango production and supporting value addition and processing.

CHAPTER ONE
INTRODUCTION

1.1 Background to the Study

Farming is crucial in addressing the Sustainable Development Goals (SDGs), particularly in reducing poverty and eliminating extreme hunger. This sector has driven significant economic and political reforms across many countries, including India, Pakistan, the Netherlands, France, Canada, Guatemala and Kenya (Lee-Geiller & Lee, 2019; Kimathi, 2017). These reforms have been informed by the need to review governance structures and systems that define rural development. Fonseca, Domingues and Dima (2020) posit that enhancing rural economies needs to be prioritized in order to achieve the SDGs centred on the elimination of hunger and poverty in developing countries.

For mango production, Castro-Arce and Vanclay (2020) noted that many rural development programs and initiativaes have not transcended into better livelihood for rural mango producers in countries such as India and Pakistan. In other countries such as Brazil, the country has potential of producing more mangoes compared to the 970 thousand tonnes produced per year (Nogueira *et al*., 2020). There is also a low rate of markets for mango farmers in Asian countries such as India and Thailand and South America (Brazil, Venezuela, Guatemala, Haiti, Ecuador and Peru) (Thompson, 2021).

In Africa, countries such as Egypt and Madagascar have been touted to improve their mango production and marketing through integrated rural development programs in mango farming for local communities (O'Brien, Pike & Tomaney, 2019). Among the fundamental issues mentioned is devolution, which seeks to address optimization of information flow, easing of development cost and taking services closer to the people. Further, devolution creates a democratic space for institutions of governance to thrive (Omondi, 2019).

In addition, Mulesa and Westengen (2020) indicate that mango producing African countries such as Burkina Faso, Guinea, Mali, Ivory Coast, Gambia and Ghana must speed up the development of agricultural technologies and marketing processes must be revitalized for farmers to reap maximum benefits associated with their efforts. There are huge deficiencies in fruit farmers' economies of scale which limit their competitiveness in the international market. Many fruit farmers, mangoes included, in the developing nations are unable to comply with the international quality standards rendering their produce unattractive to international marketing organizations (Odari, 2018). In addition, these farmers are often ignorant of marketing information and as such they are poorly linked to better markets which have the potential of buying their produce at higher prices.

The constitution of Kenya 2010 ushered in devolution leading to decentralization of many sectors including agriculture (Kimathi, 2017). The sector employs more than 75% of the population (Njeru, 2017). Kenya is ranked third in mango production in Africa, with highest production recorded in 2017 (772,700 tons) (Mwangi, 2021). However, the existing markets are insufficient to absorb the high volume of mango harvests, leading to significant post-harvest losses. In 2018 for instance, Kenya exported 3% of the total production of mangoes to the international markets (Odari, 2018). 95% of mangoes are sold in the domestic markets while 2% is sold to food and processing industries locally.

Mango production is dominated by small scale rural farmers found in the Eastern counties including Makueni (1,172,636 trees), Machakos (803,533 trees), Embu (371,157) and Kitui (307,930 trees) as per Institution Development and Management Services (2023). Counties with high number of mango farmers include; Makueni (106,379), Machakos (22,238), Kitui (15,778) and Meru (13,442) (Lelgut, 2020). However, mango farmers in Makueni for a long time have been side-lined by the Ministry of agriculture (Muema *et al.*, 2018). Wangu *et al*. (2020) study on limitations of inclusive agribusiness noted that

the deficiency in marketing has rendered Makueni mango farmers very vulnerable to exploitation from middlemen. In response, the Makueni County Integrated Development Plan 2018-22 was developed for potential of transforming livelihoods of many rural communities.

1.2 Statement of the Problem

Many farmers engaged in mango farming have experienced significant distress due to substantial post-harvest losses. These losses have occurred as a result of insufficient coordination between farmers and traders, insufficient support from the government and limited opportunities for accessing markets. The challenges have made the sector very unproductive and unsustainable. Muema *et al*. (2018) noted a majority of agriculturalists were exposed to middlemen, thus promoting poverty. Some studies that have been done in Makueni County include Wangu *et al*. (2020) and Lelgut (2020).

The constraints of participatory agribusiness in promoting the security of nutrition and food in a small community have been investigated by Wangu *et al.* (2020). The study found that mango farming causes various challenges including middlemen and lack of ready markets that have caused misery to farmers. Muema *et al*. (2018) noted that farmers lose up to 45% of their produce to undeveloped farming practices related to post harvesting handling and diseases. Despite the existence of these studies, there is still a dearth of information and literature about the effects of agricultural devolution on small-scale farmers' sale of mangos in Makueni County. Thus, the purpose of this study was to assess the impact of agricultural devolution on small-scale farmers' sale of mangoes in Makueni County, Kenya.

1.3 Objectives of the Study

1.3.1 General Objective

The purpose of this study was to assess the impact of agricultural devolution on small-scale farmers' sale of mangoes in Makueni County, Kenya.

1.3.2 Specific Objectives

It was important to establish specific objectives for this study as follows:

i. To establish the indicators of agricultural devolution in Makueni County.
ii. To assess the benefits of devolution to mango farmers in Makueni County.
iii. To examine the challenges faced by mango farmers in selling their produce despite agricultural devolution.
iv. To investigate the coping strategies by mango farmers on the challenges they faced in Makueni County

1.4 Research Questions

i. What are the indicators of agricultural-devolution in Makueni County?
ii. What benefits result from devolution on mango farmers in Makueni County?
iii. What are the challenges faced by mango farmers in selling their produce despite devolution?
iv. What are the coping strategies by mango farmers on the challenges they faced in Makueni County y?

1.5 Research Hypothesis

H_0: There is no significant association between agricultural devolution and marketing of mangoes by small scale farmers in Makueni County, Kenya.

1.6 Assumptions

Farmers' marketing strategies were thought to be impacted by the devolution of agriculture, according to the study. The research additionally postulated that the subset of small-scale mango growers in Makueni County was representative of the overall community of small-scale mango growers and that the information gathered via questionnaires and interviews faithfully captured the viewpoints and experiences of these growers.

1.7 Significance

One of the strategies of accelerating agriculture sector growth is to advance market access (Kogo *et al*., 2021). The essence of market access to agriculture development has been emphasized in the ASDS 2010-2020. With the advent of devolution, comprehending how farmers have been able to exploit the available markets is crucial. This study carries substantial importance for policymakers, planners, researchers, mango farmers and other stakeholders in the mango farming sub-sector. Examining market access strategies in regions like Makueni County, the findings can inform policy decisions, strategic planning initiatives and farming practices aimed at improving agricultural productivity and livelihoods. Through collaboration and knowledge-sharing, stakeholders can leverage the study's insights to optimize market engagement and enhance economic development outcomes. Ultimately, the study has the potential to contribute to poverty alleviation, food security and overall socio-economic growth in mango farming regions.

1.8 Scope and Limitations

The study sought to establish the indicators of agricultural devolution, benefits of devolution on mango farmers, challenges faced by mango farmers in selling their produce despite agricultural devolution and the coping strategies on challenges faced by mango farmers in Makueni County. The study targeted a range of stakeholders involved in

mango farming and marketing in the county, including individual farmers, farmer group associations and corporations such as Makueni Fruit Processors Cooperative Society, Makueni Fruits Value Chain Cooperative Society, Mulili-Kyale Fruits Farmers' Cooperative Society, Kakika Joint Farmers' Cooperative Society, Kalamba Fruit Farmers Marketing Cooperative, Kwiminia Farmers' Cooperative Society, Nzakika Mango Farmers' Cooperative Society and Makueni Fruits Joint Cooperative.

Mango farming is selected as opposed to other fruits farming because most farmers in Makueni County have planted mangoes (106,379 farmers with 1,172,636 trees) compared to 40,818 citrus fruits farmers, for instance. Makueni County is selected because of higher amount of farming: Makueni County (1,172,636 trees) and Kitui County (307,930 trees) for instance. It is therefore the main livelihood farming activity in the County.

Through surveys, interviews and focus groups, both quantitative and qualitative data were gathered and analysed as part of the study's descriptive research study design. To ensure there was enough time to gather information and evaluate the results, data gathering took place in January 2023. Unfortunately, the study was constrained by some respondents' refusal to divulge information, which would have compromised the reliability and validity of the results. In order to address this issue, the researcher received prior authorization from Kenyatta University to carry out the study and gave respondents assurances regarding their privacy and confidentiality. This served to foster a sense of confidence and raised the respondents' desire to engage in the research. The respondents also had trouble responding to the questions in the survey. The investigator took a few actions to overcome this constraint. First, in order to help the respondents understand the questions, the researcher clarified and explained things as needed. Additionally, the researcher made sure that respondents felt at ease and secure in their responses by providing help and direction through the data collection process.

CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

This chapter offers a literature review on agriculture's impact on mango marketing by small-scale farmers, exploring market chains, perceived benefits, challenges faced by farmers and their coping strategies. It also addresses the philosophical and theoretical underpinnings that support the research.

2.1 Review of Related Literature

2.1.1 Empirical Literature on Indicators of Agricultural Devolution

In the Islamic Republic of Iran, Tajbakhsh (2019) found that extension services to farmers, training and capacity building to improve their skills, funding/soft loans to finance their agricultural activities, public participation in decision making, provision of infrastructural development to facilitate access to markets were required in the decentralized systems of governments for competitive business activities. The insensitive top-down, state-controlled machineries that are in charge of market regulations and operations are in most cases limiting given the bureaucratic bottlenecks that define them and as such, hinder innovation and progressiveness in development of new market channels like e-markets and modern logistic processes that are pragmatic and flexible (Tajbakhsh (2019). This study, however, was conducted in the Islamic Republic of Iran, which is a different context.

In Ethiopia, Mulesa and Westengen (2020) analysed access governance resources for food and agriculture. Based on an analytical approach, the study postulated that devolved functions are meant to offer pathways for new investments opportunities that are viably lucrative and can attract additional capital from the private sector, offering the farmer greater access to domestic and internal markets. Factors such as marketing aid, farm

inputs (subsidized), processing of produce, inspection and regulation, promotion of farm cooperatives and climate change policy define the requirements for agricultural devolution. The devolution in totally therefore, is an economic driver of change as it addresses the challenges that have stagnated the potential in agricultural sectors, such as poor and unsustainable marketing channels for small holder farm produce. This is made possible by redesigning and implementing more technically effective and appropriate policies that are in tangent with farmers' demands and needs. In effect, small holder produces become more energized and improve their production capabilities in terms of quality and variety, given the assurances of better and reliable markets that are characterized by proper coordination, corporation and collaboration with collectors, transporters, wholesalers and retailers and good pricing. However, this study focused on overall agricultural production in Ethiopia and not specific to mangoes, while the current study focused on mango farming in Makueni County.

In Kenya, Wanjiku, Jonyo and Alwanga (2020) noted that the perception about devolution is that it influences political and economic processes governing sectors that are central to human development, such as agriculture, health and education. It is believed that decentralization has the potential of reviewing, restructuring and restoring marginalized segments of production, as in the case of marketing channels for fruit farmers in the developing nations. The expected end-result of devolution is a proper functioning system that is not biased or favours particular individuals but one that is sensitize and accommodates majority interests and thus effective in reducing global poverty through encouraging sustainable practices. To achieve this, provision of marketing aid, processing of produce, inspection and regulation, promotion of farm cooperatives and climate change policy should be considered. The study has a gap in that is mainly focused on Kenya as a whole, while the current study was specific to mango production in Makueni County.

Ngaruiya (2019) collected data using semi-structured interviews with stakeholders, actors and representatives of different institutions that are involved with devolution in Kenya. This study noted that devolution has been touted as a means of attaining environmental, social and governance goals which are the pillars for sustainable development goals, in relation to reducing global poverty and enhanced wellbeing of citizens, by improving the sector of agriculture, particularly in developing worlds given their dependence on food and fruit production. Further, the study argues that local governments must ensure that there is the implementation of local programs, open channels for farmers including looking for markets and provide financing to a whole range of services that are included in decentralization. The study however focused on stakeholders and actors of devolution, but did not include the farmers, who were included in the current study.

Wangu *et al*. (2020) highlighted the limitations of inclusive agribusiness and noted that deficient marketing has rendered Makueni mango farmers vulnerable to exploitation from middlemen. One way to address challenges faced is through provision of extension services to educate farmers on good agricultural practices and market trends. Additionally, devolved governments can facilitate knowledge to improve their production capabilities and enhance the quality of their produce. However, the study did not include the farmers in devising its findings, who were included in the current study.

2.1.2 Empirical Literature on Benefits of Devolution to Farmers

In Britain, O'Brien, Pike and Tomaney (2019) studied devolution and governance. The study determined that the structural bottlenecks that farmers faced were addresses through the establishment of local based commissions within the devolved circles of governance. The enhanced public participation in policy drafts and implementation committees enabled the local governments to build better roads for timely delivery of produce, as well as improvements in the extension services for farmers and other economic actors. In

effect, farmers were able to coalesce resources for optimum management and operations that drastically reduced their productions costs at the expense of better profits. This study, however, has gaps in context and methodologies adopted.

In the US, Chang, Lanfranconi and Clark (2020) used a mixed-method analytic approach, drawing findings from structural intersectionality framework and the critical race theory. The study postulated that lack of minorities in devolved units produces a downside effect in relation to structural and operational institutions that are central to survival of small holder farming initiatives. In the US for instance, lack of African American and Hispanics in devolved units widened the gap between the races in the US, thus equating devolution to a one-sided political sideshow. This study mainly focused on theoretical approaches, while the current study mainly depended on primary data in deducing the findings of the study.

Keya *et al*. (2019) looked at the prospects for food security in five counties and argued that the case for devolution effect in structural and operation systems of marketing channels in the counties studied has attracted both praise and criticism in equal measure. Devolution has promoted entrepreneurship into the supply and market chains in the agriculture sector. In addition, many community-based groups, youth and women enterprises sprung up with the advent of devolution, particularly in the crop and animal production sectors. Decentralization has thereby provided opportunities for marginalized communities given the enhanced local participation in channels of decision making and thus improved efficiency in the administration of local based services. In some counties, however, the impact of decentralization has not resulted into betterment of service delivery to farmers owing to low levels of information about devolved policies and affairs, low capacity levels, limited finance and poor accountability. This study has a gap

in that it mainly focused on five counties. The current study, however, focused on mango farmers in Makueni County.

Ng'asike, Stepputat and Njoka (2020) using primary data obtained through fieldwork in Garissa and Nairobi Counties of Kenya, found that devolution has led to improved rural road networks, better provision of extension services, improved management and regulation of brokers, construction of new and modern markets, provision of better transportation services and promotion of grassroots capacity building through cooperative and community-based organizations. The model of decentralization is based on the need to build grassroots capacity for effective delivery of community-sourced services.

The World Bank has supported devolution and advocated for greater stakeholder involvement. The establishment and co-management between devolved functions and farmers often leads to better decision-making and regulation of market functions, which are crucial for enhancing local livelihoods (Ng'asike *et al*., 2020). However, the municipal factors that directly influence individual participation and productivity in mango farming, for example, are missing in this study.

2.1.3 Empirical Literature on the Challenges Faced by Farmers in Selling their Produce Despite Devolution

In Vietnam, Pham, Kappas and Faust (2021) noted that agriculture in general forms the primary income generating activity for most households in the developing world. The rural communities whose livelihoods solely depend on agriculture: production, processing, trade and services, often have limited access to lucrative markets which has the potential of buying their produce at sustainable and fair process, thus enhancing their income livelihoods settings. The lack of agricultural marketing interventions, either pursued by governments or non-state actors, has continued to see majority of farmers in developing nations remain poor. Many of the small-scale farmers therefore are left with

no choice but to sell to domestic markets, which are vulnerable to bad governance, corruption and unhealthy practices and the current study determined if the same could be applicable in Makueni County.

Thompson (2021) reviewed existing past studies and postulated that mango farming over the years has gained momentum in many African communities owing to conducive climate and availability of land. Many farmers however, are yet to enjoy the full potential of this venture given their poor structures that are inherent in the production chain. The casual and traditional farming techniques that have been adopted have continued to render the mango fruit from these communities less marketable in the international world. The unhealthy practices that associate the post harvesting and handling processes, have made the marketing of these product less viable in the competitive markets. As a result, farmers rely on local markets which are bent on poor pricing systems, less efficient forms in handling and transportation and lack of transparency in marketing information in relation to international markets. This study, however, was different as it was done in a generalized African context, while the current study was specific to mango farming in Makueni County.

Asghar, Rasool, Younas, Basit and Haq (2020) conducted a study in developing countries on agricultural devolution. The study postulated that market traders have become the only alternative for many smallholder farmers. In supporting this view, the authors opined that the underdeveloped subsistence levels in cultivation, harvesting and post-handling techniques are impediments to meeting strict international standards manifested in quality and sustainable practices. However, this study did not involve data collected from the farmers, a gap that the present study filled.

Muricho, Otieno and Oluoch-Kosura (2017) used a triangulation of participatory research methods encompassing the community, reflection meetings, expert consultations and focused key informant group discussions. The authors found that restructuring the face of fruit markets in Kenya and other developing nations is inevitable if the SDGs are to be attained. Mango markets in these settings suffer from low prices and limited access to sustainable marketing systems. The seasonal and often unreliable production of low-quality mangoes, coupled with rudimentary post-harvesting, transportation and handling techniques, have continued to render farmers vulnerable to brokers and middlemen.

The large number of traders in the marketing cycle has reduced the unit value-at-farm for mangoes. Other marketing factors that strain the mango markets are a lack of legitimate marketing lobbyists that fight for farmers' interests in the marketing value chain systems, a lack of coordination through cooperatives that would increase bargaining power and limited capacity and ignorance of market information systems in export markets (Muricho *et al*., 2017). The gap in this study is that it was conducted in a different contextual environment, West Pokot, while the current study focused on mango farming in Makueni County.

The study by Kibet (2019) focused on smallholder French beans farmers in Kirinyaga County, Kenya and used a social experiment. The study found that devolved governments with reputation and financial power have been able to seek reputable marketing information in international markets, leading to sustainable partnerships between farmers' associations, devolved governments and international markets. This has resulted in direct sales of farmers' produce to international markets, enhancing profits and locking out middlemen. However, this study was different from the current study, which focused on mango farming in Makueni County, Kenya.

2.1.4 Empirical Literature on Marketing of Mangoes

In India, Agarwal (2018) conducted a study that compared marketing of mango by group farms and individual family farms. The study used empirical literature to highlight the difficulties they face in competing in international markets. The study emphasizes the need for developing effective marketing strategies and providing better market opportunities for smallholder farmers, including those in the mango farming industry. The study, however, did not really address the difficulties encountered by Kenyan mango growers or the efficacy of marketing techniques in that country. As a result, there is a study vacuum about the unique marketing difficulties faced by Kenyan mango growers as well as the efficacy of marketing tactics in that country. In order to close this gap, this study looked at the difficulties faced by mango growers in Kenya's Makueni County and came up with practical marketing plans that would increase their profitability and marketability.

Adenle, Wedig and Azadi (2019) used qualitative data, including interviews with key stakeholders in the agriculture sector, to emphasize the need for African countries to prioritize their agricultural sectors to achieve food security and economic growth. The study determined that investment in agriculture technologies and revitalization of critical industries could ensure sustainable development and economic growth. However, the study did not specifically address mango farming issues in Kenya, including those in Makueni County, Kenya. This highlights the need for further research that specifically focuses on how investment in agricultural technologies and critical industries can support marketing of mangoes.

Odari (2018) using primary data collected through interviews and questionnaire, the study highlights the need for improved marketing channels and investment in the mango farming industry to increase its profitability and support its growth. The study calls for

greater government investment and support for the industry to enable smallholder farmers to access international markets. There is need for improved marketing channels and investment in the mango farming industry in Makueni County, Kenya. The study by Wangu et al. (2020) shows lack of market information and limited bargaining power. The research emphasizes the need for inclusive business models that address these challenges to improve the profitability and competitiveness of smallholder mango farmers in Kenya. Overall, the study sheds light on the importance of effective marketing strategies and infrastructure development.

2.1.5 Empirical Literature on Coping Strategies on Challenges Faced by Mango Farmers

In Norway, Stewart (2021) focusing on empirical data to draw conclusions determined that the financial and human resources gap that has caused farmers to lose a significant portion of their profits to middlemen and brokers has led to the establishment of savings and cooperative societies to improve cooperation and coordination, thereby increasing farmers' leverage in bargaining with potential buyers. In some instances, devolved governments have established farmer management committees tasked with monitoring local services to regulate and inspect line activities. Such systems have reduced the exploitation of smallholder farmers by locking out bad actors in the marketing channels, thereby enhancing profits. Although this study focused on smallholder farmers, its context in Norway differs from that of Makueni, where the current study was conducted.

In Indonesia, Kresna (2021) argued that the principles of decentralization dictate that efficient, effective and sustainable initiatives must be offered to small-scale farmers who have been neglected by central governments. The growth and development of local societies that depend predominantly on agricultural practices depend on the support offered by decentralized government departments. Kresna (2021) argues that devolved

systems must actively participate in sensitizing farmers to modern, sustainable and technologically advanced modes of farming, to popularize the products produced in both domestic and international markets. The study does not indicate if this is achieved through enhanced cooperation and coordination between county/state governments and farmers, which the current study aims to determine. The methodology adopted is theoretical, which differs from the current study that mainly relied on primary data sources to arrive at the study findings.

In Pakistan, Ahmad, Shahbaz and Randhawa (2018) studied challenges and opportunities in developing sustainable agriculture, basing their arguments on literature review. The close relationships that state governments have built with production stakeholders have enhanced focus on farmer needs. In Pakistan for instance, the decentralized municipals provide comprehensive extension services to fruit farmers in addition to providing water, fertilizers, seeds, pesticides, transport and delivery to markets thus cushioning small scale farmers from high costs of inputs that usually eat into their profits. Such initiatives cushion the farmers from external exploitation by middle level servicemen. Comparing their findings to India, the state governments monitor and regulate mango market channels. The small-scale mango farmers sell their products through four avenues, namely the pre-harvest contractors, country traders, village traders or commission agents and mango processing units. Such initiatives by the devolved units in the creation and regulation of market channels for fruits are crucial for the sustainability of the mango industry and the current study was done in Makueni County, which is a different contextual environment to Pakistan.

Tchewafei *et al.* (2020) noted that decentralization has opened new financial avenues and partnerships for small holder farmers which have enabled them to access credits and grants. In addition, the devolved departments of agriculture have backed the enhanced

capacity building for small scale farmers in seeds and seedlings management, post-harvest management, value addition, marketing and sales of produce. Although this study was in a developing country in Africa, its context is still different from that of Makueni County, where the current study was conducted for mango farmers.

Maina *et al*. (2019) using primary data collected from the producers of mangoes showed that decentralization is pegged on enhancing the quality of agricultural products and services that small-scale farmers are dominant in their geographical zones. The authors argue that the renewed spirit by the County Governments in the lower Eastern region in the affairs of farmers is not only aimed at increasing the profits that producers reap from agricultural activities but also encourage diversification and provision of producer information needs on sustainable and profitable farming practices. In addition, devolved governance is about rural development in terms of building modern market structures such as storage and cooler units that are required for perishable products, better service delivery in markets and roads development. As such, farmers are able to generate better revenues owing to reduced losses associated with marketing infrastructures. The devolved units are also the custodians of environmental protection and sustainability. In a bid to mitigate the risks of climate change, the current study aimed to determine if the decentralized systems of government offer disaster credits and insurances to farmers in Makueni County.

2.2 Theoretical Framework

2.2.1 Theory of Unbalanced Growth

The proponent of this theory, Hirschman (1958), in his developmental study in strategy, assumed that focusing additional investments in key economic sectors is crucial for the general growth and stability of a nation, especially the developing ones. Since this theory is a situation in which economic growth is significantly higher in some sectors than

others, the proponent argues that channelling resources that are limited concurrently across the sectors of the economy do not always have the same trickle-down economic effect due to diverse challenges that each sector has.

The interlinkage between government departments ensures that growth is spread progressively across all departments and therefore focused investment in central departments will ultimately produce trickledown effect on other sectors. Skewed distribution of resources across government functions is therefore encouraged in developing nations as long as priority is given to key production sectors, given that third world nations operate on lean and very tight budgets.

Saliminezhad and Lisaniler (2018) support this view by arguing that in order to effectively grow through efficient utilization of public resources, economic planners should deliberately prioritize key production segments of the economy in their fiscal budgets by channelling more funds in the associated organizations. This ensures that the focused development ultimately achieves the intended goals and not jeopardized by financial challenges. The skewed distribution and development of key sectors will ultimately grow other sectors.

In the context of the study on devolution and mango farming in Makueni County, the theory is relevant in addressing all objectives/variables of the study as follows: The first objective on the indicators of agricultural devolution in Makueni County aligns with the theory as it highlights the importance of identifying the key economic sectors for investment. The second objective, the benefits of devolution on mango farmers in Makueni County, is also relevant to the theory as it focuses on the potential benefits that can be derived from strategic investments. The third objective, challenges faced by mango farmers in selling their produce despite devolution, aligns with the theory as it highlights

the need of strategic investments. Finally on the coping strategies used by mango farmers in Makueni County to overcome the challenges they face also aligns with the theory of Unbalanced Growth. The study aims to identify coping strategies used by farmers to overcome challenges such as poor market access, which can inform future investment decisions.

2.2.2 Theory of Agricultural Transformation

The Theory of Agricultural Transformation (TAT) was proposed by Bruce F. Johnston and Peter Kilby in their 1975 book Agricultural and Structural Transformation. This theory emphasizes the need for agricultural transformation to promote economic growth and development. This theory suggests that agricultural transformation, through the adoption of modern technologies and practices, can help shift labour and resources from the agricultural sector to the manufacturing and service sectors, leading to overall economic growth and development (Diao *et al*., 2017). The TAT also recognizes policies such as subsidies for agricultural inputs and research and development programs can help increase productivity in the agricultural sector. Similarly, institutions such as extension services and farmer cooperatives can help disseminate information.

In the context of the study, the first objective of establishing indicators of agricultural devolution in Makueni County can be linked to the TAT's emphasis on policies and institutions promoting agricultural transformation. The second objective of assessing the benefits of devolution on mango farmers in Makueni County can be linked to the TAT's focus on increased productivity in the agricultural sector. The third objective of examining the challenges faced by mango farmers in selling their produce despite devolution can be linked to the TAT's emphasis on the need for effective marketing strategies. Lastly, the fourth objective of investigating coping strategies on challenges faced by mango farmers can be linked to the TAT's recognition of the importance of

farmer cooperatives and extension services in facilitating the adoption of modern technologies and practices.

The study adopted two theories to provide a comprehensive framework for examining the issues related to devolution and mango farming in Makueni County. The theory of unbalanced growth was utilized to understand the importance of focusing investments in key economic sectors and the potential challenges that may arise when resources are distributed equally across all sectors. This theory also emphasizes the need for strategic resource allocation. On the other hand, the theory of agricultural transformation highlights the significance of agricultural development and its role in promoting overall economic growth. It emphasizes productivity improvements and facilitate the transition of resources from agriculture to other sectors.

2.2.3 Research Gap(s)

The reviewed literature has indicated a number of studies such as Ngaruiya (2019), Keya *et al*. (2019), Kibet (2019) and Maina *et al*. (2019) on devolution and/or marketing in local context. The studies have indicated that there are benefits of devolution to agricultural production, which are also accompanied by various challenges. Further, Muema *et al*. (2018), Wangu *et al*. (2020) and Lelgut (2020) among others have been conducted in Makueni County, there is still very limited on the topic.

Despite the numerous studies on devolution and/or marketing in the local context, there is still limited literature on mango farming in Makueni County. Specifically, on the indicators of agricultural devolution in Makueni County, while there have been previous studies on the effects of devolution, there is a need to establish specific indicators that are relevant to the mango farming sector. On the benefits of devolution on mango farmers in Makueni County, the reviewed literature suggests that devolution has the potential to

improve agricultural production in general, but the specific benefits to mango farmers have not been extensively studied. On the challenges faced by mango farmers in selling their produce despite devolution; while devolution may have positive effects on agricultural production, it is not without challenges. There is a need to identify and understand the challenges that small-scale mango farmers face in selling their produce despite devolution. Finally, this research aimed to investigate the coping strategies used by mango farmers in Makueni County to overcome the challenges they face in the marketing of their produce.

2.2.4 Conceptual Framework

The researcher's concepts are illustrated in this section. The document delineates the correlations among various variables and topics in the investigation, facilitating a lucid comprehension of the research methodology. The dependent and independent variables that are the subject of the investigation are presented by the researcher in this part. The study's independent variable, agricultural devolution, was thought to have an impact on the dependent variable, mango marketing. Agricultural devolution, as demonstrated by many metrics as the supply of extension services, training and capacity building, funding/soft loans, public participation in decision-making, farm inputs, infrastructural development, marketing aid, processing of produce, inspection and regulation, promotion of farm cooperatives and climate change policy in Makueni County, served as the driving force or influencing factor.

The dependent variable, marketing of mangoes, was influenced by agricultural devolution. The study examined how agricultural devolution affected the marketing of mangoes in terms of specific indicators, including the rise in overall production or mango yields per hectare, an increase in the volume of mango marketing and an increase in income levels of farmers. It determined how the various components of agricultural

devolution impact mango marketing, ultimately assessing whether improvements in agricultural devolution positively affect mango marketing indicators such as production, volume and farmer income. The intervening variables, partners, laws/ policies and regulations were postulated to improve the relationship between agricultural devolution and marketing of mangoes in Makueni County. Figure 2.1 presents the conceptual framework.

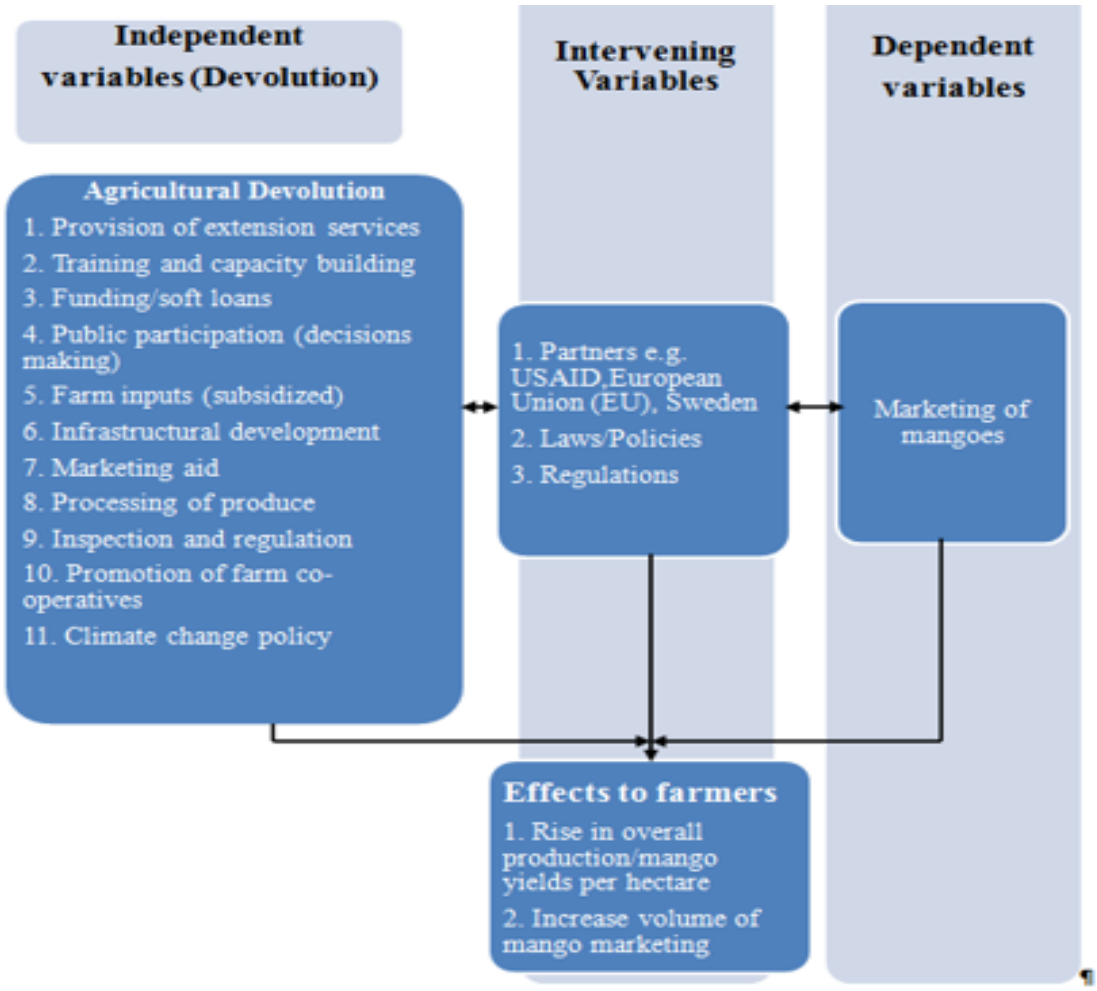

Figure 2.1: Conceptual Framework on the Relationship between Devolution and Marketing of Mangoes

Source: Synthesized from literature review

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter defines the methodological procedures for determining both the sample sizes and the sample participants who include Mango farmers in Makueni County and other farmer group associations and corporations that undertake the marketing and sales of mangoes within the county.. The chapter also brings out the research instruments, data collection procedure, validity and reliability.

3.2 Research Design

The research design used in the study was descriptive. Descriptive research means that the study's goal was to accurately depict the actual situation in Makueni County. The purpose of the design was to ascertain the causal relationship between the independent and dependent variables by gathering and analysing data. "Causal" in this sense refers to the study of cause-and-effect correlations between independent and dependent variables with the goal of figuring out how modifications to one variable affect modifications to another.

3.3 Variables

The study was composed of two main categories of variables, the independent variables that, is agricultural devolution and the dependent variable, marketing of mangoes. The details on the independent variable are shown first in sub-section 3.3.1.

3.3.1 Independent Variable

Devolution of agricultural services (independent variable) was looked into using the aspects of provision of extension services, training and capacity building, funding/soft loans, public participation (decisions making), farm inputs, infrastructural development, marketing aid, processing of produce, inspection and regulation, promotion of farm cooperatives and climate change policy in Makueni County.

3.3.2 Dependent Variable

Marketing of mangoes was measured using rise in overall production/mango yields per hectare for sale, increase in volume of mango marketing and increase in income levels of farmers in the county. The study assessed the rise in overall production and mango yields per hectare, as well as the increase in volume of mango marketing and income levels of farmers, as indicators of the impact of devolution on mango marketing in Makueni County. The responses were collected through interviews and questionnaires and analyzed quantitatively using statistical software to determine the percentage of respondents who believed that there was a rise in overall production/mango yields per hectare and increase in volume of mango marketing since devolution was introduced.

3.4 Study Area

The study's boundaries are Kajiado County, which extends to the north western region, the county of Kitui to the north-east, Taita Taveta County to the southeast and Machakos County to the southwest. Makueni County is the study's primary emphasis. As seen in Figure 3.1, its approximate location is between latitudes 1° 38' and 2° 31' South and longitudes 37° 52' and 38° 30' East. Makueni, Mbooni, Kibwezi East, Kibwezi West, Kaiti and Kilome are the six sub-counties that make up Makueni County.

One of the Arid and Semi-Arid Lands (ASAL) regions is Makueni County. It has moderate temperatures (15–260C) and little annual precipitation (250–900 mm). The fertility of the soils is low. A vital source of income for most small and medium-sized farmers is growing mangoes. The majority of farmers in the agricultural industry are small-scale growers that depend on a variety of crops for their income. In the area, beans, maize, cowpeas, green grammes, pigeon peas, sorghum and millet are the principal crops farmed. In the region, growing mangoes is another well-liked pastime; most small- and

medium-sized farmers depend on it for their revenue. In addition, farmers in the area cultivate forages and pastures, which they utilise as cattle feed.

77495 houses in the County are home to 987653 people (Kenya National Bureau of Statistics [KNBS], 2019). In Makueni County, marketing a variety of commodities is a significant part of the agricultural sector. There are several obstacles in Makueni County's agricultural product marketing. The main challenges include inadequate market access, poor infrastructure, low prices for their produce and lack of storage facilities.

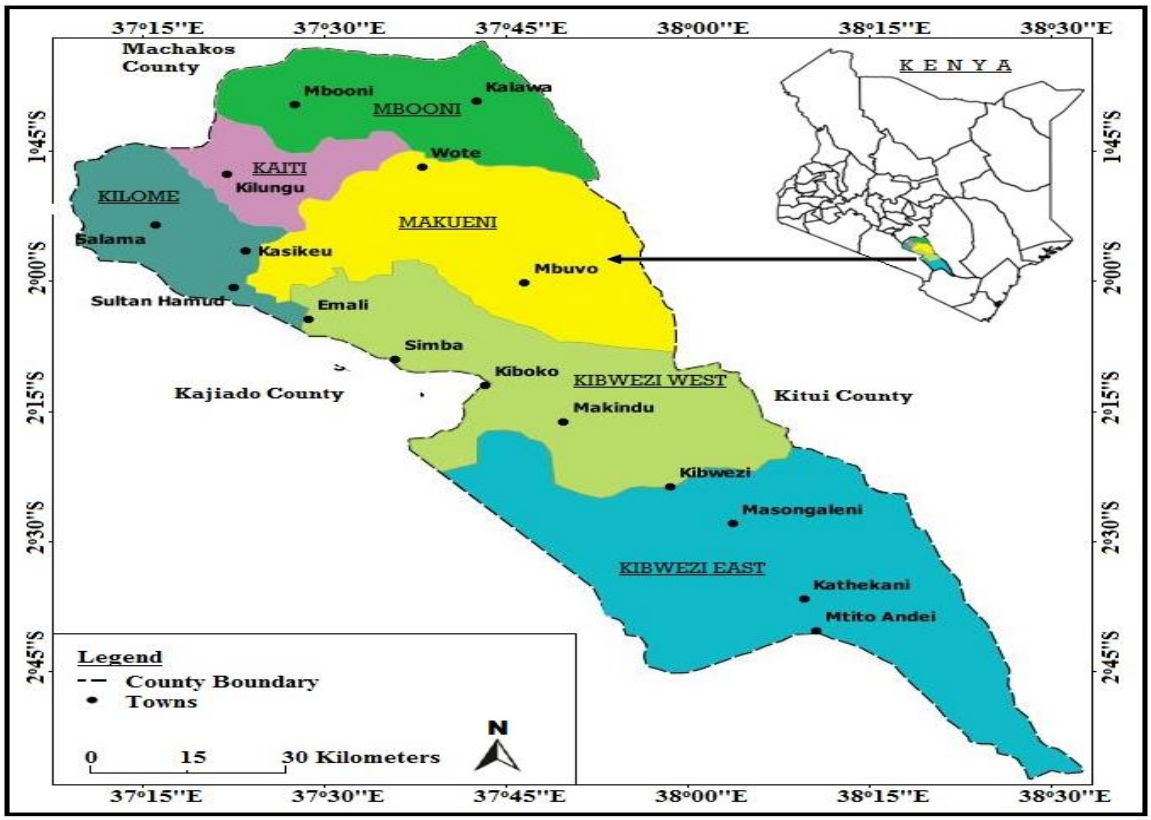

Figure 3.1. Map Showing Sub-Counties in Makueni County
Source: First County Integrated Development Plan, Makueni County (2018-2022).

3.5 Target Population

In social science research, a target population is the entire group of elements that can provide information, which is relevant to objectives of a study (Creswell & Creswell, 2017). The study targeted all the Mango farmers in Makueni County and other farmer group associations and corporations that undertake the marketing and sales of mangoes

within the county. Also, the study targeted the relevant departments such as that of agriculture in the county. The mango farmers are mostly small scale and spread across the different wards in the county. Some are in the highlands parts whereas others are in the lowlands.

3.6 Sampling Techniques and Sample Size

The sampling strategies and sample size calculations utilised in the study are covered in this section. This section also includes the rationale for the selected procedures. It is broken down into two subsections: 3.6.1 deals with sampling methodologies and 3.6.2 deals with determining sample size.

3.6.1 Sampling Techniques

The research used a stratified random sample technique to choose farmers who grew mangoes in order to choose survey respondents. Makueni County's six Sub-Counties were divided into six strata. The size and location of the Sub-County were taken into consideration when determining the sample size from each stratum. In order to provide all participants a fair opportunity of participating in the study, the initial step in the sampling method required travelling to the first sub-county, Makueni, when participants were randomly picked using a random number generator. After that, the researcher went on to Mbooni, the next Sub-County and continued the procedure there until the needed number of responders was attained. This procedure was carried out repeatedly in Kibwezi East, Kibwezi West, Kaiti and Kilome, the remaining four Sub-Counties, until the desired total sample size was reached.

The selection of respondents within each Sub-County was done through random sampling. A random number generator was adopted to select households from a list of households in each Sub-County. Only household heads were allowed to participate from

each household (husband or wife). Additionally, respondents who were below 18 years of age were excluded from the study. With bias reduction and sample representation as top priorities, the sampling procedure was created. Valid conclusions could be drawn from the study's sample since stratified random sampling produced a sample that closely matched the population's characteristics.

The knowledge and experience of the key informants in this study about mango growing and marketing was taken into consideration. The criteria for selecting key informants included their roles as agricultural extension officers, representatives from farmer cooperatives and officials from the County Government's department of agriculture. These individuals were identified through purposive sampling, which involves selecting individuals who have knowledge or experience relevant to the research question.

For FGDs, the criteria for constituting the groups included age, gender and geographic location. The FGDs were conducted together for both male and female farmers, with each FGD group comprising participants from different age groups and geographical locations within each Sub-County. The purpose of this approach was to capture a range of perspectives and experiences related to mango farming and marketing among different demographic groups in the county. Participants for the FGDs were selected through purposive/convenience sampling.

Specifically, there was one FGD conducted per Sub-County. This means that each Sub-County had its own separate FGD. The interviews and discussions for the FGDs took place in various locations within each Sub-County. These locations included conference halls, community centers, schools, or even outdoor settings like under trees. The specific places where the FGDs were held depended on the availability of suitable venues within each Sub-County. To pull the participants together for the FGDs, the involvement of

chiefs and Sub-County agricultural officers was employed. These individuals played a role in assisting with participant recruitment by reaching out to potential participants within their respective jurisdictions. By utilizing their knowledge and networks within the community, the chiefs and agricultural officers helped identify and invite farmers who met the criteria for participation in the FGDs. Finally, each FGD group consisted of eight participants from different age groups and geographical locations within the Sub-County. This participant number was chosen to ensure a manageable group size that would facilitate meaningful discussions and allow for a diversity of perspectives to be represented within each FGD.

3.6.2 Sample Size

A finite population of 106,379 farmers was targeted, a sample size was computed using Cochran's formula for sample size determination (Table 3.1).

$$n = \frac{Z^2 pq}{d^2}$$

Thus n =1.96^2 (0.5 X 0.5)/0.05^2 = 384, distributed proportionally as shown in Table 3.1.

Table 3.1: Sample Size Determination

Strata	Target Population	Sample Size Calculation	Sample Size
Makueni	34,759	34,759/106,379*384	125
Mbooni	27,123	27,123/106,379*384	98
Kibwezi East	11,518	11,518/106,379*384	42
Kibwezi West	13,136	13,136/106,379*384	47
Kaiti	14,917	14,917/106,379*384	54
Kilome	4,926	4,926/106,379*384	18
Total	**106,379**	**106,379/106,379*384**	**384**

Source: Field work (2022)

The rationale for selecting all six Sub-Counties in Makueni County was to ensure that the study captured the diverse perspectives of mango farmers across the county; each Sub-County has unique characteristics such as climate, soil type and economic activities, which may influence the production and marketing of mangoes. Therefore, by selecting

all Sub-Counties, the study aimed to obtain a representative sample that reflects the diverse perspectives and experiences of mango farmers across the county. Additionally, the sample size for the study was determined based on the size and location of each Sub-County to ensure that the sample was proportional to the population size in each Sub-County.

3.7 Research Instruments

In this study, a semi-structured questionnaire (Appendix 1) was used to guide respondents as well as give them chance to express themselves. To get more detailed information, the study also used interviews (Appendix 2) and Focused Group Discussions (FGD) (Appendix 3) to collect data from committee members of local mango cooperatives, partners, local mango traders and exporters, farmers group and agricultural stakeholders, as well as the county department of agriculture.

3.7.1 Questionnaire

A semi-structured questionnaire was the primary tool for sourcing the requisite data. This is because questionnaires are easy to collect both quantitative and qualitative data and gives greater room for confidence and confidentiality and hence relevant for the study. The purpose of the tool was to gather data regarding the marketing channels that mango growers were previously utilising in addition to those they are currently employing.

The semi-structured questionnaire was designed to capture both closed and open-ended questions about access and sustainability of market channels and how devolution have influenced the restructuring and operation mechanisms. Closed-ended questions gave the farmers options to choose from. The questionnaire's open-ended questions aimed to elicit from farmers perspectives and ideas that the researcher was unable to obtain through

closed-ended questions. To get more detailed information from the farmers and some members of cooperative societies, the researcher also conducted focus group discussions.

3.7.2 Interviews

The survey also used interviews to collect in-depth information on marketing channels from the Key Informant Persons (KIP), who include committee members of local mango cooperatives, local mango traders and exporters, farmers group and agricultural stakeholders such as the Kenya Agricultural Productivity Project (KAPP), Kenya National Farmers Federation (KENAFF), Mbukinya Digital and Uvuanyo which deal with marketing and sales of mangoes within the county and offer technical support to enhance the mango value chain, as well as the county department of agriculture staff.

3.7.3 Focus Group Discussions

Focus groups were also held by the researcher in order to obtain additional details about farmer respondents and some cooperative society members. Apart from individual interviews, focus groups were held to gather additional in-depth details about farmers' and cooperative society members' experiences with agricultural devolution and mango marketing. The researcher recruited participants for the focus group discussions through purposive/convenience sampling, selecting individuals who were involved in mango farming and marketing in the selected Sub-Counties of Makueni County. The discussions were held in community halls or schools within the Sub-Counties and each session lasted for approximately two hours. A total of 6 FGDs were done across the 6 Sub Counties.

During the focus group discussions, the participants were encouraged to express their opinions and experiences on the benefits and challenges of agricultural devolution on mango farming and marketing. The discussions also explored their views on the roles of the County Government, cooperative societies and other stakeholders in promoting

agricultural development in the county. The focus group discussions provided an opportunity for the participants to interact and share their experiences with each other, which helped to enrich the data collected from the individual interviews.

3.8 Pilot Test

A pilot study was carried out in Mwala Sub-County to test the research tools and protocols before the main study was carried out. The pilot study was chosen for Mwala Sub-County because it shares similarities with Makueni County in terms of climatic conditions and mango production. Being a neighbouring sub-county, Mwala likely experiences comparable environmental factors and agricultural practices as Makueni County, making it a suitable location to test the research instruments and procedures before conducting the main study. The pilot study helped to identify potential challenges and weaknesses in the research instruments and procedures, which were then rectified before the main study.

A representative number of 38 was employed in the pilot study to assess the questionnaire's reliability, relevance and clarity. The pilot study assisted in determining the amount of time needed to finish the survey and any potential logistical issues that might come up when gathering data. Reliability determined which items, such as marketing infrastructure and climate change policies, were changed or eliminated when the Cronbach Alpha coefficient was less than 0.7. Additionally, the pilot study offered a chance to verify that the respondents chosen were roughly representative of the intended audience and to test the sampling strategies. In order to enhance the calibre of the data gathered for the primary study, the research tools, protocols and sampling strategies were improved in light of the pilot study's findings. In general, the pilot study assisted in making sure that the primary study ran well and that the tools and protocols used for research were legitimate and trustworthy.

3.8.1 Validity

Utilised was the Content Validity Index (CVI). In this sense, a tool's contents were considered strongly valid if their CVI score was 0.6 or above. To administer this test, SPSS version 27 was used. The findings are shown in Table 3.2.

Table 3.2: Content Validity Indices

Variable	No. of Items	CVI
Indicators of agricultural devolution	17	0.723
Benefits of devolution on mango farmers	9	0.672
Challenges faced by mango farmers	6	0.755
Coping strategies	6	0.811
Marketing of mangoes	3	0.667
Overall	41	0.736

Source: (Researcher, 2022)

3.8.2 Reliability

Cronbach's alpha (α) was used by the researcher to assess the degree of reliability of the research instrument. In this study, the SPSS statistical program was used to determine Cronbach's alpha coefficients for the data collection tool during piloting and a Cronbach's Alpha of more than 0.7 were found in this study, which warranted data collection (Table 3.3).

Table 3.3: Reliability Statistics Summary

Variable	No. of Items	Cronbach's Alpha
Indicators of agricultural devolution	17	.842
Benefits of devolution on mango farmers	9	.892
Challenges faced by mango farmers	6	.827
Coping strategies	6	.823
Marketing of mangoes	3	.842
Overall	41	.844

Source: (Researcher, 2022)

3.9 Data Collection Techniques

Research assistants were used. After obtaining permission, the participants were given a total of 3 days to respond to the research instruments administered to them. The selection of key informants was based on their proficiency and understanding of the cultivation and

promotion of mangoes in Makueni County. They were contacted to take part in the study after being found by purposive sampling. Participants in Focus Group Discussions (FGDs) were chosen based on their experience growing and selling mangoes in their local communities. The criteria for constituting the FGDs included the following: participants had to be small-scale mango farmers, members of farmer groups or associations, or representatives of corporations involved in the marketing and sales of mangoes in the county. The FGDs were conducted separately for each of the six Sub-Counties in Makueni County, with 8-10 participants in each group.

3.10 Data Analysis and Presentation

For Objective 1, the variables were analyzed using percentages, frequencies, mean averages and standard deviations. The qualitative approach involved the identification of similar themes and relationships between themes. Objective 2 was analyzed using percentages, frequencies, mean averages and standard deviations as well as identification of similar themes and relationships between themes were done. Similarly, Objective 3 was analyzed using mean averages, standard deviations, percentages and frequencies and qualitative data was organized into themes and analyzed. Finally, for Objective 4, percentages, frequencies, mean averages and standard deviations were used and qualitative data was organized into themes and analyzed. Table 3.4 provides a summary of the data analysis methods used for each objective. Quantitative data analysis was also performed using inferential statistics, in this case correlation analysis, which was used to test the hypothesis.

Table 3.4: Summary of Data Analysis per Objective

Objective	Analysis Method
To establish the indicators of agricultural devolution in Makueni County.	Qualitative data was categorised into themes and subjected to analysis, while quantitative data was presented using percentages, frequencies, mean averages and standard deviations.

To assess the benefits of devolution on mango farmers in Makueni County.	Qualitative data was categorised into themes and subjected to analysis, while quantitative data was presented using percentages, frequencies, mean averages and standard deviations.
To examine the challenges faced by mango farmers in selling their produce despite devolution.	Qualitative data was categorised into themes and subjected to analysis, while quantitative data was presented using percentages, frequencies, mean averages and standard deviations.
To investigate the coping strategies on challenges faced by mango farmers in Makueni County	Qualitative data was categorised into themes and subjected to analysis, while quantitative data was presented using percentages, frequencies, mean averages and standard deviations.

3.11 Logistical and Ethical Considerations

This section discusses the logistical and ethical considerations that was used in the study. The justifications on the considerations chosen are also given in this section. NACOSTI granted a research authorization in order to authorise the collection of data. This was supported by an introductory letter from the Department. Copies of both letters were shared with all participants for introductions and consent obtained. The researcher also provided an introductory letter to the participants in the study, outlining the goals of the investigation and the process for completing the surveys. Since study assistants were employed, they received training on how to conduct the questionnaires in order to get high-quality results.

Confidentiality and voluntary involvement were respected. To get correct data, the researcher solely relied on participants' willingness and integrity. In addition, participants were made aware of their freedom to leave the study at any time. It was also instructed to the responders not to put their initials anyplace on the information collection instrument.

CHAPTER FOUR
DATA ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter offers the findings from the information gathered regarding how agricultural devolution has affected small-scale farmers in Kenya's Makueni County's sale of mangos. It aims to identify the indicators of agricultural devolution, explore the advantages devolution brings to mango farmers, examine the difficulties faced by mango farmers in selling their produce and study the strategies used by mango farmers to overcome these difficulties.

4.2 Response Rate

The study aimed to gather data from 384 mango farmers in Makueni County, Kenya. During the data collection process, some questionnaires were not completed, resulting in a non-response rate of 18.5%. Despite this, the researcher still managed to collect data from 313 farmers, which represents an overall response rate of 81.5%. The response rate for each Sub-County varied between 74.1% and 86.7%, with an average response rate of 81.5%. This response was considered sufficient for the analysis, as it exceeded the 70% threshold commonly accepted in research, according to the guidelines established by Creswell and Creswell (2017). Table 4.1 presents the response in each strata of the study.

Table 4.1: Study Response Rate

Location (Sub County)	Sample Size	Response	Response Rate
Makueni	125	101	80.8%
Mbooni	98	85	86.7%
Kibwezi East	42	36	85.7%
Kibwezi West	47	36	76.6%
Kaiti	54	40	74.1%
Kilome	18	15	83.3%
Total	384	313	81.5%

Source: Field Data (2023)

4.3 Demographic Data of the Respondents

It's critical to comprehend farmer demographics in order to create agriculture interventions and strategies that work. In order to gain insight into the socioeconomic position of small-scale mango growers in Makueni County, Kenya, demographic information about the respondents such as age, gender, level of education, family size and farm size—was gathered for this study. The analysis of the demographic data was done using frequencies and percentages to provide a comprehensive picture of the characteristics of the respondents. This information is crucial for developing targeted interventions aimed at improving mango farming and marketing in the county.

4.3.1 Gender of Farmers

The findings indicated that 59% (n=185) of the respondents were male whereas 41% (n=128) of the respondents were female. The findings imply that there is a notable gender imbalance in terms of representation among mango farmers in Makueni County, with males being more represented in the farming population than females. The findings on gender are shown in Figure 4.1. Gender imbalance in agriculture is a widely researched topic in the literature. Studies have shown that women tend to be underrepresented in the agricultural sector in many countries (Nogueira *et al*., 2020). In Kenya, women are estimated to contribute to about 70% of agricultural labour but own only about 1% of agricultural land (KNBS, 2019).

Gender disparities in agriculture and specifically in mango farming have been reported in many studies. In Makueni County, Kenya, for example, a study by Lelgut (2020) discovered that male-headed families had greater availability of assets and amenities connected to mango growing than female-headed households. Similarly, a study by Mulesa and Westengen (2020) found that female farmers in Ethiopia faced more constraints in accessing extension services and inputs for mango farming compared to

male farmers. Therefore, the findings from this study that males dominated mango farming in Makueni County are consistent with the existing literature on gender disparities in agriculture (Nogueira *et al*., 2020).

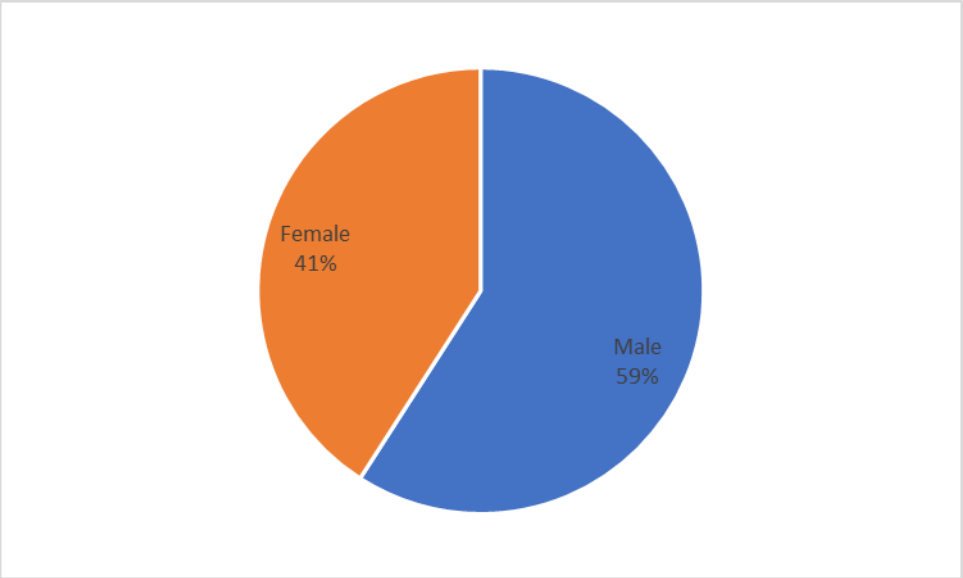

Figure 4.1: Gender of Farmers

Source: Field Data (2023)

4.3.2 Age of Farmers

A global trend of an ageing agricultural population is indicated by the literature now available on the subject of ageing in agriculture. Young people are frequently disinclined to pursue farming as a vocation for a variety of reasons, including lack of resources and low pay (Castro-Arce & Vanclay, 2020). Concerns about sustainable agriculture and food security are raised by this phenomena, which is referred to as the "youth bulge." Results of the survey on respondents' age brackets indicate that, comprising 35.5% (n=111) of the people who responded, the majority of Makueni County's mango farmers are around their respective ages of 31 and 40. People aged 41 to 50 make up 32.6% (n=102) of the population after this. With only 9.5% (n=30) of those surveyed being 51 years of age or older, this age group was the least represented. Furthermore, the results show that 22.4%

(n=70) of those surveyed were under 30. The findings show that most of Makueni County's mango producers are middle-aged.

The findings from this study on the age bracket of mango farmers in Makueni County are consistent with Kibet *et al*. (2019) and Mwangi (2021). The majority of farmers are in the mid-age group (30–50 years old), according to studies done in other parts of Kenya as well as other developing nations. In 2019, Kibet et al. conducted a survey which revealed that the average lifespan of producers was 42 years old, with the bulk of them belonging to the 30-49 age range. Similarly, Mwangi's (2021) survey revealed that farmers' average age was 41 years and 44.4% of them were in the 36–50 age range. Therefore, the findings from this study on the age bracket of mango farmers in Makueni County are consistent with the existing literature on the age distribution of farmers in Kenya and other developing countries.

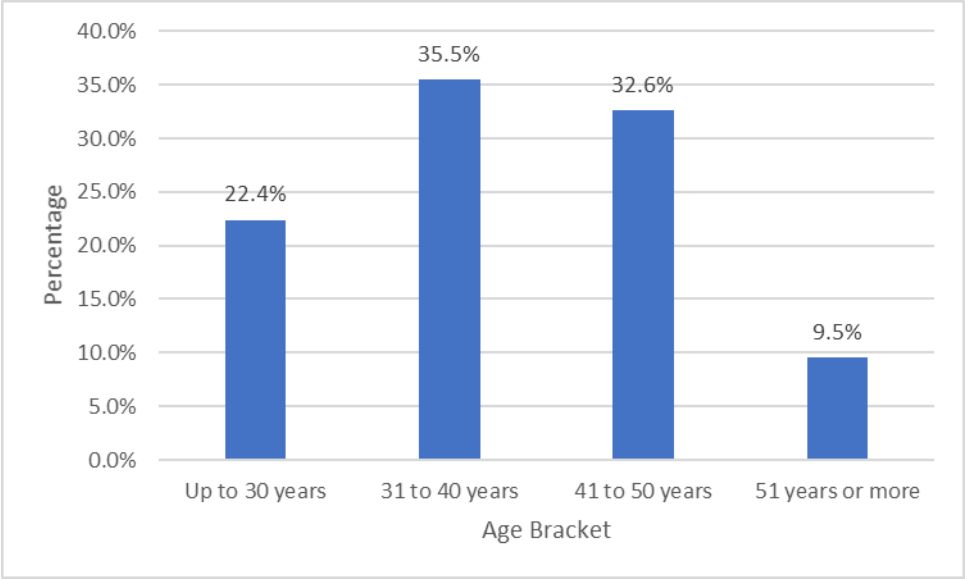

Figure 4.2: Age Bracket of Farmers

Source: Field Data (2023)

4.3.3 Level of Education of Farmers

Research on education level and agriculture shows that education plays a vital role in agricultural productivity and rural development. Farmers with higher levels of education

are more likely to use technology, obtain loans and implement new farming techniques (Nogueira *et al.*, 2020). When asked what their greatest level of schooling was, the respondents had to respond. The results showed that, among the respondents, 45% (n=141) had completed secondary education, 24% (n=75) had completed university education, 20.8% (n=65) had completed tertiary education, 8.6% (n=27) had completed primary education and 1.6% (n=5) had not completed any education at all (Figure 4.3). This shows that the less than a quarter of the mango farmers in Makueni County had attained university level education, with secondary education being the most commonly held level of education.

This result is in line with a study by Muema et al. (2018) that discovered education was a major factor in smallholder farmers in Kenya adopting new agricultural technologies and practices. Ngaruiya (2019) discovered that farmers who had greater educational attainment had a higher propensity to embrace novel agricultural technologies. In addition, the fact that 20.8% of research participants had completed postsecondary education raises the possibility that a sizeable number of extremely educated farmers reside in Makueni County. This agrees with the findings of the Ajibade *et al. (*2018) study, which showed that farmers with higher levels of education were more likely to use sustainable farming methods.

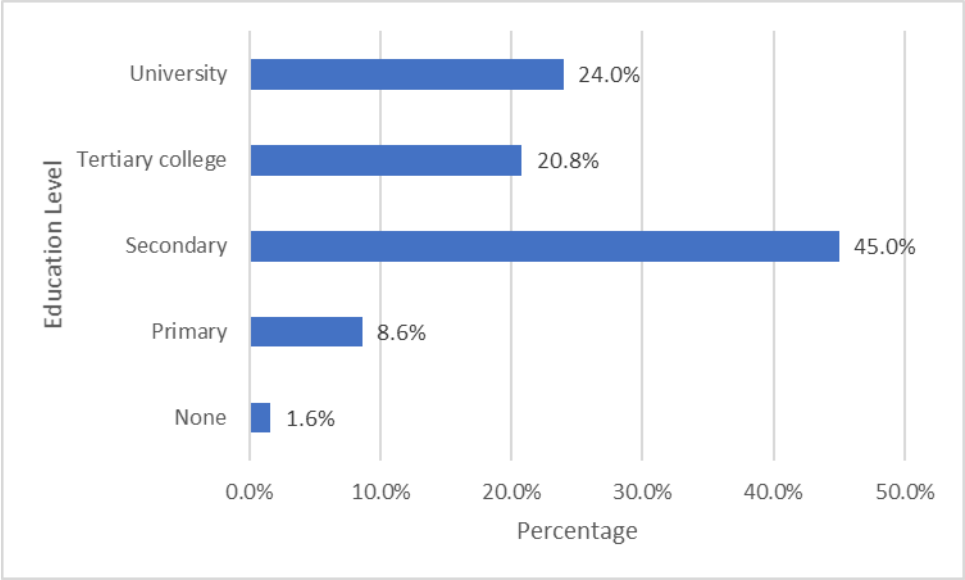

Figure 4.3: Highest Education Level Attained by Farmers

Source: Field Data (2023)

4.3.4 Marital Status of Farmers

Ng'asike *et al*. (2020) suggest that stable family relationships provide a basis for farmers to make long-term investments in farming activities. On marital status, the findings indicated that 70% (n=219) of the respondents were married, 28% (n=88) of the respondents were unmarried and finally 2% (n=6) of the respondents were either widows or divorced. These findings suggest that most of the mango farmers in Makueni County are in stable relationships and are likely to have more support systems to help them in their farming activities. Figure 4.4 shows the results.

The results are in line with Ahmad *et al.* (2018), who contend that enhancing family support is essential to raising farmers' standard of living. Moreover, the results align with the research conducted by Muricho *et al.* (2017), which indicates that familial assistance plays a critical role in improving food security and lowering poverty rates among smallholder farmers in Kenya. The study by Castro-Arce and Vanclay (2020), who contend that social networks play a critical role in fostering sustainable rural development, is compatible with the conclusion that also emphasises the significance of

social networks in the lives of smallholder farmers. Overall, the results point to the importance of social networks and family in sustaining smallholder farmers' livelihoods in Kenya's Makueni County.

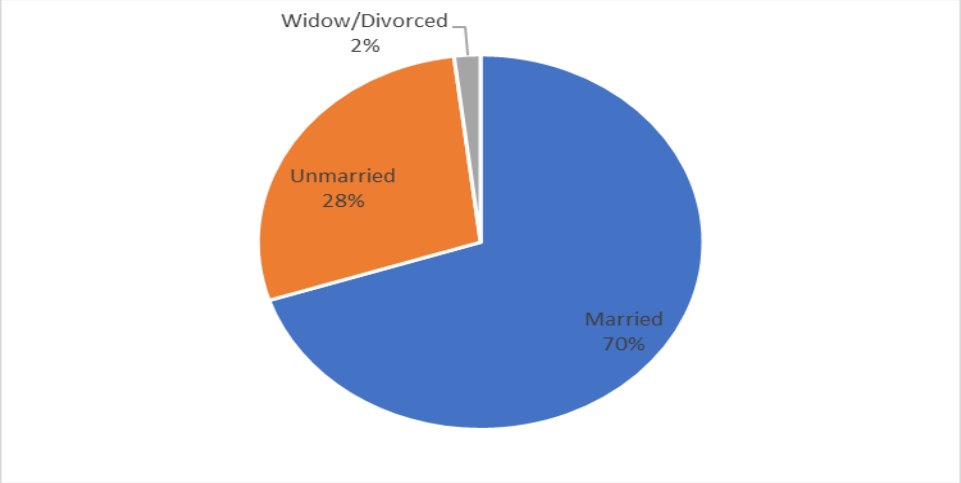

Figure 4.4: Marital Status of Farmers

Source: Field Data (2023)

4.3.5 Number of Children

Figure 4.5 shows the distribution of the number of children in each household of the mango farmers in Makueni County. The findings indicate that some respondents, 30.7% (n=96), have 1-2 children in their households, 32.6% (n=102) have 3-4 children in their households, while 27.8% (n=87) have 5-6 children in their households. Only 8.9% (n=28) of the respondents have 7 or more children in their households. The findings imply that the majority of mango farmers in Makueni County have a small to medium-sized household, with the majority having 1-2 people or 3-4 people in their households. Only a small proportion, around 8.9%, have larger households with 7 or more people. These findings align to studies that focus on the livelihoods of farmers in Kenya, such as Ng'asike *et al*. (2020), who discuss the challenges facing smallholder farmers in the country. The small household size may be a factor that limits the ability of mango farmers in Makueni County to increase their production and income.

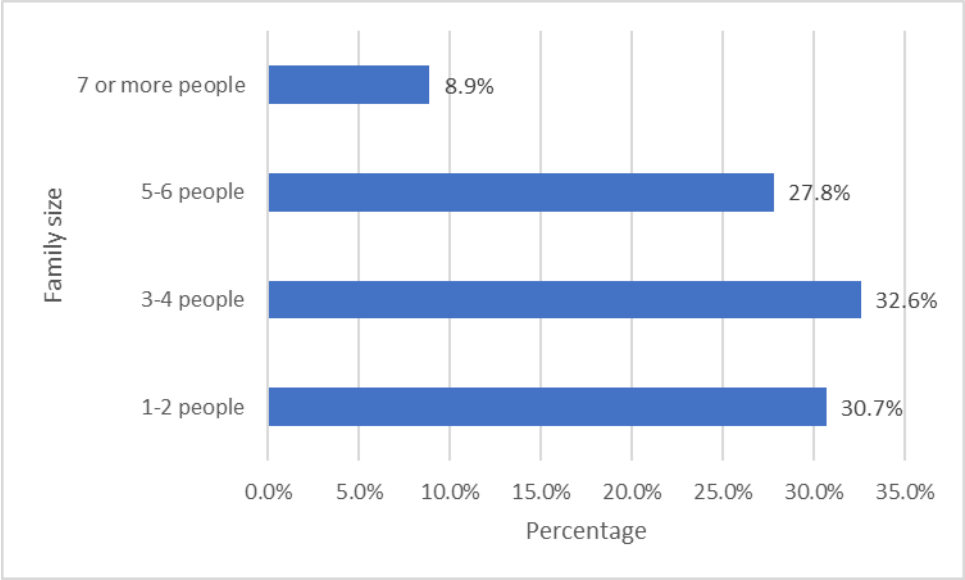

Figure 4.5: Family Size of Farmers

Source: Field Data (2023)

4.3.6 Farm Size

It was asked of the respondents how big their farms were. According to the research results, 47.9% (n=150) of the respondents had a farm with a size of three hectares, 20.1% (n=63) had a farm with a size of four hectares, 13.4% (n=42) had a farm with a size of two hectares, 11.9% (n=37) had a farm with a size of one hectare or less and 6.7% (n=21) had a farm with a size of five hectares. Based on the data, it appears that most mango growers in Makueni County have comparatively modest landholdings; 47.9% (n=150) of respondents grow mangoes on less than 3 hectare. These findings support those of Wangu *et al*. (2020) that the majority of mango farmers in Makueni County have a relatively small landholding, with nearly half of the respondents cultivating mangoes on 3 hectares or less.

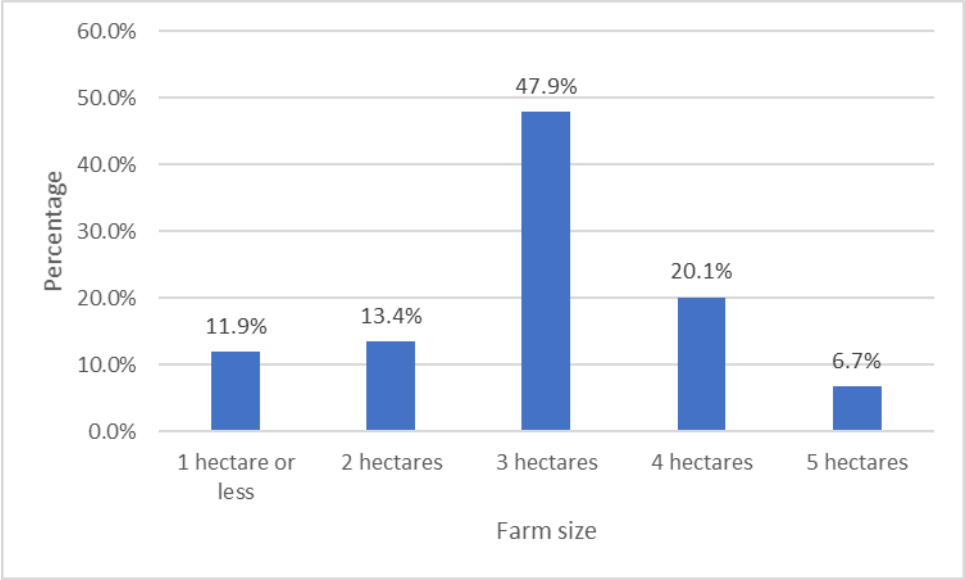

Figure 4.6: Farm Size of Farmers

Source: Field Data (2023)

4.4 Indicators of Agricultural Devolution

One of the purpose of this study was to identify Makueni County's agricultural devolution indicators. Regarding this, the study examined a number of variables that may influence the county's agricultural sector's growth. The study analyzed the promotion of farm cooperatives, provision of extension services, training and capacity building, funding/soft loans, public participation in decision-making, subsidized farm inputs, infrastructural development, marketing aid, processing of produce, inspection and regulation and climate change policy as indicators of agricultural devolution. The findings are presented in the subsequent sub-sections.

4.4.1 Results on Promotion of Farm Cooperatives

Participants were asked to indicate whether there were mango marketing cooperatives within their area. The survey results show that 180 out of 313 respondents (57.5%) reported having knowledge of mango marketing cooperatives. Out of the 180 respondents who reported having knowledge of mango marketing cooperatives, 31.3% (98) are members of one of the cooperatives, while 68.7% are not members of any mango

marketing cooperative. The results are as illustrated in Table 4.2. This indicates low knowledge mango marketing cooperatives in the County.

These findings support the findings of Maina et al. (2019) that farmers used cooperatives as among the main ways of marketing their mangoes. Though some members were yet to join cooperatives, farmers in Makueni County have joined together for a cooperative society which held them up to market their fruits at good prices to the processing plant as opposed to the current situation where much of the fruits goes to waste and at throwing price. One of the major problem they hope to ease is marketing of their produce. They are also not well versed with the gaps in agronomy and need further training but through the cooperatives, the groups were able to mobilize farmers for trainings, as indicate by the findings of the current study.

Table 4.2: Knowledge of Mango Marketing Cooperatives

		Frequency	Percent
Existence of mango marketing cooperatives	Yes	180	57.5
	No	133	42.5
Member in at least one the mango selling cooperative in the county	Yes	98	31.3
	No	215	68.7
	Total	313	100.0

Source: Field Data (2023)

Data for this study was also gathered from committee members of local mango cooperatives, partners, local mango traders and exporters, farmers' groups, agricultural stakeholders and the county department of agriculture. The results from these interviews and discussions corroborated the findings from the farmers, indicating that the County Government was actively engaged in promoting the marketing of mango produce for the farmers through cooperatives. It was found that the truck had assisted in countrywide marketing of the society's fruit produce for increased profitability, as revealed by the following response;

In 2021, the county joined Makueni Fruit Processors Cooperative Society members during their Annual General meeting at Wote, where they flagged off a truck donated to the society by National Agricultural and Rural Inclusive Growth Project (NARIGP) in partnership with the County Government (KII with an agricultural stakeholder 12th January 2023).

4.4.2 Results on Marketing Aid

Most respondents (60%) sold mangoes through agents, followed by those who sold through cooperatives (17%) and market centres (23%), as shown in Figure 4.7. The finding that 60% of the respondents sold mangoes through agents implies that, most farmers do not have direct access to the market and are likely to receive lower prices for their produce compared to what they would receive if they sold directly to the consumers. As suggested by Lelgut (2020), there is a need to create more opportunities for direct marketing, such as through the establishment of farmers' markets and to provide training and support to farmers to enable them to engage in direct marketing effectively.

On the other hand, the finding that 17% of the respondents sold mangoes through cooperatives indicates that there is a significant number of farmers who are organized. This highlights the potential benefits of promoting cooperative farming and supporting the development of strong farmers' organizations. Finally, the finding that 23% of the respondents sold mangoes through market centres suggests that there is still a role for traditional market channels and that efforts should be made to improve the infrastructure and facilities in these markets to ensure that they meet the needs of both the farmers and the consumers.

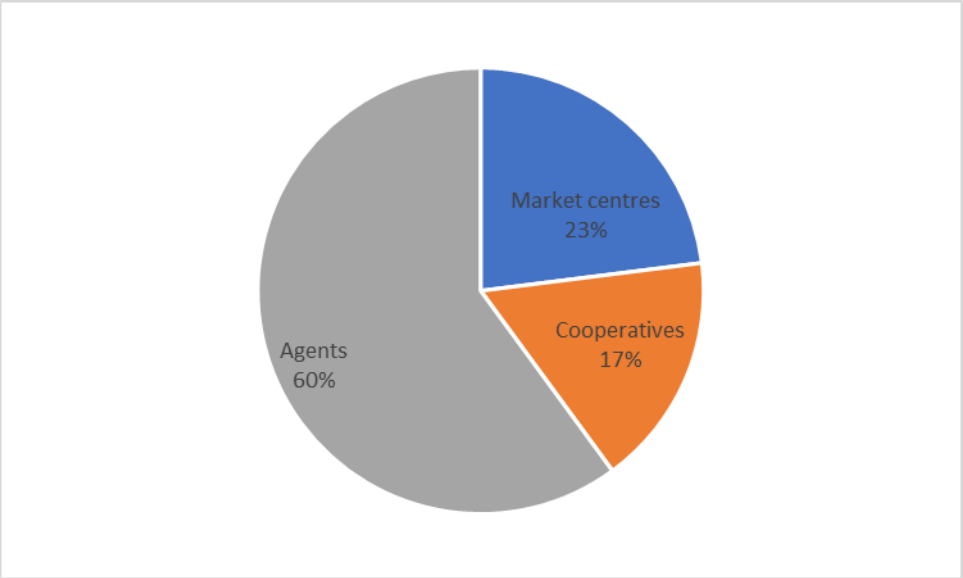

Figure 4.7: Marketing Aid by Involved Parties

Source: Field Data (2023)

When it comes to the County Government's involvement in mango marketing, 69.3% of the respondents believe that the County Government has not developed enough marketing options for mango farming, while 30.7% believe otherwise. Additionally, 78% of the respondents reported that the County Government has not invested in better marketing structures for mango farming. However, 41.2% of the respondents believe that there are enough marketing options for mango produce, while 58.8% think otherwise. Furthermore, a significant portion of the respondents (73.2%) believe that market facilities affect the processing efforts of mango farming among small-scale farmers. On the other hand, 26.8% of the respondents do not think so, as evident on Table 4.3.

Table 4.3: Mango Marketing Scenario in Makueni County

		Frequency	Percent
County Government has developed enough marketing options	Yes	96	30.7
	No	217	69.3
County Government has invested in better marketing structures	Yes	69	22.0
	No	244	78.0
Enough marketing options for mango produce	Yes	129	41.2
	No	184	58.8
Market facilities affect the efforts of processing of mango farming in small	Yes	229	73.2
	No	84	26.8

scale farmers	Total	313	100.0

Source: Field Data (2023)

The findings indicate that the majority of the respondents (69.3%) believe that the County Government has not developed enough marketing options for mango farming and many feel that there are not enough marketing options for mango produce, as also postulated by Nogueira *et al*. (2020) in Brazil. Additionally, the majority of respondents believe that market facilities affect the processing efforts of mango farming among small-scale farmers. These findings highlight the importance of addressing marketing challenges in the mango industry to support small-scale farmers and promote agricultural development in Makueni County.

In this regard, the study used interviews and focus group discussions to collect data from committee members of local mango cooperatives, partners, local mango traders and exporters, farmers group and agricultural stakeholders, as well as the county department of agriculture. The findings obtained from them largely supported the findings from the farmers, that the County Government was in some instances involved in marketing the mango produce for the farmers, though much still needed to be done, as shown from the following responses by the county department of agriculture and FGDs;

> *The County Government supports, aggregates and mobilises farmers in marketing of their mangoes. By aggregating mangoes from multiple farmers, the County Government helps to increase the volume of mangoes available for sale and negotiate better prices for the farmers. Mobilizing farmers to market their mangoes can also increase their exposure to potential buyers, helping them to reach more markets and increase their revenue (KII with the county department of agriculture 6th January 2023).*

Makueni is the leading mango producer in the country with a market share of 32 percent (Makueni County Integrated Development Plan 2018-22). The county intends to build more market access through quality improvement, capacity building of farmers and establishment of aggregation centres (FGD 11th January 2023).

The county is involved in promoting and facilitating the sale of mangoes produced by local farmers. This has been done through initiatives such as organizing mango fairs, creating links between farmers and buyers and providing information on the best practices for mango farming and post-harvest handling (FGD 13th January 2023).

4.4.3 Results on Processing of Produce and Value Addition

Regarding whether the processing of farm produce was better because of devolution, 35.1% (n=110) of the respondents disagreed, 15.3% (n=48) agreed and 6.4% (n=20) were unsure (Table 4.4). This suggests that there may be some challenges in the processing of farm produce that have not been addressed by the devolution process. The 15.3% of the respondents who agreed that the processing of farm produce had improved under devolution, while small in number, provide some indication that there may be some positive effects of devolution on the processing of farm produce.

In general, the research findings indicate that processing of farm produce had not been achieved as required in the County, however, it was a beneficial step towards mango production in the County. Odari (2018) agrees that many fruit farmers like mangoes in the developing nations are not able to meet the terms with the international quality standards rendering their produce unattractive to international marketing organizations, hence

require processing industries in their localities. The County Government had established a processing plant to help farmers in processing, as shown from the following response;;

> *Establishment of Kalamba processing plant - By establishing a Kalamba processing plant, the County Government is taking a proactive approach to promoting and improving the mango value chain in Makueni County, which is a positive step for the local economy and the mango farming industry (FGD 13th January 2023).*

However, some respondents did not think that the processing plant was very helpful, as they were still in the hand of brokers and middlemen. Nonetheless, Odari (2018) argues that some farmers are often ignorant of marketing information and as such they are poorly linked to better markets which have the possibility of buying their produce at higher charges. They have also not taken steps to utilize the existing facilities, as reported by one of the respondent during the FGDs;

> *Makueni is a fruit county. The Kalamba plant has done very little to help the people sell their produce. It's time the county looked into this matter seriously. We are still in the hands of the brokers and sometimes no market. The county should do more (FGD 8th January 2023).*

The study also found that the county had created fruit fly-free zones. Creating fruit fly-free zones helps to improve the quality of mangoes, as fruit flies are a major pest that can damage the fruit and reduce its shelf life. Enhancing value addition capacities and establishing certified fruit tree nurseries also help to improve the competitiveness and profitability of mango production in the area, as suggested by Muema *et al*. (2018). By implementing these interventions, the County Government is taking a comprehensive

approach to improving the mango industry and supporting the local economy. This was confirmed by one of the key informant during an interview section, who opined that;

> *Creation of fruit fly-free zones, enhancing value addition capacities and establishment of certified fruit tree nurseries are some of the interventions being undertaken. These interventions are crucial steps in promoting and improving the mango value chain in Makueni County (KII with local mango traders and exporter 10th January 2023).*

4.4.4 Results on Inspection and Regulation

According to the study, a sizable percentage of participants (66.1%) concurred that the County Government had implemented steps to lessen the influence of intermediaries and brokers on the sale of mangos. Furthermore, 25.9% of respondents strongly agreed and 40.2% of participants felt that the County Government has improved its marketing standards in this regard. Nonetheless, 24.3% of the participants expressed disapproval towards this statement, implying that further efforts were required to mitigate the adverse effects of intermediaries and brokers on the value chain involved in mango marketing (Table 4.4).

Despite this, the county department of agriculture has implemented several programs and initiatives aimed at improving the quality and quantity of mango production in Makueni. From the interviews and FGDs, the study determined that the county department of agriculture provided technical assistance to farmers and regulated the quality of mangoes produced, leading to an increase in the reputation of Makueni's mangoes and demand from both local and international markets. As reported by some of the respondents during the key informants interview:-

> *The county department of agriculture in Makueni has provided technical assistance to mango farmers in order to improve the quality and quantity of their mango production. The department's efforts also include inspection and regulation to ensure that the mangoes meet quality standards (KII with County department of agriculture 16th January 2023).*

In addition to this, it was also revealed that the department of agriculture in Makueni County has established a certification program specifically for mango farmers. The primary goal of the program is to ensure that the mangoes grown in Makueni meet the required quality standards. The implementation of this program has had a significant impact on the reputation of Makueni's mangoes, resulting in a surge in demand from both local and international markets. As reported by some of the respondents during the key informants interview:-

> *The department of agriculture has implemented a certification program for mango farmers, which helps to ensure that the mangoes produced in Makueni meet the required quality standards. This program has been instrumental in improving the reputation of Makueni's mangoes, leading to increased demand from both local and international markets (KII with County department of agriculture 6th January 2023).*

Additionally, the department had established partnerships with local regulatory agencies to ensure safe and quality use of pesticides and other agrochemicals in mango farming. These efforts aimed to promote sustainable and environmentally friendly practices, which not only improved the quality of the mangoes produced but also protected the health of the farmers and consumers. The partnerships also provided access to training and

education on the proper use and handling of pesticides and agrochemicals, as shown from the following response by the FGDs:

> *The County has established partnerships with local regulatory agencies to monitor and control the use of pesticides and other agrochemicals in mango farming, thereby ensuring the safety and quality of the produce (FGD 21st January 2023).*

The findings of the study suggest that while the County Government has made efforts to reduce the negative impact of brokers and middlemen on mango marketing in Makueni, more work is needed to address the issue. This is consistent with the findings of Kibet (2019) and other studies that have identified the negative impact of middlemen and brokers on smallholder farmers in developing countries, particularly in terms of reducing their bargaining power and profitability. The current study found that 32.9% (n=103) of the respondents disagreed that farmers had a better bargaining power because of devolution whereas 14.1% (n=44) agreed and 9.9% (n=31) of the respondents strongly agreed (Table 4.4).

However, the county department of agriculture's initiatives to improve the quality and quantity of mango production in Makueni are noteworthy and demonstrate the potential for government intervention to positively impact smallholder farmers. This is consistent with existing studies that have shown that government support and intervention can be effective in improving the productivity and profitability of smallholder farmers (O'Brien *et al*., 2019; Omondi, 2019).

Moreover, the department's partnerships with local regulatory agencies to monitor and control the use of pesticides and other agrochemicals in mango farming are critical in ensuring the safety and quality of the produce. The findings support those of Tajbakhsh

(2019), Ngaruiya (2019) and other studies that have identified the importance of agricultural regulation in reducing the negative impact of pesticide use and other chemicals on farmers' health and the environment.

4.4.5 Results on Infrastructural Development

The findings on whether devolution had improved the roads and transportation networks for mango farmers show that 43.1% (n=135) of the respondents disagreed, 27.8% (n= 87) of the respondents strongly disagreed while 16.6% (n=52) of the respondents agreed (Table 4.4). The research found that devolution had improved the roads and transportation networks for mango farmers and residents in general, though not to satisfaction of the farmers.

The study findings suggest that there is a need for more efforts to improve the roads and transportation networks in the region to facilitate the transportation of mangoes to markets, as this can significantly enhance the economic benefits to farmers. The low levels of agreement on the improvement of roads and transportation networks also highlight the need for more government interventions to address the challenges faced by farmers in accessing markets and other essential services. In this regard, the researcher used interviews and FGDs to determine what the County Government was doing to address the challenge of infrastructural development for farmers. The findings indicate that devolution had improved access to resources in some instances and the County Government was putting efforts to improve infrastructure. Devolution had led to the creation of new resources, such as funds and programs, that are specifically designed to support the mango industry in Makueni County. This was confirmed by one of the respondent during FGD's who indicated that:

> *Devolution includes investment in marketing facilities, such as cold storage, transportation and processing facilities, as well as research and development initiatives that aim to improve the quality and productivity of mango farming (FGD 21st January 2023).*

Similar views were expressed by another respondent during the FGD's, who opined that:

> *Although the required levels of infrastructure have not been achieved, the creation of resources such as cold storage, transportation and processing facilities is a good step forward for the industry in Makueni County (KII with a committee member of local mango cooperatives 17th January 2023).*

In contradiction to the findings of the study, Maina *et al*. (2019) illustrate that there had been rural development in terms of better service delivery; including market structures and roads development for perishable products in semi-arid lands in Kenya. This study found that small-scale farmers do not have access to adequate marketing facilities, they struggle to sell their produce at a fair price, or have to sell their mangoes at a discounted rate due to poor quality or limited storage options. This has negatively impacted the profitability and sustainability of the mango industry, particularly for small-scale farmers who may not have the resources to invest in marketing infrastructure.

4.4.6 Results on Public Participation (Decisions Making)

The study findings whether there was better marketing as a result of devolution due to public participation in decision making, 34.5% (n=108) of the respondents agreed, 26.2% (n=82) of the respondents disagreed while 24.9% (n=78) of the respondents strongly agreed (Table 4.4). This finding implies that there is mixed perception among the respondents regarding whether there was better marketing as a result of devolution due to public participation in decision making. Therefore, the researcher sought to find out of the

same was applicable from FGDs and key informants. As reported by some of the respondents during the key informants interview and FGDs, devolution has in some instances helped with better marketing, as there was improved decision making. The respondents reported that:

> *Devolution has led to the establishment of local farmers' markets where farmers can sell their produce directly to consumers. This has eliminated middlemen who would previously buy the mangoes at low prices and sell them at a higher price in urban market (FGD 18th January 2023).*

Similar views were expressed by another respondent during the key informant interview, who opined that:

> *There has been development of better marketing strategies, including the creation of branding initiatives that aim to promote Makueni mangoes as a premium product in local and international markets. This has led to increased demand for Makueni mangoes, which has resulted in better prices for the farmers (KII with a committee member of local mango cooperatives 17th January 2023).*

The study findings on better marketing as a result of devolution due to public participation in decision-making are consistent with previous studies (such as Keya *et al*., 2019) that have shown that public participation in decision-making can lead to better outcomes for communities. Keya *et al*. (2019) found that involving local communities in decision-making processes related to natural resource management can lead to more sustainable and equitable outcomes. However, the relatively low percentage of respondents who agreed or strongly agreed (59.4%) suggests that there is still room for improvement in

terms of involving the public in decision-making related to the mango industry in Makueni County.

4.4.7 Results on Climate Change Policy

The study found that 37.7% (n=118) of the respondents strongly agreed that the climate change policy as a result of devolution ensured that there was more produce by the farmers, 37.7% (n=118) of the respondents strongly disagreed, 33.5% (n=105) disagreed and finally 22.4% (n=70) strongly agreed (Table 4.4). The study findings indicate that there was a lack of consensus among the respondents on the impact of the climate change policy resulting from devolution on agricultural production in Makueni County. While 37.7% of the respondents strongly agreed that the policy had led to increased production, an equal percentage of respondents strongly disagreed. This lack of agreement suggests that the impact of the climate change policy on agricultural production is still a subject of debate among farmers in Makueni County.

The information from FGDs and key informant responses shed some light on the issue. One informant noted that climate change policy had brought about positive changes in agricultural practices. FGDs responses also noted that while the policy had been well-intentioned, it had not been adequately implemented to achieve the desired results. Another informant highlighted the need for more resources and support from the government to enable farmers to adapt to climate change and improve their agricultural practices, as shown from the following responses;

> *The climate change policy has definitely had an impact on mango farming in the county. For example, we now use more drought-tolerant varieties of mangoes and have started to practice more efficient water management techniques. This has resulted in higher yields and better-quality mangoes, which has ultimately*

benefited both farmers and consumers (KII with an agricultural stakeholder 67th January 2023).

Similar thoughts were raised by another respondent during the FGDs, who opined that:

While the climate change policy is a step in the right direction, I don't think it has had a significant impact on the mango industry in the county. There are still a lot of challenges that we face as farmers, including unpredictable weather patterns, pests and diseases and inadequate access to resources such as water and fertilizer (FGD 13th January 2023).

These two responses illustrate the divergent opinions that exist on the impact of the climate change policy on the mango industry in Makueni County. While one informant believes that the policy has been effective in promoting climate-resilient farming practices and increasing yields, the other informant is more sceptical, pointing out that there are still many challenges that need to be addressed in order to fully support the industry.

The results of this investigation are in line with previous research on how measures addressing climate change affect agricultural output. A number of factors, including insufficient implementation and a lack of funding, may limit the impact of climate change policies on agricultural production, despite the fact that they are crucial for tackling the challenges presented by the phenomenon (Kogo *et al*., 2021; Muema *et al.,* 2018). Furthermore, depending on the background and unique conditions of the impacted farms and localities, the effects of climate change policy may differ.

Therefore, the study findings suggest that while the climate change policy resulting from devolution has the potential to improve agricultural production in Makueni County, its impact is still a subject of debate among farmers. The findings highlight the need for a

more comprehensive approach to climate change policy that takes into account the specific needs and circumstances of farmers in the region and provides adequate resources and support them.

4.4.8 Results on Training and Capacity Building

On whether there was more produce due to training and capacity building to the farmers as a result of devolution, 36.7% (n=115) of the respondents agreed, 26.5% (n=83) disagreed whereas 24% (n=75) of the respondents strongly agreed (Table 4.4; Figure 4.8). The finding implies that there is some level of agreement among the respondents that training and capacity building for farmers have increased as a result of devolution. The fact that a quarter of the respondents strongly agreed with the statement suggests that there have been some successful training and capacity building programs initiated at the county level.

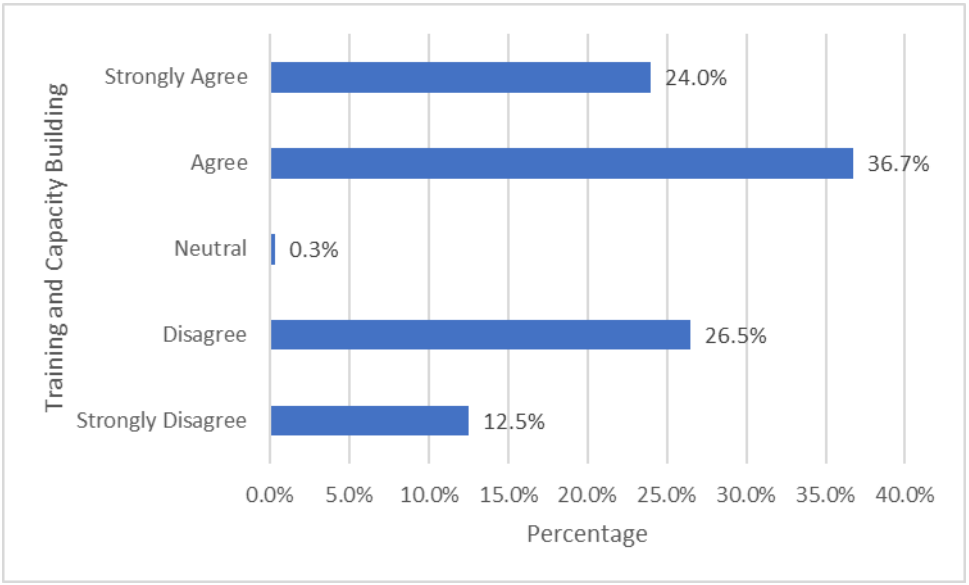

Figure 4.8: Training and Capacity Building For Farmers

Source: Field Data (2023)

Findings from Tchewafei *et al*. (2020) collaborate with the current study findings which illustrates that there has been devolved departments of agriculture which have consequently backed the enhanced capacity building for small scale farmers in seeds and

seedlings management, post-harvest management, value addition, marketing and sales of produce. This results findings were in line with what was reported by one of the respondent during FGDs that;

> *The establishment of mother orchards and market linkages are important interventions by the County Government to promote and improve the mango industry in Makueni County. Mother orchards serve as sources of high-quality mango seedlings for farmers, helping to improve the quality and quantity of mango production in the county (FGD 18th January 2023).*

Similar views were expressed by another respondent during the key informant interview, who opined that:

> *Market linkages have helped to connect mango farmers with buyers, providing them with access to new markets and helping to increase their revenue. By establishing mother orchards and market linkages, the County Government is taking a comprehensive approach to improving the mango industry and supporting the local economy (KII with the county department of agriculture 7th January 2023).*

4.4.9 Results on Provision of Extension Services

The study found that the Makueni County Government, in partnership with other stakeholders such as cooperatives and external marketers, had established strong extension networks to support farmers in accessing the latest information and technology for managing pests and diseases in mango farming. These extension networks provide training on best practices for mango farming, access to credit and financial services and assistance with market development and marketing. This highlights the County Government's efforts towards ensuring that farmers are equipped with the necessary skills

and resources to succeed in their farming activities, particularly in mango production. The establishment of such extension networks is crucial in supporting farmers to overcome challenges such as pests and diseases and poor market access, which have been identified as major barriers to successful mango farming. The following response supports these claims;

> *Devolution has led to the provision of improved services, such as extension services, that have helped mango farmers to improve the quality and productivity of their farms (KII with the committee members of local mango cooperatives 17th January 2023).*

It is clear from comparing the results of this study with those of previous research that devolution has significantly impacted Kenya's agriculture industry. According to a 2019 report by the Food and Agriculture Organisation (FAO), devolution has increased agricultural productivity, especially in counties3 where the County Government and other agriculture-related stakeholders work closely together. The study's conclusions are consistent with the FAO study's recommendations, especially when it comes to better availability of services for extension, training and capacity building and support for market growth.

In addition, in line with the findings of Ajibade *et al*. (2018), provision of extension services together with training and capacity building, funding/soft loans, public participation (decisions making), farm inputs, infrastructural development, marketing aid, processing of produce, inspection and regulation and climate change policy were important components in mango production. Provision of extension services is an important role that the County Government can play in promoting and improving the

mango industry in Makueni County. As reported by some of the respondents during the key informants interview:-

> *Devolution has given mango farmers in Makueni County greater control over the policies and programs that affect their industry, allowing them to tailor their activities to meet the unique needs and challenges of their local context. These include decision-making on issues such as market development, research and extension services, as well as the allocation of resources to support the mango industry (KII with a local mango trader and exporter 10th January 2023).*

In conclusion, extension services provide farmers with information and technical support on best practices for mango farming, post-harvest handling and marketing. This can help farmers to improve the quality and quantity of their mango production, making their mangoes more competitive in the market. Extension services can also provide farmers with access to new technologies and innovations in the mango industry, helping them to stay ahead of the curve and stay profitable. By providing extension services, the County Government could help to build a strong and sustainable mango industry in Makueni County, which ultimately benefits both farmers and the local economy.

4.4.10 Results on Funding/Soft Loans and Subsidized Farm Inputs

On whether there was more produce due to the provision of funding/soft loans by the County Government, 26.2% (n=82) of the respondents disagreed, 19.2% (n=60) of the respondents strongly disagreed while 16.9% (n=53) agreed. The finding that only 16.9% of the respondents agreed that the provision of funding/soft loans by the County Government led to more produce implies that there may be limitations in the availability or accessibility of funding and loans for the farmers. This could be due to factors such as

insufficient funds allocated for agricultural development or inadequate information and awareness about available funding and loan programs.

The provision of funding and soft loans to support agriculture is a common strategy used by governments in many countries to promote agricultural development. However, studies have shown that access to credit and financial services alone may not be sufficient to improve agricultural productivity and income. For instance, a study conducted by Bouet *et al*. (2020) found that access to credit alone did not significantly improve the livelihoods of smallholder farmers, but rather the use of credit in combination with other support services such as extension services and market linkages had a more significant impact.

The current study established that devolution had increased mango production by the farmers. Research conducted by O'Brien *et al*. (2019) illustrated that countries such as Egypt and Madagascar have been touted to improve their mango production and marketing through integrated rural development programs, subsidized farm inputs, as well as soft loans in mango farming for local communities. As reported by some of the respondents during the key informants interview:-

> *Giving loans to buy mangoes is a way for the County Government to support the mango industry in Makueni County. By providing loans to individuals or organizations to purchase mangoes, the County Government helps to increase the demand for mangoes (KII with the county department of agriculture 7th January 2023).*

On whether devolution had facilitated the provision of farm inputs, 31.3% (n=98) of the respondents strongly disagreed, 30% (n=94) of the respondents disagreed while 15% (n=47) of the respondents strongly agreed. The finding that only 15% of the respondents strongly agreed that devolution had facilitated the provision of farm inputs implies that

there is still a gap in the availability of farm inputs in the mango farming sector in Makueni County. The majority of the respondents disagreed or strongly disagreed, indicating that they have not seen significant improvements in this area. As shown from the following response by the local mango traders and exporter:-

> *By providing farmers with access to subsidized inputs, such as seeds, fertilizer and pesticides, the County Government can help to reduce the cost of mango production and make it more affordable for farmers (KII with local mango traders and exporter 16th January 2023).*

The findings indicate that providing farmers with access to subsidized inputs can help to increase the profitability of mango farming, making it a more attractive livelihood option for local communities. Subsidized farm inputs can also help to improve the quality and quantity of mango production, making the mangoes more competitive in the market.

4.4.11 Summary of Indicators of Agricultural Devolution

As already discussed in the previous sub-sections, this section provides a summary of the indicators of agricultural devolution. On average, the farmers agreed that the County Government had developed better marketing guidelines that had reduced the impact of brokers and middle men (M = 3.49, SD = 1.347); devolution had created more marketing avenues for mango farmers through promotion of farm cooperatives (M = 3.36, SD = 1.338); there was better marketing as a result of devolution due to public participation in decision making (M = 3.33, SD = 1.420) and there were more produce due to training and capacity building to the farmers as a result of devolution (M = 3.33, SD = 1.409).

However, the respondents disagreed that the processing of farm produce was better because of devolution (M = 2.48, SD = 1.246); devolution had improved the roads and transportation networks for mango farmers (M = 2.26, SD = 1.146); farmers had a better

bargaining power because of devolution (*M* = 2.82, *SD* = 1.105); devolution had facilitated the provision of farm inputs (*M* = 2.46, *SD* = 1.396); there were more produce due to the provision of funding/soft loans by the County Government (*M* = 2.74, *SD* = 1.253) and the climate change policy was a result of devolution had ensured that there was more produce by the farmers (*M* = 2.42, *SD* = 1.573). The findings are illustrated in Table 4.4.

Table 4.4: Summary Descriptive Statistics on Indicators of Agricultural Devolution

		SD	D	N	A	SA	Mean	Std. Dev
The County Government has developed better marketing guidelines that has reduced the impact of brokers and middle men	f	29	76	1	126	81	3.49	1.347
	%	9.3%	24.3%	0.3%	40.2%	25.9%		
Devolution has created more marketing avenues for mango farmers through promotion of farm cooperatives	f	26	93	7	115	72	3.36	1.338
	%	8.3%	29.7%	2.3%	36.7%	23.0%		
The processing of farm produce is now better because of devolution	f	110	20	120	48	15	2.48	1.246
	%	35.1%	6.4%	38.4%	15.3%	4.8%		
Devolution has improved the roads and transportation networks for mango farmers	f	87	135	27	52	12	2.26	1.146
	%	27.8%	43.1%	8.7%	16.6%	3.8%		
Farmers have a better bargaining power because of devolution	f	30	103	105	44	31	2.82	1.105
	%	9.6%	32.9%	33.5%	14.1%	9.9%		
Devolution has facilitated the provision of farm inputs	f	98	94	48	26	47	2.46	1.396
	%	31.3%	30.0%	15.4%	8.3%	15.0%		
There is better marketing as a result of devolution due to public participation in decision making	f	40	82	5	108	78	3.33	1.420
	%	12.8%	26.2%	1.6%	34.5%	24.9%		
There is more produce due to the provision of funding/soft loans by the County Government	f	60	82	84	53	34	2.74	1.253
	%	19.2%	26.2%	26.8%	16.9%	10.9%		
There is more produce due to training and capacity building to the farmers	f	39	83	1	115	75	3.33	1.409
	%	12.5%	26.5%	0.3%	36.7%	24.0%		
The climate change policy as a result of devolution has ensured that there is more produce by the farmers	f	118	105	0	20	70	2.42	1.573
	%	37.7%	33.5%	0.0%	6.4%	22.4%		
Composite Mean and Std. Dev							**2.869**	**.693**

Source: Field Data (2023)

4.5 Benefits of Devolution on Mango Farmers

The study sought to assess the benefits of devolution on mango farmers in Makueni County. The study first sought to determine whether the devolution changed the life of Mango farmers in Makueni. The findings indicated that 66.1% (n=207) of the respondents agreed that devolution changed their life whereas 33.9% (n=106) of the respondents disagreed (Table 4.5). The finding that 66.1% of the respondents agreed that devolution changed their life while 33.9% disagreed suggests that devolution has had a significant impact on the lives of the people in Makueni County. This may be attributed to the increased participation of the public in decision-making processes, as well as the increased allocation of resources to support local development initiatives. The results of the study showed that devolution has led to the creation of new resources, such as funds and programs, that are specifically designed to support various sectors, including agriculture, education and health. However, some respondents who disagreed with the statement may have experienced challenges in accessing the benefits of devolution, such as limited access to information or resources. Based on the key informants and FGDs, these findings were supported as follows;

> *From my perspective, I have seen first-hand how devolution has positively impacted the lives of people in our county. Overall, I believe that devolution has brought positive change to the lives of people in our county (KII with the county department of agriculture 7th January 2023).*

Similar ideas were raised by another respondent during the key informant interview, who opined that:

> *While there have been some positive changes as a result of devolution, I also think that there are still many challenges that need to be addressed. For*

example, there is still a lack of transparency and accountability in the County Government, which can lead to corruption and mismanagement of resources (KII with local mango traders and exporter 16th January 2023).

The findings of this study are consistent with existing studies that have shown that devolution can have a significant impact on the lives of people in local communities. For example, a study by Kimathi (2017) found that devolution has led to the establishment of new health facilities and the provision of better health services in several counties in Kenya. Another study by Chang *et al*. (2020) found that devolution has led to increased public participation in decision-making processes and the creation of new job opportunities in various sectors.

Based on the interview and FGDs responses, the farmers were also asked whether they got subsidy to their farm inputs from the County Government or donors. From the findings, few people received subsidies to their farm inputs from the county or government donors. In addition, 55.3% (n=173) disagreed that the County Government gave soft loans to aid farmers to produce and market their mangoes and 64.2% (n=201) of the respondents agreed that devolution facilitated the training and capacity building of farmers. Additionally, 88.5% (n=277) of the respondents agreed that the County Government offered training services to mango farmers, as shown in Table 4.5.

Table 4.5: Devolution Benefits to Farmers

		Frequency	Percent
Devolution has changed the life of Mango farmers	Yes	207	66.1
	No	106	33.9
Subsidy for farm inputs from the County Government or donors	Yes	84	26.8
	No	229	73.2
County Government offers soft loans to the farmers	Yes	140	44.7
	No	173	55.3
Devolution facilitates the training and capacity building of farmers	Yes	201	64.2
	No	112	35.8
County Government offers training services	Yes	277	88.5

to mango farmers	No	36	11.5

Source: Field Data (2023)

The findings suggest that working with other development partners, the county can aspire to build market-driven agriculture especially in the fruits sector. This will not only improve the profitability of the society but also help to boost the local economy. Overall, this collaboration is a positive step towards strengthening the mango value chain in Makueni County, as shown from the following response;

> *By partnering with NARIGP and providing the fruit processors cooperative society with a truck, the County Government is helping the society to increase their reach and access more markets for their fruit produce (KII with the county department of agriculture 8th January 2023).*

In line with the findings of Njeru (2017), devolution has facilitated greater collaboration between the County Government, farmers and other stakeholders in the industry, allowing them to work together more effectively to achieve common goals. These include the development of joint marketing initiatives, the creation of new partnerships and networks and the sharing of information and best practices. In this study, based on a Likert scale responses, the study found that that 36.7% (n=115) of the respondents agreed that devolution had increased mango production by the farmers, 22% (n=69) strongly agreed while 22% (n=69) disagreed. On whether devolution had facilities which increased income to the mango farmers, 39.3% (n=123) disagreed, 33.2% (n=104) agreed whereas 22% (n=69) strongly agreed. Finally, 33.2% (n=104) of the respondents agreed that devolution had improved the standards of farming in the county, 31.3% (n=98) disagreed and 17.3% (n=54) strongly disagreed.

On average, the study found that the respondents agreed that devolution had increased mango production by the farmers (M = 3.34, SD = 1.364) and that devolution had

facilitated increased income to the mango farmers (*M* = 3.27, *SD* = 1.325). However, the respondents slightly disagreed that devolution had improved the standards of farming in the county (*M* = 2.89, *SD* = 1.328), as shown in Table 4.6.

Table 4.6: Descriptive Statistics on Benefits of Devolution on Mango Farmers

		SD	D	N	A	SA	Mean	Std. Dev
Devolution has increased mango production by the farmers	f	39	69	21	115	69		
	%	12.5%	22.0%	6.8%	36.7%	22.0%	3.34	1.364
Devolution has facilitated increased income to the mango farmers	f	17	123	0	104	69		
	%	5.5%	39.3%	0.0%	33.2%	22.0%	3.27	1.325
Devolution has improved the standards of farming in the county	f	54	98	23	104	34		
	%	17.3%	31.3%	7.3%	33.2%	10.9%	2.89	1.328
Composite Mean and Std. Dev							**3.167**	**1.257**

Source: Field Data (2023)

4.6 Marketing of Mangoes

Mango marketing was the study's dependent variable. According to the research findings, after devolution was implemented, there has been an increase in overall output and mango yields per hectare. Of the respondents, 47.9% (n = 150) strongly agreed, 39.9% (n = 125) agreed and 9.6% (n = 30) disagreed. Regarding the question of whether the volume of mango marketing has increased since devolution was implemented, 58.8% (n=184) of those surveyed strongly agreed, 19.8% (n=62) disagreed and 18.5% (n=58) agreed. 30% (n=94) of those surveyed agreed, 30% (n=94) strongly agreed and 16.4% (n=51) of participants disputed that farmers' income levels have increased since devolution was implemented.

On an average, it was discovered that every responder concurred with the claims that the overall production/mango yields per hectare was increasing since devolution was introduced (*M* = 4.26, *SD* =.907); there was increased volume of mango marketing since devolution was introduced (*M* =4.16, *SD* =1.178) and finally there was an increase in

income levels of farmers since devolution was introduced (*M* =3.66, *SD* =1.177). The results are shown in Table 4.7.

Table 4.7: Descriptive Statistics on Marketing of Mangoes

		SD	D	N	A	SA	Mean	Std. Dev
The overall production/mango yields per hectare has been increasing since devolution was introduced	f	0	30	8	125	150	4.26	.907
	%	0.0%	9.6%	2.6%	39.9%	47.9%		
There has been increased volume of mango marketing since devolution was introduced	f	0	62	9	58	184	4.16	1.178
	%	0.0%	19.8%	2.9%	18.5%	58.8%		
There has been an increase in income levels of farmers since devolution was introduced	f	12	51	62	94	94	3.66	1.177
	%	3.8%	16.4%	19.8%	30.0%	30.0%		
Composite Mean and Std. Dev							**4.029**	**.946**

Source: Field Data (2023)

In conclusion, based on the responses obtained from the survey, it was found that the introduction of devolution has had a positive impact on mango farming in the county. The results indicated an overall increase in mango production and yields per hectare, an increase in the volume of mango marketing and an increase in income levels of farmers.

4.7 Challenges Faced By Mango Farmers

The study sought to examine the challenges faced by mango farmers in selling their produce despite devolution. To achieve this objective, the study first sought whether there were better markets established by the County Government. The findings indicated that 67.1% (n=210) of the respondents disagreed whereas 32.9% (n=103) of the respondents agreed to the statement. The respondents were asked to indicate the status of roads used for transportation of their produce. The findings indicated that 66.5% (n=208) of the respondents illustrated that the roads were bad whereas 33.5% (n=105) of the respondents indicated that the roads were good. From the findings, 76.4% (n=239) of the respondents

agreed that there were middle men in the sale of their produce whereas 23.6% (n=74) of the respondents disagreed. The findings are presented in Table 4.8.

Table 4.8: Challenges in Mango Farming

		Frequency	Percent
Better markets established by the County Government	Yes	103	32.9
	No	210	67.1
Status of roads used for transportation of your produce	Good	105	33.5
	Bad	208	66.5
Presence of middlemen in the sale of the respondent's produce	Yes	239	76.4
	No	74	23.6

Source: Field Data (2023)

Based on the findings on Table 4.8, key informants and FGDs supported that there were challenges in mango farming, such as lack the technical expertise to effectively implement devolved functions, which has led to poor service delivery among others. As reported by some of the respondents during the FGDs:-

> *In the county, there have been issues with corruption and mismanagement of funds, which has hindered the implementation of development projects. This may explain why some residents have not seen improvements in their lives (FGD 18th January 2023).*

> *In many rural areas, road infrastructure is poor and inadequate, which hinders the movement of goods and services. This is a major challenge for farmers who rely on good roads to transport their produce to markets (FGD 11th January 2023).*

Studies by O'Brien *et al*. (2019) have found out that devolution has led to improvements in service delivery and infrastructure development in some counties. However, other studies have found that implementation of devolution has been slow and ineffective in

some areas, leading to limited improvements in the lives of residents (Omondi, 2019). The majority of respondents did not agree that devolution had improved their lives, which is in line with Omondi's (2019) assertion that devolution has not been successful in all regions. Overall, the results point to the necessity of ongoing efforts to enhance devolution's implementation and to fund infrastructure development in order to enhance the quality of life for Kenya's rural citizens.

Based on a Likert scale, the research indicated that 56.2% (n=176) of the respondents strongly agreed that the prices of mangoes were poor, 21.4% (n=67) strongly disagreed and 16.9% (n=53) of the respondents agreed. On whether the road networks used to transport the mangoes to the market were poor, 38.7% (n =121) of the respondents agreed, 26.2% (n=82) strongly agreed whereas 17.9% (n=56) disagreed. On whether middle men and cartels derailed the efforts to sale the mangoes at a reasonable price, 41.5% (n=130) of the respondents strongly agreed, 31.6% (n=99) agreed whereas 19.2% (n=60) of the respondents strongly disagreed.

On average, the farmers agreed that the prices for mangoes were poor (*M* =3.81, *SD* =1.637); the road networks used to transport the mangoes to the market were poor (*M* =3.39, *SD* =1.470) and middle men and cartels derail the efforts to sale the mangoes at a reasonable price (*M* =3.69, *SD* =1.535).The results are shown in Table 4.9.

Table 4.9: Descriptive Statistics on Challenges Faced By Mango Farmers

		SD	D	N	A	SA	Mean	Std. Dev
The prices for mangoes are poor	f	67	17	0	53	176	3.81	1.637
	%	21.4%	5.5%	0.0%	16.9%	56.2%		
The road networks used to transport the mangoes to the market are poor	f	54	56	0	121	82	3.39	1.470
	%	17.3%	17.8%	0.0%	38.7%	26.2%		
Middle men and cartels derail the efforts to sale the mangoes at a reasonable price	f	60	24	0	99	130	3.69	1.535
	%	19.2%	7.7%	0.0%	31.6%	41.5%		

Composite Mean and Std. Dev	**3.628**	**1.464**

Source: Field Data (2023)

The findings of the interviews and focus group discussions from committee members of local mango cooperatives, partners, local mango traders and exporters, farmers group and agricultural stakeholders and county department of agriculture largely identified similar challenges identified by the farmers. As reported during an interview with key informants;

> *Mango farmers lack adequate infrastructure, such as cold storage and processing facilities, that is necessary for the safe storage and transportation of their produce. This reduces the quality of the produce and makes it difficult for mango farmers to sell their produce at a fair price (KII with a local mango traders and exporter 18th January 2023).*

Another participant in the FGDs shared comparable ideas, expressing the belief that:

> *The available markets are not adequate for mango produce. There is over-production of mangoes. This has led to a glut in the market, which has resulted in lower prices for mangoes and reduced revenue for farmers (FGD 11th January 2023).*

It is important for the County Government and mango farmers to work together to find ways to reduce the supply of mangoes and increase demand, such as by promoting the consumption of mangoes through marketing campaigns, or by exploring new export markets. The study also found that there were logistical issues in marketing of mangoes. According to Thompson (2021), many farmers are yet to enjoy devolution given their poor structures that are inherent in the production chain. As a result, farmers rely on local markets which are bent on poor pricing systems, less efficient forms in handling and

transportation and lack of transparency in marketing information in relation to international markets. Other challenges identified by the respondents were as follows;

> *The problem facing fruit farmers in Makueni County is not transportation of their produce to the processing plant but the price of the produce. This is something that the county has not looked onto for a long time (FGD 11th January 2023).*

The findings therefore show that mango farmers face price fluctuations due to changes in market demand, supply and other factors. This makes it difficult for mango farmers to predict their income and plan for their future. In addition, post-harvest losses reduces the quantity and quality of the produce that is available for sale and reduce the income of mango farmers, as shown from the following response;

> *Mango farmers face post-harvest losses due to spoilage and damage to their produce during transportation, storage and handling (FGD 11th January 2023).*

Extreme weather conditions such as drought negatively impact mango crop yields and quality, reducing the quantity and quality of the produce that is available for sale. There is also presence of pests and diseases reduce crop yields and quality, leading to lower income for mango farmers. Additionally, the use of pesticides and other chemicals to control pests and diseases are expensive, reducing the profit margins of mango farmers (County department of agriculture). The cost of inputs such as seeds, fertilizer, labour, water and energy were also high, reducing the profit margins of mango farmers, in addition to higher costs of production and lower profits, as shown from the below response;

Mango farmers face challenges in accessing affordable credit to finance their farming operations, leading to higher costs and lower profits (KII with a committee member of local mango cooperatives 23rd January 2023) .

4.8 Coping Strategies on Challenges Faced by Mango Farmers

The research sought to investigate the coping strategies on challenges faced by mango farmers in Makueni County. First the respondents were asked whether the challenges facing mango farmers in Makueni County could be solved. From the findings, 81.5% (n=255) of the respondents agreed whereas 58% (n=18.5%) of the respondents disagreed. The findings indicated that 52.7% (n=165) disagreed that farm sales helped them whereas 47.3% (n=148) of the respondents agreed. From the findings, 60.1% (n=188) of the respondents agreed that dependence on local markets helped avoiding logistical problems experienced in the county whereas 39.9% (n=125) of the respondents disagreed. The findings are as shown in Table 4.10.

Table 4.10: Coping Strategies For Farmers

		Frequency	Percent
Challenges facing mango farmers in Makueni County can be solved	Yes	255	81.5
	No	58	18.5
Farm sales help the farmer	Yes	148	47.3
	No	165	52.7
Dependence on local markets help avoid logistical problems	Yes	188	60.1
	No	125	39.9

Source: Field Data (2023)

The findings of the study indicate that 56.9% of the respondents said that on farm sales could avoid the challenges associated with transportation of produce. It was noted that the farmers sold the products at local markets to avoid logistical issues (37.6%) and capacity building and training was used to teach farmers on how to handle and sell their produce (5.5%). This is shown in Figure 4.9.

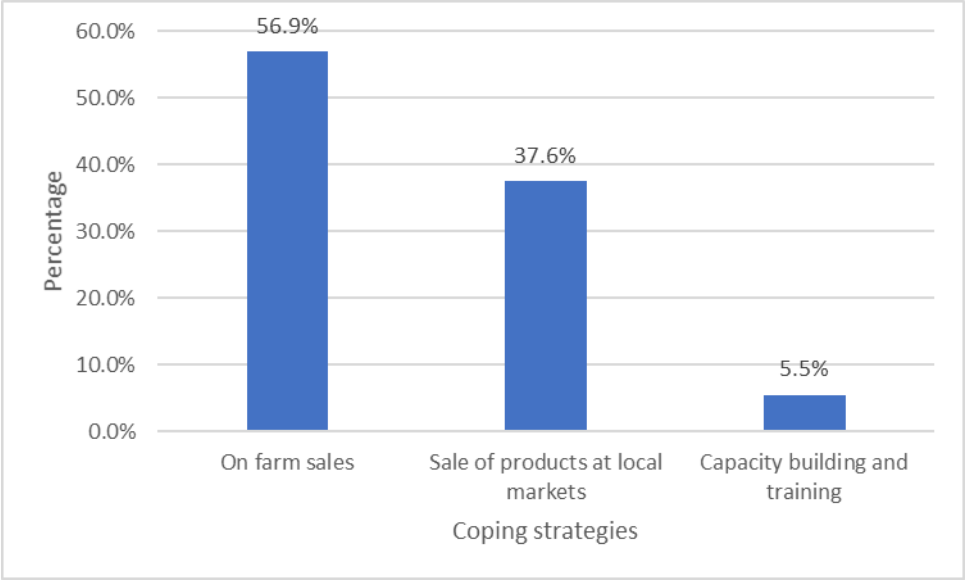

Figure 4.9: Coping Strategies For Farmers

Source: Field Data (2023)

From the farmers, committee members of local mango cooperatives, partners, local mango traders and exporters, farmers group and agricultural stakeholders, as well as the county department of agriculture, some respondents recommended that in order to mitigate the impact of bad weather on mango farming, the County Government and other stakeholders can invest in infrastructure and services that help farmers to better adapt to changing weather conditions, such as irrigation systems, weather monitoring systems and disaster risk reduction programs. In addition, some stakeholders invested in extension services, as shown from the responses;

> *To mitigate the impact of pests and diseases on mango farming, the County Government and other stakeholders can invest in extension services and research programs that help farmers to identify and control pests and diseases effectively and sustainably (KII with a committee member of local mango cooperatives 23rd January 2023)*

This can include promoting integrated pest management practices, training farmers on proper crop management techniques and developing disease-resistant mango varieties. To

mitigate the impact of high cost of production on mango farming, the County Government and other stakeholders can invest in programs and initiatives that help farmers to lower their production costs and increase their profits. This can include providing subsidies for farm inputs, training farmers on cost-saving techniques and developing market linkages that help farmers to access markets that offer fair prices for their produce. The following response supports such assertions;

> *The County Government and other stakeholders can support the development of agribusiness initiatives that help farmers to access affordable credit and other financial services, such as microfinance programs, agricultural cooperatives and business incubators (FGD 19th January 2023).*

4.9 Hypothesis Testing

The study conducted correlation between the independent variable (indicator of agricultural devolution) and the dependent variable (marketing of mangoes through production/mango yields per hectare, volume of mango marketing and increase in income levels of farmers) as shown in the conceptual framework in section 2.2.3. This was done to test the hypothesis: H_{01}: There exists no significant relationship between agricultural devolution (independent variable) and marketing of mangoes (dependent variable) by small scale farmers in Makueni County, Kenya. In the correlation, therefore, the variables that were tested were agricultural devolution and marketing of mangoes by small scale farmers in Makueni County, Kenya. The aim was to test whether there was a significant relationship between the two variables.

Correlation analysis with a p-value of 0.000 and a correlation coefficient of 0.572 revealed a substantial positive association between agricultural devolution and mango marketing. This shows that the two variables have a substantial positive correlation,

indicating that the agricultural devolution policies put in place in Makueni County have benefited small-scale farmers' ability to market their mango harvests.

The fact that there is a positive correlation among agriculture decentralisation and mango marketing suggests that the adoption of devolved policies in Makueni County has improved small-scale farmers' ability to market their mangoes. There are multiple possible explanations for this. For example, the provision of extension services and training have improved farmers' knowledge and skills in mango production and marketing techniques. Access to funding and soft loans have facilitated investment in infrastructure and marketing activities. Public participation and involvement in decision-making processes have led to more targeted and effective interventions to support mango marketing. The promotion of farm cooperatives have enhanced collective marketing efforts and increased market access for mango farmers. Furthermore, the formulation of climate change policies have provided guidance and support in adapting to climate-related challenges and ensuring the sustainability of mango production and marketing.

This finding provides new knowledge in the understanding of the relationship between agricultural devolution and the marketing of agricultural produce by small scale farmers. It suggests that devolution policies that aim to empower and support small scale farmers can have a significant positive impact on their ability to market their produce effectively. This finding is consistent with Kibet (2019) and Muema *et al*. (2018) who suggest that agricultural devolution can lead to increased productivity, improved access to markets and better marketing strategies for small scale farmers. The findings are shown in Table 4.11.

Table 4.11: Hypothesis Testing

		Marketing of Mangoes	Agricultural Devolution
Marketing of Mangoes	Pearson Correlation	1	.572**
	Sig. (2-tailed)		.000
	N	313	313

Agricultural Devolution	Pearson Correlation	.572**	1
	Sig. (2-tailed)	.000	
	N	313	313

Source: Field Data (2023)

CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the study findings, conclusions and recommendations to various stakeholders. The sections are organized based on the specific objectives of the study which were to establish the indicators of agricultural devolution, benefits of devolution on mango farmers, challenges faced by mango farmers in selling their produce despite devolution and the coping strategies on challenges faced by mango farmers in Makueni County.

5.2 Summary of Findings

Based on the study's aims, which include to establish the indicators of agricultural devolution, the benefits of devolution on mango farmers, challenges faced by mango farmers in selling their produce despite devolution and the coping strategies on challenges faced by mango farmers in Makueni County, this section presents a summary of the findings.

5.2.1 Indicators of Agricultural Devolution

Based on the first objective, the study found that the indicators of devolution included better marketing guidelines (40.2%), promotion of farm cooperatives (36.7%), processing of farm produce (15.3%), better infrastructure (16.6%), better bargaining power (14.1%), provision of farm inputs (8.3%), funding/soft loans (16.9%) and training and capacity building (36.7%). From the FGDs and interviews, it was further determined that other indicators of devolution included the creation of a supportive policy environment, the establishment of effective and efficient institutional arrangements, the improvement of service delivery and the strengthening of extension services, the development of efficient and effective value chains and the strengthening of partnerships between government,

civil society and the private sector. Devolution had also created more marketing avenues for mango farmers through promotion of farm cooperatives.

5.2.2 Benefits of Devolution on Mango Farmers

There were benefits of devolution on mango farmers, which included increased decision-making authority (34.5%), subsidy for farm inputs (26.8%) and overall improvement of life (66.1%) among others. Other benefits included better alignment of government programs and initiatives with local needs, more opportunities for market development and economic growth, improved access to financing and investment and strengthened relationships between farmers and their communities. Overall, devolution helped create more favourable conditions for mango farmers to thrive, increase their income and improve their livelihoods.

5.2.3 Challenges Faced By Mango Farmers

The research findings indicated that though mango marketing cooperatives helped the farmers to market their products, the County Government did not have enough marketing options for its farmers in their mango produce. As a result, there were poor prices of mangoes (16.9%), poor road networks used to transport the mangoes to the market (38.7%) and middle men and cartels who derailed the efforts to sale the mangoes at a reasonable price (41.5%). Therefore, the County Government had not extensively invested in better marketing structures, leading to lack of access to markets, limited access to credit and low prices for their produce. As the county lacked enough marketing options for their mango produce, the market facilities affected the efforts of processing of mangoes in small scale farmers. The situation was made worse by poor infrastructure such as roads and transportation networks for mango farmers.

5.2.4 Coping Strategies on Challenges Faced by Mango Farmers

The study found that 56.9% of the respondents said that on farm sales could avoid the challenges associated with transportation of produce. It was noted that the farmers sold the products at local markets to avoid logistical issues (37.6%) and capacity building and training was used to teach farmers on how to handle and sell their produce (5.5%). In addition, some farmers chose to diversify their crops, incorporating other high-value crops alongside mango to reduce their risk. The adoption of such strategies helped mango farmers to better withstand the impacts of these challenges and maintain their livelihoods.

5.3 Conclusions

5.3.1 Indicators of Agricultural Devolution

The study concludes that there were indicators of agricultural devolution which included better marketing guidelines (40.2%), promotion of farm cooperatives (36.7%), processing of farm produce (15.3%), better infrastructure (16.6%) and increased engagement of the private sector in the agricultural sector among others.

5.3.2 Benefits of Devolution on Mango Farmers

The Makueni County Government plays a significant role in promoting and improving the mango industry by providing support for mango marketing, production and distribution. The department has established aggregation centres, a Kalamba processing plant and mother orchards. It has also provided extension services, loans and subsidized farm inputs to farmers.

5.3.3 Challenges Faced By Mango Farmers

There were other challenges such as lack of proper infrastructure and storage facilities which results in significant losses due to spoilage, limited access to market information which makes it difficult for farmers to know where to sell their produce and at what price,

pests and diseases which limit the productivity and efficiency of mango farming . and inadequate government support and policies aimed at promoting the growth and development of the industry. These challenges present a significant hindrance to the growth of the mango industry in Makueni County and need to be addressed in order to improve its competitiveness and sustainability.

5.3.4 Coping Strategies on Challenges Faced by Mango Farmers

In conclusion, the study highlights the various coping strategies employed by mango farmers to overcome the challenges they face. The findings reveal that on-farm sales, local market participation, capacity building and training and crop diversification are effective strategies utilized by farmers to mitigate logistical issues and market constraints. These strategies have enabled mango farmers to maintain their livelihoods and sustain their businesses.

5.4 Recommendations for Practice

Based on the research findings, the following recommendations were made in the study;

5.4.1 Indicators of Agricultural Devolution

The study recommends that the County Government and other stakeholders should invest in extension services and research programs that help farmers to identify and control pests and diseases effectively and sustainably. This can incorporate developing disease-resistant mango varieties, training farmers on proper crop management techniques, marketing and sales strategies and promoting integrated pest management practices.

In addition, there is need for setting up regular meetings with stakeholders, including mango farmers, County Government officials and representatives from relevant organizations, to assess the implementation of devolution policies. The study also

recommends that farmers should join mango selling cooperatives so as to increase sales in the County.

The County Government and other stakeholders should invest in infrastructure and services that help farmers to better adapt to changing weather conditions, such as irrigation systems, weather monitoring systems and disaster risk reduction programs.

5.4.2 Benefits of Devolution on Mango Farmers

The study recommends development of a comprehensive monitoring and evaluation framework that tracks the progress of devolution in the mango industry in Makueni County.

The research recommends that the County Government should give the mango farmers loans to buy mangoes as a way of supporting the mango industry in the County.

The County Government should avail subsidized farm inputs by providing farmers access to subsidized inputs, such as seeds, fertilizer and pesticides so as to reduce the cost of mango production and make it more affordable for farmers. These inputs help to improve the quality and quantity of mango production.

5.4.3 Challenges Faced By Mango Farmers

Farmers can work with the County Government and relevant organizations to identify and address the root causes of challenges the face, such as limited access to markets and poor transportation infrastructure.

The County Government and mango farmers need to work together to find ways to increase the demand for mangoes. This can be done by promoting mangoes and the benefits of consuming them, finding new markets for mangoes, improving the quality and quantity of mango production and supporting value addition and processing. By working

together to address these issues, the County Government and mango farmers can help to improve the competitiveness and profitability of mango production in Makueni County.

The County Government and other stakeholders can also provide financial and technical support to mango farmers, to help them overcome the challenges they face and improve their livelihoods.

5.4.4 Coping Strategies on Challenges Faced by Mango Farmers

The study recommends that the County Government should educate the mango farmers on the best strategies to use so as to reduce overproduction of mangoes which lead to a glut in the market.

The study recommends identification of the most effective coping strategies being used by mango farmers in Makueni County and encourage their replication among other farmers in the region.

5.5 Suggestions for Further Research

Since there are other counties in Kenya which practice mango farming, the scope of the research was limited. Furthermore, large scale production of mangoes should be paid attention to so as to broaden the scope of the research. Therefore, a study can be conducted on evaluation of agricultural devolution and its effects on mango marketing in other counties, mainly focusing on large-scale production.

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APPENDICES

Appendix 1: Questionnaire

SECTION A: PERSONAL INFORMATION

1. Gender of farmer: Male ( ) Female ( )
2. Age of farmer: ----------
3. Highest Education level: None ( ) Primary ( ) Secondary ( )
   Tertiary college ( ) University ( )
4. Marital status:
5. Family size (Number of Children): ----------
6. Farm size: ----------

SECTION B: INDICATORS OF AGRICULTURAL DEVOLUTION

7. Are there mango marketing cooperatives that exist in your area? Yes ( ) No ( )
8. Are you a member of one of the mango selling cooperative? Yes ( ) No ( )
9. Where do you usually sell your mangoes? Market centres ( ) Cooperatives ( )
   Agents ( ) Other (Specify)……
10. Has the County Government developed enough marketing options for your mango produce? Yes ( ) No ( )
11. If yes explain how----------
12. Do you feel the County Government has invested in better marketing structures?
    Yes ( ) No ( )
13. If yes, what government marketing structures exist in your area----------
14. Do you feel you have enough marketing options for your mango produce?
    Yes ( ) No ( )
15. Do marketing facilities affect the efforts of processing of mango farming in small scale farmers? Yes ( ) No ( )
16. To what extent do you agree with the statements in the scale below running from 1-5. (Where 5= strongly agree, 4= agree, 3= neutral, 2= disagree and 1= strongly disagree)

STATEMENT	5	4	3	2	1
The County Government has developed better marketing guidelines that has reduced the impact of brokers and middle men					
Devolution has created more marketing avenues for mango farmers					

through promotion of farm cooperatives					
The processing of farm produce is now better because of devolution					
Devolution has improved the roads and transportation networks for mango farmers					
Farmers have a better bargaining power because of devolution					
Devolution has facilitated the provision of farm inputs					
There is better marketing as a result of devolution due to public participation in decision making					
There is more produce due to the provision of funding/soft loans by the County Government					
There is more produce due to training and capacity building to the farmers as a result of devolution					
The climate change policy as a result of devolution has ensured that there is more produce by the farmers					

SECTION C: BENEFITS OF DEVOLUTION ON MANGO FARMERS

17. Has devolution changed the life of Mango farmers in Makueni? Yes ( ) No ( )
18. Has devolution influenced the development of road infrastructure and markets for mango farmers? Yes ( ) No (
19. Can you give some of the instances where roads have been developed for purposes of benefiting farmers?
20. Have you gotten subsidy to your farm inputs from the County Government or donors? Yes ( ) No ( )
21. If yes, what kind of subsidy have you received?----------
22. Does the County Government give soft loans to aid farmers to produce and market their mangoes? Yes ( ) No ( )
23. Has devolution facilitated the training and capacity building of farmers? Yes ( ) No ( )
24. Does the County Government offer training services to mango farmers? Yes( ) No ( )
25. If yes, what nature of training do they offer?----------
26. To what extent do you agree with the statements in the scale below running from 1-5. (where 5= strongly agree, 4= agree, 3= neutral, 2= disagree and 1= strongly disagree)

STATEMENT	5	4	3	2	1
Devolution has increased mango production by the farmers					
Devolution has facilitated increased income to the mango farmers					
Devolution has improved the standards of farming in the county					

SECTION D: CHALLENGES FACED BY MANGO FARMERS

27. What major challenges are mango farmers in Makueni County facing? ----------
    ----
    -
28. Are there better markets established by the County Government? Yes ( ) No ( )
29. What is the status of roads used for transportation of your produce? Good ( ) Bad ( )
30. Are there middle men in the sale of your produce? Yes ( ) No ( )
31. How have the middle men affected your sale of mangoes? ----------
    ----
    ----
32. To what extent do you agree with the statements in the scale below running from 1-5.

STATEMENT	5	4	3	2	1
The prices for mangoes are poor					
The road networks used to transport the mangoes to the market are poor					
Middle men and cartels derail the efforts to sale the mangoes at a reasonable price					

SECTION E: COPING STRATEGIES

33. Do you think the challenges facing mango farmers in Makueni County can be solved? Yes ( ) No ( )
34. How can the prices of mangoes in the county be improved?
35. Do you think on farm sales can help the farmer in the county? Yes ( ) No ( )
36. If yes ,explain ----------
37. Do you think dependence on local markets can help avoid logistical problems experienced in the county? Yes ( ) No ( )

38. How can capacity building and training be done to benefit more farmers?----------

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39. To what extent do you agree with the statements in the scale below running from 1-5.

STATEMENT	5	4	3	2	1
On farm sales can be used to avoid the challenges associated with transportation of produce					
It is recommended to sale the products at local markets to avoid logistical issues					
Capacity building and training can be used to teach farmers on how to handle and sell their produce					

SECTION F: MARKETING OF MANGOES

40. To what extent do you agree with the statements in the scale below running from 1-5.

STATEMENT	5	4	3	2	1
The overall production/mango yields per hectare has been increasing since devolution was introduced					
There has been increased volume of mango marketing since devolution was introduced					
There has been an increase in income levels of farmers since devolution was introduced					

Thanks

Appendix 2: Key Informant Interview Guide

This tool is designed for committee members of local mango cooperatives, partners, local mango traders and exporters, farmers group and agricultural stakeholders and the county department of agriculture. We won't use the findings for any other purpose except academics.

1) How has the County Government agricultural department played a role in marketing of mangoes in Makueni County?

   _____

   _____

   _____

2) Are the available markets adequate for mango produce?

   _____

   _____

   _____

3) Has the County Government developed enough marketing options for mango produce?

   _____

   _____

   _____

4) Has the County Government established better marketing structures?

   _____

   _____

   _____

5) Do marketing facilities affect the efforts of processing of mango farming in small scale farmers?

   _____

   _____

   _____

6) What are the benefits of devolution on mango farmers in Makueni County?

   _____

   _____

   _____

7) Are there challenges faced by mango farmers in selling their produce despite devolution?

_____

_____

_____

8) What are these challenges?

_____

_____

_____

9) What can be done to deal with the challenges faced by mango farmers in Makueni County?

_____

_____

_____

Appendix 3: Focus Group Discussion Guide

This tool is designed for committee members of local mango cooperatives, partners, local mango traders and exporters, farmers group and agricultural stakeholders and the county department of agriculture. We won't use the findings for any other purpose except academics.

1) How has the County Government agricultural department played a role in marketing of mangoes in Makueni County? What specific actions have they taken to support mango marketing?

   _____

   _____

   _____

2) Are there any gaps in the market chain that affect the marketing of mangoes in the county?

   _____

   _____

   _____

3) Are the marketing options accessible to all small scale mango farmers in the county?

   _____

   _____

   _____

4) What marketing structures have been established and how effective have they been in enhancing mango marketing in the county?

   _____

   _____

   _____

5) How have marketing facilities affected small scale farmers in the county and their ability to process mango farming?

   _____

   _____

   _____

6) How has devolution impacted small scale mango farmers in the county?

_____

_____

_____

7) What challenges have mango farmers faced in selling their produce and how have these challenges impacted the marketing of mangoes in the county?

_____

_____

_____

8) How have these challenges affected small scale mango farmers in the county?

_____

_____

_____

Appendix 4: Kenyatta University Introduction 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. 020-8704150

Our Ref: C50/37739/2017

DATE: 27th October, 2022

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

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR MS. MARY KALUKI VAMBA – REG. NO. C50/37739/2017

I write to introduce Ms. Mary Kaluki Vamba who is a Postgraduate Student of this University. She is registered for M.A. degree programme in the **Department of Geography.**

Ms. Vamba intends to conduct research for a M.A. thesis Proposal entitled, **"Devolution of Agriculture and Its Effects on Mango Marketing by Small Scale Farmers in Makueni County, Kenya."**

Any assistance given will be highly appreciated.

Yours faithfully,

KENYATTA UNIVERSITY OFFICE OF DEAN 31 OCT 2022 GRADUATE SCHOOL P.O. Box 43844-00100, NAIROBI

PROF. ELISHIBA KIMANI
DEAN, GRADUATE SCHOOL

JL/ddw

Appendix 5: NACOSTI Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **167327**

Date of Issue: **10/November/2022**

RESEARCH LICENSE

This is to Certify that Miss.. Mary kaluki Vamba of Kenyatta University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Makueni on the topic: devolution of agriculture and its effects on mango marketing by small scale farmers in makueni county, Kenya for the period ending : 10/November/2023.

License No: **NACOSTI/P/22/21836**

167327

Applicant Identification Number

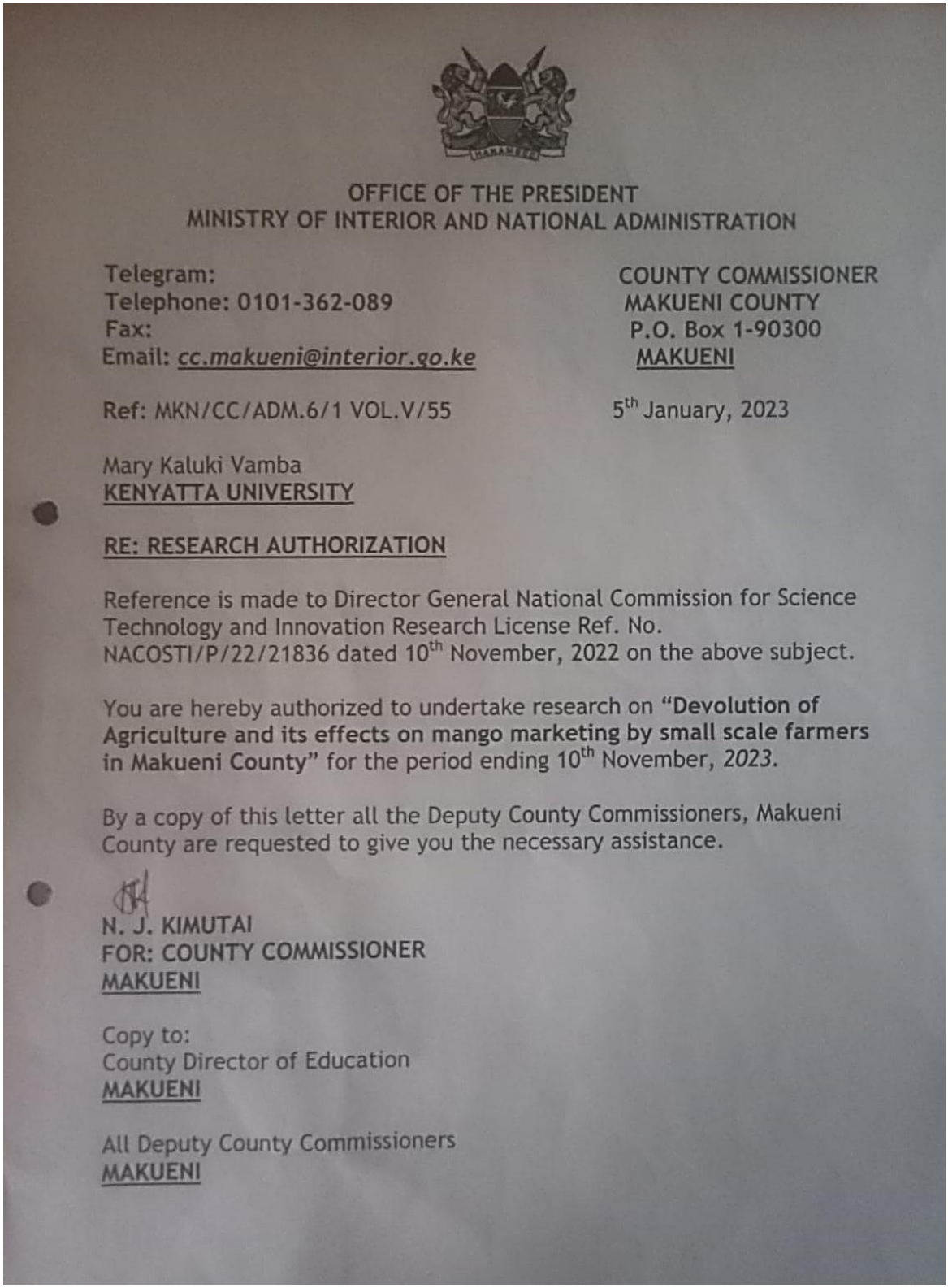
Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

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: County Commissioner Authorization



OFFICE OF THE PRESIDENT
MINISTRY OF INTERIOR AND NATIONAL ADMINISTRATION

Telegram:
Telephone: 0101-362-089
Fax:
Email: cc.makueni@interior.go.ke

COUNTY COMMISSIONER
MAKUENI COUNTY
P.O. Box 1-90300
MAKUENI

Ref: MKN/CC/ADM.6/1 VOL.V/55

5th January, 2023

Mary Kaluki Vamba
KENYATTA UNIVERSITY

RE: RESEARCH AUTHORIZATION

Reference is made to Director General National Commission for Science Technology and Innovation Research License Ref. No. NACOSTI/P/22/21836 dated 10th November, 2022 on the above subject.

You are hereby authorized to undertake research on **"Devolution of Agriculture and its effects on mango marketing by small scale farmers in Makueni County"** for the period ending 10th November, 2023.

By a copy of this letter all the Deputy County Commissioners, Makueni County are requested to give you the necessary assistance.

N. J. KIMUTAI
FOR: COUNTY COMMISSIONER
MAKUENI

Copy to:
County Director of Education
MAKUENI

All Deputy County Commissioners
MAKUENI

Appendix 7: County Education Office Authorization

REPUBLIC OF KENYA

MINISTRY OF EDUCATION
STATE DEPARTMENT FOR BASIC EDUCATION

Telephone: .....
Fax: .....
Email:cdemakueni@gmail.com
When replying please quote

County Director of Education Office
Makueni County
P.O. BOX 41 - 90300
MAKUENI

Ref No. MKN/C/ED/5/33/VOL.II/147

5th January, 2023

Mary Kaluki Vamba
Kenyatta University
NAIROBI

RE: RESEARCH AUTHORIZATION

This office is in receipt of a letter from the Director General, National Commission for Science, Technology and Innovation (NACOSTI) authorizing you to carry out research on **"Devolution of Agriculture and its effects on mango marketing by small scale farmers in Makueni County"**, for the period ending **10th November, 2023.**

Following this authorization, you are allowed to proceed with your research as requested.

DATE: 5/1/2023
P.O. BOX 41-90300
MAKUENI

Dr. Samson Arodi
For County Director of Education
MAKUENI COUNTY

CC:
Director General/ CEO, NACOSTI

SGS