FACTORS OF PRODUCTION AND AGRICULTURAL PRODUCTIVITIES AMONG COMMUNITY-BASED FARMING PROJECTS IN SUBA SUB-COUNTY, HOMA-BAY COUNTY

BY

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DECLARATION

This Research Report is my original work and has not been submitted for any award to any other university.

Signature:  Date: 6th July 2022

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This Research Report has been submitted for examination with my approval as the university supervisor:

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DEDICATION

This research is dedicated to my beloved daughter Mercy Jessicah, who is an inspiration and a source of hope to me.

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ABSTRACT

Agricultural productivities is an important issue in Kenya's agriculture sector. The Kenya Vision 2030 and the Agricultural Sector Transformation and Growth Strategy envisions a commercialized, resilient, and competitive smallholder farms. Smallholder farmers productivities are for home consumption, market, or a blend of the two. The study sought to understand the agricultural productivities among community-based farming projects in Suba Sub-County and the factors of production influencing them. The research used a cross-sectional survey with a sample size of 260 and return rate of 93% which comprised smallholder famers and key informants. An administered questionnaire was used to collect data from the sampled farmers while a key informant interview guide was used to interview key informants. The study found a weak positive correlation and statistically significant relationship between access to land and agricultural productivities ($r= 0.227$; $P>0.001$); access to market and agricultural productivities ($r= 0.223$; $P>0.001$); and access to technology and agricultural productivities ($r= 0.136$; $P>0.035$). The study also found a weak positive correlation and statistically insignificant relationship between infrastructure and agricultural productivities ($r= 0.098$; $P<0.129$) and between access to finance and agricultural productivities ($r= 0.086$; $P<0.182$). The study concluded that access to land, markets, and technology are key determinants of agricultural productivities among community-based farming projects while infrastructure and access to finance does not significantly influence agricultural productivities. It is recommended that that development actors, including the County government, national Government, and Non-State Actors to formulate policies and strategies, develop programs, and design and implement projects that facilitate access to land, market, and technology to spur agricultural productivities of community-based farming projects. It is also recommended that policies on inclusive financial access for farmers and improved infrastructure should be a key priority of County Government, national Government, and other key stakeholders. Further research should be conducted to assess the influence of other factors such as entrepreneurial spirit, county and national Government policies, NGO activities, and household characteristics among others. This research should also be replicated in other regions of the country to compare findings.

LIST OF ACRONYMS AND ABBREVIATIONS

CGIAR	-	Consultative Group for International Agricultural Research
CUTS	-	Consumer Unity & Trust Society
FAO	-	United National Food and Agriculture Organization
FM	-	Frequency Modulated
Ha	-	Hectares
IFC	-	International Finance Corporation
IT	-	Information Technology
KNBS	-	Kenya National Bureau of Standards
MVA	-	Manufacturing Value Added
NGO	-	Non-Governmental Organization
RNF	-	Rural Non-Farm
SACCOs	-	Savings and Credit Co-operative Organizations
SDCP	-	Smallholders Dairy Commercialization Program

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Approximately 2 billion rural families in the developing world live in tiny farm homes, which in many countries are much less than 2 hectares (FAO, 2015). Smallholder farmers in developing countries use agribusiness practices to a very limited extent, and they typically cultivate for one of four reasons (FAO, 2012): (i) Exclusively for home consumption; (ii) Primarily for home consumption and marketing excess; (iii) Primarily for market consumption with some home; (iv) or exclusively for market usage. Those who farm simply for personal consumption or market surplus do not yet consider their activities to be businesses, and long-term investment is not a top goal. They are averse to diversifying into higher-value items, preferring to sell surpluses of their food crops instead. Smallholder farmers who farm primarily for the market but also for personal use are farmers who recognize the benefits of farming for the market but are constrained by a lack of capital, manpower, or market intelligence. They can't put their family's food security at risk without a more reliable source of revenue from cash crops. Smallholder farmers that grow only for the market are completely market oriented, with profit as their major motivation. Farmers who want to succeed at market-oriented farming need to improve their farm management and entrepreneurial skills.

Elbehri et al. (2013) identified four types of smallholders in West Africa: (i) subsistence farmers; (ii) moderately market oriented; (iii) good market orientation; and (iv) fully commercial. Climate change and natural events such as drought, floods, pests, and disease outbreaks, to name a few, make subsistence farming very vulnerable. When everything goes perfectly, subsistence farming works – but that seldom happens, and even when it does, there is no profit. Because there is no upward movement in subsistence farming, it is a barrier to development in rural Africa.

There is evidence that increasing access to production aspects such as land, infrastructure, markets, money, and technology may help smallholder farmers improve their agricultural practices. Infrastructure availability and use have a favorable and significant influence on agricultural production development, according to Manjunath and Kannan (2017). Smallholder families with comparatively larger production capability in terms of physical capital, such as land, financial

capital, access to loans, and human capital benefit from participation in inclusive agriculture. Access to capital is critical for the development of entrepreneurial activities and the expansion of inclusive agriculture (Douglas, M. and Oniankitan, A., 2010). Value chain-based finance techniques, in which ‘ready markets' serve as collateral, are feasible possibilities for input credit, pre-funding sales activities, and infrastructure and equipment expenditures. According to Martey, Etwire, and Kuwornu (2020), access extension service, seeds, labor, and land location are the most important factors in adoption of drought tolerant maize. They also discovered that DTM adoption has a beneficial effect on yield and commercialization intensity. According to Martey (2014), the type of market information availability is crucial for market decision-making.

In Tufa, Bekele, and Zemedu's (2014) study, arable land, gender, market proximity, family education, family size, access to technologies and resources for irrigation, were identified as determinants of smallholder horticultural crops farming as a business. Engagement in ICT-based initiatives boosts farmers' participation in input and product markets, as well as their household income, according to Zheng and Ma (2021). Despite the fact that less than 8% of Kenya's land is under cultivation, with the bulk of the country's land mass being dry or semi-arid and just roughly 20% being arable, agriculture remains the country's economic backbone (Agriculture Sector Development Strategy, 2010). In Kenya, farming is primarily done by small farmers who grow little more than five acres with inadequate technology. Around three million households run these small farms, which account for 75% of total production. Directly, the sector contributes 24% of GDP, but indirectly, via linkages with distribution, manufacturing, and other service-oriented businesses, it contributes 27% of GDP. The industry employs 60% of the workforce, making it the economy's major employer. Over 80% of individuals, especially those in rural areas, depend on agricultural-related activities to support themselves.

Homabay County's economy is based on agriculture, with around 150,000 agricultural households owning an average of 2.2 acres of land (HomaBay County Draft Strategic Plan, 2013). Homa Bay County's primary economic activities are fishing (on Lake Victoria) and agriculture, which make for the majority of family income in the region. Suba Sub-County in Homa Bay County is one of Kenya's poorest, with subsistence agriculture and fishing being the primary sources of income (Kenya National Bureau of Statistics, 2009). Agriculture is based on consumption, with surpluses

sold solely on market days within the community. Roads, in particular, are in a dismal state and are nearly inaccessible during wet seasons. Some rural places have access to electricity, although it is infrequent, with extended periods of power loss the norm. People, particularly women and girls, trek considerable distances to gather water for domestic use since water is limited. With livestock ranchers hauling their herd considerable distances to watering spots, water for agricultural purposes is scarce.

Agribusiness is labor-intensive, with value-added, agro-processing operations producing jobs. With increased productivity throughout the whole agricultural value chain system, agribusiness offers Suba Sub-County a strong possibility to enjoy fast economic prosperity. One of the only local pathways out of poverty for smallholder farmers may be the growth of employment through downstream agro-industrial processing value chains. For this to have a wide-ranging influence, a structural transition from subsistence-oriented home production and household-based agro-industry to a modern integrated rural economy based on specialization and interchange, frequently depending on economies of scale, is required. 2011 (Komarwa). Furthermore, both in terms of value contributed and employment, the off-farm aspects of the agribusiness and food retailing systems grow faster than farm-level output.

1.2 Statement of the Problem

By 2022, one of the pillars of the "Big Four Agenda" is to guarantee that all Kenyans are properly nourished while also generating employment opportunities for the country's working-age population. Suba Sub-County, which is one of Homa Bay County's administrative units, is one of Kenya's poorest areas, with poverty rate estimated at 50.2 percent (KNBS). In Homa Bay County, Njenga (2013) discovered that engaging in agricultural activities increased the likelihood of a household becoming impoverished. However, challenge is that there is a lack of proper understanding of the factors influencing agricultural productivities among smallholder farmers to enable effective development of the agriculture sector. Smallholder farmers' lack of or restricted adoption of agribusiness methods may impede the implementation of Kenya Vision 2030's economic pillar, the Kenya Agribusiness Strategy (2012), and the Big 4 Agenda's food security component. Economic growth, poverty reduction, and livelihood enhancement would all suffer as a result of this.

1.3 Purpose of the Study

The study's purpose was to evaluate the effect of production factors on agricultural productivities among community-based farming projects in Suba Sub-County.

1.4 Objectives of the Study

The study explored the following objectives:

(a) To determine how access to land influences agricultural productivities among community-based farming projects in Suba Sub-County.

(b) To establish the extent to which infrastructure influences agricultural productivities among community-based farming projects in Suba Sub-County.

(c) To assess how access to market influences agricultural productivities among community-based farming projects in Suba Sub-County.

(d) To investigate how access to finance influences agricultural productivities among community-based farming projects in Suba Sub-County.

(e) To determine the extent to which technology influences agricultural productivities among community-based farming projects in Suba Sub-County.

1.5 Research Questions

The research sought answers to the following research questions:

(a) How does access to land influence agricultural productivities among community-based farming projects in Suba Sub-County?

(b) To what extent does infrastructure influence agricultural productivities among community-based farming projects in Suba Sub-County?

(c) How does access to market influence agricultural productivities among community-based farming projects in Suba Sub-County?

(d) How does access to finance influence agricultural productivities among community-based farming projects in Suba Sub-County?

(e) To what extent does technology influence agricultural productivities among community-based farming projects in Suba Sub-County?

1.6 Research Hypothesis

The study tested the following 5 null hypotheses;

(a) H_{01}: There is no statistically significant relationship between access to land and agricultural productivities among community-based farming projects in Suba Sub-County.

(b) H_{02}: There is no statistically significant relationship between infrastructure and agricultural productivities among community-based farming projects in Suba Sub-County.

(c) H_{03}: There is no statistically significant relationship between access to market and agricultural productivities among community-based farming projects in Suba Sub-County.

(d) H_{04}: There is no statistically significant relationship between access to finance and agricultural productivities among community-based farming projects in Suba Sub-County.

(e) $H_{05:}$ There is no statistically significant relationship between access to technology and agricultural productivities among community-based farming projects in Suba Sub-County.

1.7 Significance of the Study

This study adds to the growing body of knowledge about community-based agricultural projects. The research is also significant for reviewing and formulating agricultural, food security, nutrition, and agribusiness development policies at the national and local levels. The study's results will also be used to enhance the management of community-based agricultural initiatives in Suba Sub-County, as well as the economic empowerment of smallholder farmers in the area. Future research in the subject of local economic development via community-based agricultural projects will be aided by the findings of this study.

1.8 Basic Assumptions of the Study

The following assumptions underpin this research:

Targeted community-based agribusiness initiatives in Suba Sub-County adhere to community-led and community-driven development principles. The study also believed that the data acquired from the population sample respondents in Suba Sub-County utilizing data collecting techniques mirrored the opinions of the non-chosen sample population. Finally, it was believed that all respondents cooperated with the researcher, replied to the questionnaire honestly, and that errors due to bias and non-response were few, increasing the study's reliability and validity.

1.9 Limitations of the Study

Due to funding restrictions, the research was limited to Suba Sub-County rather than the entire Homabay County or the entire country of Kenya. The research focused on agricultural productivity in community-based farming programs rather than farming operations in the study region as a whole. The research was also confined to a subset of agricultural productivity, rather than all agricultural productivity. Because the study utilized a cross-sectional survey research approach, the findings may only be valid at or near the period of the study.

1.10 Delimitations of the Study

There are four sub-counties in Homa-Bay County. However, the study was confined to Suba Sub-County since there has been little research done in the region, particularly in the field of agricultural productivity. Because it is a rural community with chronic poverty, the research region and population were chosen. It's also known for its inadequate road, water, and energy infrastructure. Furthermore, the researcher is a local and long-time resident of the region, and would want to perform the research to contribute to community-wide efforts to improve living conditions, secure livelihoods, and eliminate poverty.

1.11 Definition of Significant Terms Used in the Study

Agribusiness: Agriculture based on commercial principles, particularly when sophisticated technology is used, or the set of industries that deal with agricultural products and services.

Agricultural entrepreneur: A person who plans and manages agricultural companies while taking on more financial risks than typical.

Agricultural entrepreneurship: The process of establishing an agriculture-related company or organization.

Community-based project: A temporary procedure established to achieve a well-defined aim or target that is owned, directed, and driven by the community and has a clearly defined start and finish time, a set of tasks, and a budget.

Community-driven development: An method that focuses on building rural communities' capacity to play a larger part in their own prosperity.

Community-led development: The practice of collaborating, developing and accomplishing locally generated ideas for collective prosperity.

Entrepreneur: A person who organizes and operates a company or firms while taking on more financial risks than the usual individual.

Farmers: Agriculturists are individuals or groups who work in the agricultural industry.

Finance: Refers to a government's, business's, group's, or individual's cash or other liquid assets.

Infrastructure: Essential physical and functional structures and amenities required for the running of a community or enterprise such as buildings, roads, and power sources among others.

Land: The term "arable land" refers to land that is planted in permanent crops or pastures.

Market: A channel that connects buyers and vendors of a certain commodity or service in order to expedite a transaction. The price that individuals pay during a transaction is governed by a variety of factors, but supply and demand are frequently the most important.

Technology: Refers to the practical application of scientific knowledge, particularly in agriculture.

1.12 Organization of the Study

This research project report has five chapters. Chapter one covers introduction, background, problem statement, purpose, objectives, research questions, significance, basic assumptions, limitations, delimitations, and definitions of significant terms. Chapter two focused on review of relevant literature on agricultural productivities and factors of production; theoretical framework and conceptual framework; summary of literature reviewed and knowledge gaps. Research design, target population, sample size and sampling procedures, research instruments, pilot testing, validity, and reliability of the instruments, data collection procedures, data analysis techniques, ethical considerations, and the operationalization of the variables are covered in chapter three. This research's Chapter 4 covers the introduction, questionnaire return rate, demographic characteristics of study participants, data organization, data analysis, and presentation. Finally, Chapter 5 includes an introduction, a summary of the results, conclusions and recommendations based on the findings, suggestions for further research, and the research's contributions to the body of knowledge on community-based agricultural projects.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

The notion of elements of production, agricultural productivities, access to land, infrastructure, markets, finance, and technology were all covered in this chapter's study of related literature. According to the literature evaluated, the chapter also included a conceptual framework, an overview of the literature, and gaps in the literature.

2.2 The concept of factors of production in community-based farming projects

Factors of production include resources humans use to achieve production goals, such as labor, land, capital, and entrepreneurship (Case et al., 2009; Schiller, 2009). According to the UNFAO (www.fao.org), the most significant components in production are natural resources (land, water, soil, rainfall), labor, and money. According to World Bank Group research finance, land, technology, markets, and infrastructure are all important determinants in agricultural output (World Bank, 2013). According to the National Agriculture Policy, both levels of government would encourage the development and dissemination of transformational agricultural technology and interventions, as well as providing youth with access to production factors such as land, financing, insurance, and agricultural skills. In the agricultural sector, the Agriculture Sector Development Strategy 2010–2020 is in charge of putting Kenya's Vision 2030 into action. It strives to increase sector productivity, commercialization, and competitiveness, as well as more effectively and efficiently produce and manage important production factors. Both levels of government will be encouraged to create and disseminate revolutionary agricultural technologies and solutions, according to the National Agriculture Policy. Kenya Youth Agribusiness Strategy (2018-2022) asserts that agribusiness has enormous promise for job growth, youth employment, and food security. The industry has mostly failed to capitalize on the youth's potential and remains uninteresting. The situation has been worsened by agriculture's reputation as a last-resort vocation marked by drudgery and low pay.

2.3 Smallholder Farmers Agricultural productivities

According to Hazell and Rahman (2014), There are three types of peasant farmers: competitive, transitional, and self-sustaining. Small-scale farmers that make a profit are well-connected to the

supply chain and run their businesses like companies. Farmers that work full-time or part-time might be among them. Small farms have a variety of non-farm choices accessible to them, and they account for a significant portion of their total revenue. According to AASR (2017), Many pre-commercial farms may aspire to become more successful commercial farmers with the right help, making them a particularly appealing target for farm business support programs and laws. Transition farms sell a modest to medium portion of their agricultural produce while generating significant non-farm income. Specialized commercial farms sell just a small portion of their produce and earn a big portion of their income from sources other than their farms. Subsistence agriculture is linked to low economic growth, according to FAO (2003). Low external inputs and low production are common characteristics of subsistence agriculture. The desire to profit from the sale of agricultural goods on the market drives farming as a business, also known as market-oriented farming. Market-oriented farms are nevertheless closely tied to a farm home, but the farm family has less impact on their goals and decisions. Production, finance, and marketing are the three core concerns of farm management (CRS, 2009). In order to participate in market-oriented farming, farmers must be well-versed in farm management. Agribusiness is a strategy for transitioning from a production-oriented food security approach to one that prioritizes revenue generation and profit. It combines chain-wide thinking, competitive production, cooperative marketing, product diversity, and increasing value.

2.4 Access to Land and Smallholder Farmers' Agricultural productivities

To improve the commercial performance of horticulture crops farming, Tufa, Bekele, and Zemedu (2014) advocated that efficient intervention mechanisms centered on land access be implemented. One of the most important factors influencing smallholder farmers' inclination to participate in the output market is farm size. Smaller farms, according to some, have lower rates of return than bigger ones. Salami et al. (2010) asserts that too frequently, East Africa's arable land is split into small, unproductive parcels, resulting in fragmented production systems and low total productivity. Smallholder farming in East Africa has been hampered by ambiguous land ownership and limited access to land. Underdeveloped agriculture, landlessness, food poverty, and degraded natural resources have all resulted from insecure land tenure (Lighton and Guveya, 2016). Lack of access to land is one of the biggest challenges preventing young people from pursuing careers in agriculture and agribusiness (Njeru and Gichimu, 2014). According to an FAO (2010) report cited

by Njeru and Gichimu (2014), in most developing nations, the most frequent method of gaining land is via inheritance. Young women have a much harder time purchasing land since choices are generally made by the elderly.

2.5 Infrastructure and Smallholder Farmers' Agricultural productivities

According to Kembe and Omondi (2016), infrastructure improvement has a significant impact on the commercialization of smallholder dairy production. Subsistence farming is still practiced by the majority of Bangladeshi farmers and their lack of full market participation, on the other hand, prevents them from becoming commercial agriculture (Osmani and Hossain, 2015). For smallholder participation in the output market, the distance from the farm to the nearest all-weather road is critical crucial (Alemu and Dahito, 2020). When it comes to adding value to agricultural goods, water, electricity, and suitable roadways become even more crucial (Tadesse and Melaku, 2020). Top priorities should include improving rural road networks, water availability, and access to low-cost electricity and irrigation (ACDI/VOCA, 2014). Improved road connectivity makes agricultural extension services, inputs, and marketable surpluses more mobile (Knox, 2013). This facilitation function necessitates the existence of a right of way along which motorized and non-motorized vehicles and transportation services may operate. Regional industrial structure, mechanical intensity, labor quality, and location are all elements that might affect agriculture technological efficiency (Zongzhang and Xiaomin, 2009).

Rural highways link rural regions to growing markets while lowering rural producers' and consumers' input and transaction costs (Jouanjean, 2013). Access to electricity provides rural residents with a wealth of income-generating options (Ageya and Omondi, 2016). Around 70% of Kenya's classified road network is said to be in good to fair condition. Water reuse for agriculture might help alleviate some of the world's most critical water challenges if implemented correctly (Brelle, 2016). Effective and long-term irrigation and drainage benefits not just the environment but also the economy. Decision-makers may benefit from innovative wastewater treatment for reuse techniques in building successful management strategies. Attracting foreign direct investment and increasing economic development need effective communication. Rafoneke et al (2020) found that strengthening communication infrastructure might help farmers earn more

money. Rural communication is a non-linear process in which data or information is included. Everyone engaged has the ability to be a data and knowledge inventor, mediator, or receiver.

2.6 Access to markets and smallholder farmers agricultural productivities

Farmers must have a market mindset and make production decisions based on market signals (Abafita and Atkinsonx, 2016). Farmers' characteristics, private asset characteristics, and transaction cost factors are the most important predictors of smallholder farm families' market involvement likelihood and intensity. High transportation expenses, insufficient infrastructure, a high dependence ratio, distance, cooperative membership, and production size all had a substantial influence on successful market involvement among Nigerian farmers, according to Gani and Adeoti (2011). Lothore and Delmas (2009) states that long transaction chains between farmers and consumers, limited access to accurate and timely market information, and poorly organized and inefficient marketplaces define Africa's agricultural markets. As a result, food is thrown away and small-scale farmers are underpaid. There are differences in market involvement between poor and non-poor families in Kenya. Farmers in peri-urban regions sell a higher percentage of their crop than those in rural areas (Omiti et al., 2009). Market involvement is hampered by the distance between the farm and the selling place (Kamara, 2004). Increased sales are aided by improved manufacturing price and market intelligence.

2.7 Access to Finance and Smallholder Farmers Agricultural productivities

In Zimbabwe, access to capital is a positive predictor of commercialization among smallholder farmers (Rubhara and Mudhara, 2019). If given adequate financial and extended aid, subsistence farmers are more inclined to commercialize. Mechanization and non-labor inputs benefit from financial inclusion, and the elasticity is stronger in technologically backward countries. Access to credit financing is the lifeblood of rural development and a key driver of household food security and poverty reduction to (Kiplimo et al., 2015). Kiplimo et al., (2015) further explains that access to credit financial services is influenced by education level, employment, and availability of extension services. To ease lending procedures and reduce risk, governments should construct credit/loan offices near farmers. Mbiba et al. (2018) propose that policy interventions aiming at funding smallholder coffee growers should prioritize access to credit. Coffee farming experience, the gender of the household head, the amount of coffee plants, and access to extension services all

had a substantial impact on microfinance loan uptake, according to the authors. Gender, household size, agricultural capital, animal ownership, and better technology usage all influenced access to agricultural microcredit in Northern Ghana (Anang, 2015). Extension services for smallholder farmers should be improved, according to the study, so that they may get microcredit for agricultural output. According to Gitau et al. (2014), farmer groups lack appropriate understanding about responsible financial management. Stakeholders, according to Hananu, Abdul-Hanan, and Zakaria (2015), should encourage the creation of cooperative organizations.

2.8 Access to Technology and Smallholder Farmers Agricultural productivities

The bulk of Africa's small farms will become more difficult to manage. More public investment in agriculture will be required to overcome this significant challenge. Smallholder farmers in Sub-Saharan Africa are cautious to embrace new technology, according to Meijer et al. (2014). Awotide, Karimov, and Diagne (2016) investigated the variables that affect the adoption of Improved Rice Varieties (IRVs) in Nigeria, as well as the impact of market engagement on farmer welfare. They discovered that rice production income, membership in a farmers' organization, distance to nearest seed suppliers, seed cost, and quantity of training all had a favorable and significant influence on IRV adoption. The influence of increased agricultural output on poverty levels and environmental harm is determined by the application of agricultural technologies (Muzari et al, 2012). Crop varieties, farm size, and geographic location all have a role in adoption. Assets, money, institutions, vulnerability, awareness, labor, and smallholder farmers' innovativeness are all influences on technology adoption. African governments have not paid enough attention to providing critical information to its farmers, particularly in rural regions (Langat et al., 2016). Without a larger focus on long-term output and growth, the majority of small farms in Africa will become increasingly difficult to manage (CropLife Foundation, 2015). More public investment in agriculture will be required to overcome this significant challenge.

2.9 Theoretical Framework

This study was based on the following theories:

2.10 Theory of production function

Simtion (2020) expanded the theory of production function employed in this study, stating that production function is crucial to economic analysis and is algebraically stated as P = f(x1, x2, x3,... xn), which is the connection between output (P) and inputs (x). In the framework of agricultural productivities, the farmer strives to execute those actions that assure the intended output; as a consequence, production variables interfere, resulting in various degrees of production. The production function implies that technical efficiency concerns in agriculture and management have already been addressed and handled, allowing analysis to focus on allocative efficiency issues. Despite the fact that the output-to-input connection is inherently physical, production functions frequently employ monetary values. Several sorts of inputs are used in the manufacturing process, which cannot be aggregated into physical units. It also generates a variety of outputs (joint production) that are measured in various physical units. There is an extreme viewpoint that all manufacturing processes (in some way) yield numerous outputs (Faber, et al., 1998). Because it addressed concerns in the variables indicated, the theory of production function is pertinent to this study. Factors of production, simply described, are the "inputs" required to produce a "output." Land, infrastructure, markets, finance, and technology have been recognized as variables of production beyond those enumerated by Johann von Thünen in theoretical and empirical investigations (Case et al., 2009; Schiller, 2009; FAO; and World Bank, 2013).

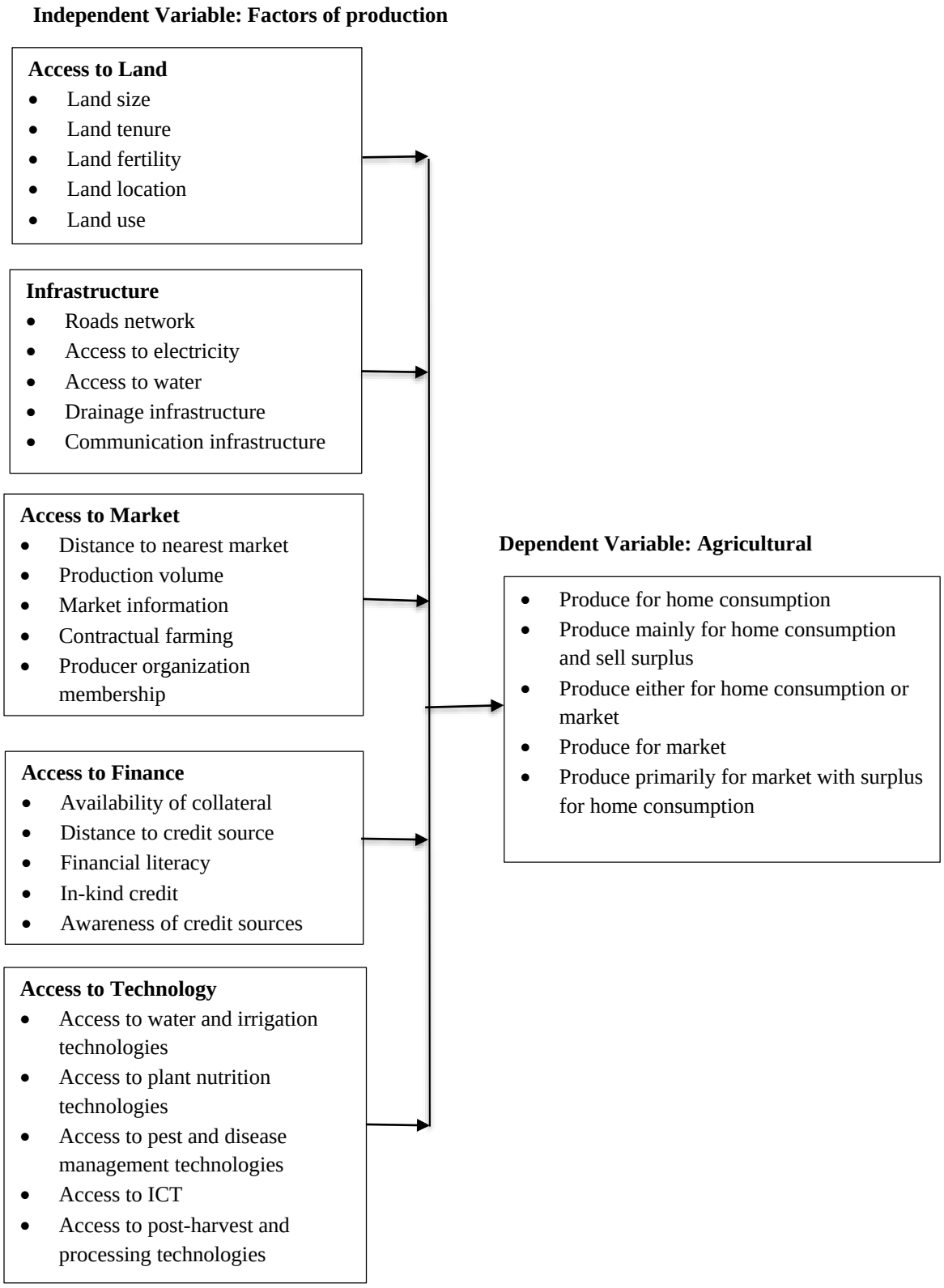
2.11 Diffusion of Innovation Theory

The method through which an idea spreads is described by the diffusion of innovation hypothesis. A notion that is judged distinctive by a person is referred to as innovation. The theory assumes that diffusion is a kind of communication including three elements: an invention, two people, and a channel of communication (Rogers, 2003). This theory is relevant to this study particularly with respect to influence of technology on agricultural productivities.

2.12 Conceptual framework

The study theory is provided in this part in the form of a model, which depicts the research variables and their interactions as a visual representation of the connections between independent and dependent variables.

Figure 1: Conceptual framework



2.13 Summary of Literature

Literature reviewed on access to land include Tufa, Bekele, and Zemedu (2014); Osmani and Hossain (2015); Lighton and Guveya (2016); Njeru and Gichimu (2014); and Cotula (2011). According to the findings of these research, there is a favorable association between farmer access to land and the aim of their output. Variables such as land size, land tenure, land fertility, and land location, and land use were highlighted as some of the factors that may influences production purposes by farmers. On infrastructure, literature reviewed were works by Kembe and Omondi (2016); Alemu and Dahito (2020); Tadesse and Melaku (2020); Knox (2013); Rafoneke et al (2020); Samboko et al (2017); and Brelle (2016). Findings from these studies suggest that infrastructure has an influence on production purposes by farmers. Better roads network may motivate farmers market orientation while access to water enhances production intensification through irrigation. Access to electricity was cited to influence market-facing production operation while communication infrastructure facilitates learning and farmer training. Drainage infrastructure was cited as key to managing production risks such as flooding.

Works by Abafita and Atkinson (2016); Tarekegn and Yosefe (2017); Onoja et al (2012); Musah, Bonsu, and Seini (2014); Gani and Adeoti (2011); Schalkwyk (2012); Adepoju, Owoeye, and Adeoye (2015); Egbetokun and Omonona (2012); Omiti et al (2009); and Kamara (2004) indicated that access to markets influence farmer's production purposes. Key market access factors highlighted included distance to market, market information, production capacity, farmers collective action, and contractual farming. On access to finance, literature reviewed included works by Rubhara and Mudhara (2019); Abu and Haruna (2017); Pingali et al (2019); Kiplimo et al (2015); Adeyonu et al (2017); Mbiba et al (2018); Anang (2015); Hananu, Abdul-Hanan, and Zakaria (2015); and Gitau et al (2014). According to the findings of these research, access to financing is a factor of farmers' productivity goals. Their ability to acquire funding has an impact on whether they create for the market or for personal use. Finally, on access to technology, literature reviewed were works by Mwangi and Kariuki (2015); Awotide, Karimov, and Diagne (2016); Hagos and Geta (2016); Mariyono (2017); Obayelu et al (2016); Muzari et al (2012); Zahedi and Zahedi (2012); and Langat (2016) which indicated that parameters such as access to water, irrigation, plant nutrition, pest and disease management, and post-harvest and processing technologies influence farmers production purposes. Access to ICT also influence their production

purposes. On smallholder farmer's production purposes, literatures reviewed include Hazell and Rahman (2014); AASR (2017); FAO (2003); CRS (2009); and Schiller (2009). Findings from these literature sources indicate that smallholder farmers produce either purely for home consumption, mainly for home consumption with surplus for market, mix of home or market, exclusively for market, or mainly for market with surplus for home consumption.

2.14 Gaps in Literature

Table 2.1: Gaps in literature

Variable	Author/Year	Title of Study	Methodology	Findings of the Study	Gaps in Knowledge
Access to land	Tufa, A., Bekele, A., & Zemedu, L. (2014).	Determinants of smallholder commercialization of horticultural crops in Gemechis District, West Hararghe Zone, Ethiopia	Sample survey of horticultural farmers	It was discovered that cultivated land played a significant effect in the productivity of smallholder farmers.	The study focused only on horticultural crops
Infrastructure	Kembe and Omondi (2016)	The Infrastructural Development and Commercialization of Smallholder Dairy Farming in Uasin Gishu County, Kenya	Cross-sectional survey	The development of infrastructure has a considerable impact on the commercialization of smallholder dairy production.	The study focused only on dairy farming
Access to market	Abafita and Atkinson (2016)	Smallholder Commercialization in Ethiopia: Market Orientation and Participation	Analysis of data from 2009 round of the Ethiopian Rural Household Survey (ERHS).	Market orientation strongly enhances market participation	Relied on Analysis of secondary panel data
Access to finance	Abu and Haruna (2017)	Financial inclusion and agricultural commercialization in Ghana: an empirical investigation	Random sampling of maize farmers across the ten regions of Ghana	Agricultural commercialization is greatly aided by financial inclusion.	The study only surveyed maize farmers
Access to technology	Awotide, Karimov, and Diagne (2016)	Agricultural technology adoption, commercialization and smallholder	Cross-sectional data of rice farmers selected	Income from rice production, participation in a farmers' association,	The study focused only on rice farmers

		rice farmers' welfare in rural Nigeria	randomly from three notable rice producing States in Nigeria	distance to the nearest sources of seed, cost of seed, yield, and degree of training were shown to be the variables that positively and substantially affected the intensity of IRV adoption.	
Smallholder farmers production purposes	Hazell and Rahman (2014)	Importance of Smallholder Farms as a Relevant Strategy to Increase Food Security	Literature review of	Smallholder farms were classified according to their number, proportion of total farms, share of farmed land, employment share, age, gender, poverty and food insecurity status, importance in marketable food staple surpluses, and income diversification.	Relied on secondary data

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This section describes the approach used in undertaking the research and includes details of the research design and data collection methodology.

3.2 Research Design

A cross-sectional design was adopted in this investigation. A cross-sectional study's defining characteristic is that variables are examined at a single moment, regardless of whether they are occurrences, individuals, or other types of data. The cross-sectional study design was selected because it enables direct observation of the phenomena under investigation, rapid data collection without any need for respondent follow-up, and speedier findings at a cheaper cost than alternative methods. These characteristics make cross-sectional studies especially advantageous for estimating the frequency of a certain event in a community, regardless of whether it is believed to be the cause, a consequence, or both.

3.3 Target Population

Farmers, input providers, technology suppliers, agriculture extension officials, project officers, and finance institutions made up the study's target group of 784 people. Table 3.1 contains information about the target population.

Table 3.1: Target population

Target group	**Population**
Smallholder farmers	750
Input suppliers	12
Technology suppliers	8
Agriculture extension officers	6
Project officers	4
Financial institutions	4
Total	**784**

3.4 Sample Size and Sampling Procedures

The number of things to be chosen from the universe for study is referred to as sample size, while the processes used to choose samples from a population are referred to as sampling procedure (Kothari and Garg, 2014). The study's sample size and sampling technique are explained in the sub-sections below;

3.4.1 Sample Size

The Krejcie and Morgan table was referenced in calculating the sample size of 260 out of a target population of 784 at a 95% confidence level.

Table 3.2: Sample size

Target group	**Sample**
Smallholder farmers	249
Input suppliers	4
Technology suppliers	3
Agriculture extension officers	2
Project officers	1
Financial institutions	1
Total	**260**

3.4.2 Sampling Procedure

To choose specific respondents using the probability sample strategy in this research, a stratified random sampling approach was adopted. The sampling strategy was used to divide the target population into strata or subgroups. Purposive sampling was used as part of a technique of non-probability sampling.

3.5 Research Instrument

As research techniques, a self-administered structured questionnaire and a guide for key informant interviews were employed. The given questionnaire elicited quantitative data from smallholder farmers, while the key informant interview guide elicited qualitative data from key informants such as input providers, technology suppliers, agricultural extension agents, project officers, and

financial institutions. There were seven components to the structured and administered questionnaire (A-G). The demographic features of smallholder farmers were the focus of Section A. Sections B through G included five statements in a Likert scale for both the independent and dependent variables. Section B looked on how land availability affects agricultural productivities in community-based farming projects. The goal of Section C was to see how infrastructure affects agricultural productivities in community-based farming projects. The goal of Section D was to see how market access affects agricultural productivities in community-based farming projects. Section E looked on how financial access affects agricultural productivities in community-based farming projects. The goal of Section F was to see how much technology effects agricultural productivities in community-based farming projects. The third section, Section G, looked for data on agricultural productivities in community-based farming projects. The key informant interview schedule included a list of questions that were used to acquire qualitative data on the study questions from key informants.

3.5.1 Piloting Testing of Research Instruments

Farmers questionnaire was piloted among 25 farmers in Ndhiwa Sub-County to ascertain how respondent farmers view and respond to the questions generated and to assist in the discovery of flaws and issues that could go missed otherwise. The 25 number of pilot farmers was chosen based on Kothari (2014) who explains that a research instrument should be piloted among 10% of the sample size.

3.5.2 Validity of the Instrument

The content validity of the study questionnaire was evaluated by piloting it among 25 farmers in Ndhiwa Sub-County. Content validity refers to the degree to which the questions in an instrument properly represent the content universe to which it would be generalized (Straub, Boudreau, et al. 2004).

3.5.3 Reliability of the Instrument

Cronbach's Alpha is most often used internal consistency statistic. When Likert scales are used, they are considered to be the most accepted measure of dependability (Whitley, 2009). While there

are no universally accepted requirements for internal consistency, the consensus of scholars concur on a threshold coefficient of 0.70 (Whitley, 2002). Reliability test for this study yielded 0.8.

3.6 Data Collection Procedures

Clearance to do research was obtained from the University of Nairobi and The National Commission for Science, Technology, and Innovation, and the local authorities, as well, were also notified accordingly. The research assistants received training on questionnaire administration and ethical considerations. The data collection process began with piloting and progressed to the real data collection. After gaining their agreement, research assistants administered the survey questionnaire to farmers in sampled households. The researcher checked the completed questionnaires for mistakes and omissions and corrected them to ensure that the field data obtained was correct, coherent with the facts acquired, consistently recorded, comprehensive, and well-organized to help in data processing and analysis. Using the interview schedule, the researcher conducted in-person interviews with key informants.

3.7 Data Analysis Techniques

Quantitative data was processed and descriptive and inferential analysis i.e. means, standard deviation, correlation and regression analyses were performed using Statistical Package for Social Scientists. Themes and content analysis were used to analyze qualitative data.

3.8 Ethical Considerations

As professionals, researchers must adhere to well-defined norms and principles that govern their behavior. This means that the study's findings may be balanced against the dangers of unethical activity. However, this is contingent upon a comparison of the proportional amount of good and evil created (Frankena, 2001). The researcher was conscious of ethical considerations such as maintaining respondents' privacy while dealing with sensitive material, gaining respondents' informed consent, and allowing respondents to interact freely and without compulsion.

3.9 Operationalization of the variables

Table 3.3: Operationalization of variables

Objectives	Variables	Indicators	Measuring Scale	Research Approach	Types of Analysis	Tools of Analysis
To determine how access to land influences agricultural productivities among community-based farming projects in Suba Sub-County	Access to land	Land size Land tenure Land fertility Land location Land use	Ratio Ordinal Interval	Quantitative and Qualitative	Descriptive and Inferential statistics	Arithmetic mean Standard Deviation Regression and Pearson's correlation (r) Analyses
To establish the extent to which infrastructure influences agricultural productivities among community-based farming projects in Suba Sub-County	Infrastructure	Land size Land tenure Land fertility Land location Land use	Ratio Ordinal Interval	Quantitative and Qualitative	Descriptive and Inferential statistics	Arithmetic mean Standard Deviation Regression and Pearson's correlation (r) Analyses
To assess how access to market influences agricultural productivities among community-based farming projects in Suba Sub-County	Access to market	Distance to nearest market Production volume Market information Contractual farming Producer organization membership	Ratio Ordinal Interval	Quantitative and Qualitative	Descriptive and Inferential statistics	Arithmetic mean Standard Deviation Regression and Pearson's correlation (r) Analyses
To investigate how access to finance influences agricultural productivities among community-based farming projects in Suba Sub-County	Access to finance	Availability of collateral. Distance to credit source Financial literacy In-kind credit Awareness of credit sources	Ratio Ordinal Interval	Quantitative and Qualitative	Descriptive and Inferential statistics	Arithmetic mean Standard Deviation Regression and Pearson's correlation (r) Analyses
To determine the extent to which technology influences	Access to technology	Access to water and irrigation technologies	Ratio Ordinal Interval	Quantitative and Qualitative	Descriptive and Inferential statistics	Arithmetic mean Standard Deviation

agricultural productivities among community-based farming projects in Suba Sub-County		Access to plant nutrition technologies Access to pest and disease management technologies Access to ICT Access to post-harvest and processing technologies				Regression and Pearson's correlation (r) Analyses
Agricultural productivities among community-based farming projects in Suba Sub-County	Agricultural productivities	Produce for home consumption. produce mainly for home consumption and sell surplus. produce either for home consumption or market. produce for market. produce primarily for market with surplus for home consumption.	Ratio Ordinal Interval	Quantitative and Qualitative	Descriptive and Inferential statistics	Arithmetic mean Standard Deviation

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter outlines the data analysis approach, presentation, and discussion of the results.

4.2 Questionnaire Return Rate

Eight respondents out of the sample of 260 were non-responsive resulting in a 97 percent response rate.

Table 4.1: Questionnaire Return Rate

Responses	**Rate**	**Percent (%)**
Number of farmers survey questionnaires completed.	241	96.9%
Number of Questionnaires Not Completed For Farmers Survey	8	3.1%
Number of keys informants interviewed	11	100%
Total number of questionnaires to farmers and key interviews conducted	**260**	**100%**

4.3 Demographic Characteristics of the Respondents

Demographic characteristics of the respondents were established as presented in Table 4.2.

Table 4.1: Distribution of Demographic Traits of Respondents

Demographic parameter		**Frequency**	**Percent (%)**
Gender	Male	101	41.9
	Female	140	58.1
Age	18-22 yrs	6	2.5
	23-27 yrs	11	4.6
	28-32 yrs	19	7.9
	33-37 yrs	27	11.2

	38-42 yrs	33	13.7
	43-47 yrs	21	8.7
	48-52 yrs	61	25.3
	53 yrs and above	63	26.1
Marital status	Single	21	8.7
	Married	176	73.0
	Separated	21	8.7
	Divorced	12	5.0
	Widowed	11	4.6
Highest level of Educational qualifications	No formal education	14	5.8
	Primary	51	21.2
	Secondary	81	33.6
	Certificate	67	27.8
	Diploma	15	6.2
	Degree and above	13	5.4

The demographic features of smallholder farmers interviewed using a structured survey questionnaire are shown in Table 4.2. Age, marital status, gender, and highest educational qualifications were among the demographic data obtained from smallholder farmers. Males made up 41.9 percent of the respondents, while females made up 58.1 percent. This indicates that females participate in community-based farming projects at a higher rate than males. The age group of 53 years and above received the most responses (26.1%), followed by 48-52 years (25.3 percent). In effect, 51.4 percent of respondents are 48 years or older, showing that people involved in community-based farming projects are quite old. The age groups of 18-22 years (2.5%) and 23-27 years (4.6%) had the fewest respondents, indicating that youth are rarely active in these community-based farming projects. The other age brackets were 28-32 years (7.9%), 33-37 years (11.2%), 38-42 years (13.7%), and 43-47 years (8.7%).

Majority of the respondents were married (73.0%). Proportions of the other categories of marital status were: single (8.7%), separated (8.7%), divorced (5.0%), and widowed (4.6%). Secondary education is the level of academic qualification with the highest number of respondents (33.6%), followed by certificate level (27.8%), and primary level (21.2%). Diploma level accounted for 6.2% of respondents while degree and above accounted for 5.4%. 5.8% of respondents lacked formal schooling. The average size of household is 4.2 in Table 4.3, with a minimum of 1 and a maximum of 7. With a minimum of 1 acre and a maximum of 8.0 acres, the average farm size is 4.0 acres.

Table 4.2: Average Household and Farmland Size

Descriptive	n	Minimum	Maximum	Mean	Std. Deviation
Household size	241	1.0	7.0	4.2	1.200
Size of farmland (Acres)	241	1.0	8.0	4.0	1.5838

The number of key informants interviewed were 11, with 6 (54.5%) being male while 5 (45.5%) were females.

4.4 Agricultural productivities among Community-Based Farming Projects

Agricultural productivities among community-based farming projects was the study's dependent variable. As a result, the study attempted to learn about the viewpoints of research participants on agricultural productivities in community-based farming projects. Their responses were evaluated on a Likert scale of 1 to 5, with 1 signifying Strongly Disagreed (SD), 2 signifying Disagreed (D), 3 signifying Neutral, 4 signifying Agreed (A), and 5 signifying Strongly Agreed (SA).

Table 4.3: Descriptive Statistics on Agricultural productivities among Community-based Farming Projects

Item	Statement	SD	D	N	A	SA	Total	Mean	Std. Dev.
AP1	I produce for home consumption	11	32	86	105	7	241	3.27	0.893
	Percentage (%)	**4.6**	**13.3**	**35.7**	**43.6**	**2.9**	**100**		
AP2	I produce mainly for home consumption and sell surplus	13	38	80	104	6	241	3.22	0.928
	Percentage (%)	**5.4**	**15.8**	**33.2**	**43.2**	**2.5**	**100**		
AP3	I produce either for home consumption or market	1	16	54	160	10	241	3.67	0.680
	Percentage (%)	**0.4**	**6.6**	**22.4**	**66.4**	**4.1**	**100**		
AP4	I produce for market	10	31	95	98	7	241	3.25	0.870
	Percentage (%)	**4.1**	**12.9**	**39.4**	**40.7**	**2.9**	**100**		
AP5	I produce primarily for market with surplus for home consumption	61	97	37	38	8	241	2.32	1.114
	Percentage (%)	**25.3**	**4.02**	**15.4**	**15.8**	**3.3**	**100**		
	Composite mean and Std. Dev.							**3.146**	**0.897**

Table 4.4 presents descriptive statistics on agricultural productivities among community-based farming projects as perceived by study participants. Item AP1 examined whether farmers produced for home consumption and had a mean and standard deviation of 3.27 and 0.893 respectively, implying that participants were neutral or indifferent. Item AP2 was created to determine if farmers produce mainly for domestic use and subsequently sell the surplus. The mean of this statement is 3.22 and the standard deviation is 0.928, showing that they are indifferent. Item AP3 was created to ascertain whether farmers produce for personal use or for sale and had a mean and standard deviation of 3.67 and 0.68 respectively indicating that farmers produce for personal use or sale, depending on other family circumstances. Item AP4 was created to ascertain if farmers produce for the market or not. The standard deviation for this response was 0.87, showing that they

are apathetic and uncertain about whether or not to produce for the market. Item AP5 was created to ascertain whether farmers produce mostly for market use or for personal usage and had a mean and standard deviation of 2.32 and 1.114 respectively, implying farmers' output is not primarily market-oriented. According to key informants, smallholder farmers participating in community-based agricultural programs are not particular about whether they produce only for the market or for personal use. Additional factors such as quantity produced, availability or market, and current market price all have an effect on this direction.

4.5 Access to land and agricultural productivities among community-based farming projects

Analysis of the relationship between access to land and agricultural productivities is presented in the subsequent sections.

4.5.1 Descriptive Analysis of Access to Land and agricultural productivities among community-based farming project

The researcher wanted to know how much farmers agreed that access to land has an influence on agricultural productivities in community-based farming projects. Their responses were evaluated on a Likert scale of 1 to 5, with 1 signifying Strongly Disagreed (SD), 2 signifying Disagreed (D), 3 signifying Neutral, 4 signifying Agreed (A), and 5 signifying Strongly Agreed (SA).

Table 4.4: Descriptive Statistics on Access to Land

Item	Statement	SD	D	N	A	SA	Total	Mean	Std. Dev.
AL1	Land size influence agricultural productivities	16	41	74	103	7	241	3.18	0.975
	Percentage (%)	**6.6**	**17.0**	**30.7**	**42.7**	**2.9**	**100**		
AL2	Land tenure influence agricultural productivities	5	10	36	53	137	241	4.27	1.000
	Percentage (%)	**2.1**	**4.1**	**14.9**	**22.0**	**56.8**	**100**		
AL3	Land fertility influence agricultural productivities	1	10	22	51	157	241	4.46	0.856
	Percentage (%)	**0.4**	**4.1**	**9.1**	**21.2**	**65.1**	**100**		

AL4	Land location influence agricultural productivities	8	20	56	99	58	241	3.74	1.021
	Percentage (%)	**3.3**	**8.3**	**23.2**	**4.1**	**24.1**	**100**		
AL5	Land use influence agricultural productivities	20	36	62	66	57	241	3.43	1.233
	Percentage (%)	**8.3**	**14.9**	**25.7**	**27.4**	**23.7**	**100**		
	Composite mean and Std. Dev							**3.816**	**1.017**

Item AL1 was created to determine if the size of the land has an effect on agricultural productivities and the mean and standard deviation were 3.18 and 0.975 respectively meaning farmers are indifferent on this statement. Item AL2 was created to examine the effect of land tenure on agricultural productivities and the mean and standard deviation were 4.27 and 1.000 respectively meaning farmers affirm that land tenure has an effect on their agricultural productivities. Item AL3 was created to examine the effect of soil fertility on agricultural productivities and returned a mean and standard deviation of 4.46 and 0.856 respectively showing that the majority of farmer respondents believed that soil fertility affects their agricultural productivities. Item AL4 was created to examine the effect of site location on agricultural productivities in and registered a mean and standard deviation of 3.74 and 1.021 respectively demonstrating that farmers are uncertain about the impact of land location on agricultural productivity. AL5 sought to determine if their land use had an effect on their agricultural productivities and the mean for this statement is 3.43 and the standard deviation is 1.233, showing that the majority of respondents are unsure.

4.5.2 Correlation Analysis of Access to Land and Agricultural productivities among Community Based Farming Projects

The Pearson Product Moment Correlation Coefficient was calculated to ascertain the presence or absence of a meaningful correlation as well as the extent or magnitude of the relationship between access to land and agricultural productivities and the results are summarized in Table 4.6.

Table 4.5: Correlation Analysis Between Access to Land and Agricultural productivities among Community-Based Farming Projects

		Agricultural productivities	Access to land
Agricultural productivities among community-based farming projects	Pearson Correlation	1	.227**
	Sig. (2-tailed)		<.001
	N	241	241
Access to land	Pearson Correlation	.227**	1
	Sig. (2-tailed)	<.001	
	N	241	241

**. Correlation is significant at the 0.01 level (2-tailed).

There is weak positive correlation (r= 0.227; P<0.001) between access to land and agricultural productivities across community-based farming projects, which is significant because the p< t-test value of 0.05.

4.5.3 Regression Analysis of Access to Land and Agricultural productivities among Community-Based Farming Projects

The coefficient of determination (R^2) was used to determine the amount of variance in agricultural productivities among community-based farming projects that explains their link to land availability. To aid in understanding or explaining the degree of variance in agricultural productivities among community-based farming projects, ANOVA and the coefficient were computed.

Table 4.6: Model Summary on Access to Land

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.227[a]	0.051	0.047	0.45186

a. Predictors: (Constant), Access to land

The model summary demonstrates that access to land and agricultural productivities have a positive multiple correlation coefficient (R=0.227). According to the table, the regression model

has a coefficient of determination of R^2=0.051. The model yields a 0.051 determinant of coefficient (R^2) value. This means that an increase in our independent variable access to land predicts a 0.51 percent rise in the dependent variable agricultural productivities. We may infer a significant connection between the two variables is R is significantly greater than zero.

Table 4.7: ANOVA Regression Analysis Between Access to Land and Agricultural productivities among Community-Based Farming Projects

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.639	1	2.639	12.925	<.001[b]
	Residual	48.798	239	0.204		
	Total	51.437	240			

a. Dependent Variable: Agricultural productivities among community-based farming projects

b. Predictors: (Constant), Access to land

An ANOVA for the regression on land access and agricultural productivities across community-based farming projects has F-test = 12.925, and P-value of 0.001<0.05 indicating that our dependent variable, agricultural productivities across community-based farming projects, and our independent variable, access to land, have a significant linear relationship hence null hypothesis of no statistically significant association between the two variables is rejected.

Table 4.8: Coefficients for the Regression of Access to Land and Agricultural productivities among Community-Based Farming Projects

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	2.289	0.240		9.541	<.001
	Access to land	0.224	0.062	.227	3.595	<.001

a. Dependent Variable: Agricultural productivities among community-based farming projects

The coefficients for the regression on land access and agricultural productivities across community-based farming projects are shown in Table 4.9. Value of agricultural productivities in

the absence of access to land is represented by the regression constant 2.289. The result is that there is a robust relationship between land access and agricultural productivities in community-based farming projects (p-value=0.001).

4.5.4 Hypothesis 1 Testing

F-statistics in Table 4.8 indicates that p<0.001 which is less that t-test Table Value of 0.05. This means than the P<0.001 is significant. As a result, the null hypothesis of no statistically substantial association between agricultural productivities and access to land is rejected, and the alternative hypothesis H1 is kept. According to key informants, land has an impact on agricultural productivities. Due to the advantages of efficiencies, the bigger the farm, the higher the potential for market production. Farmers on smaller farms may still be market-oriented, owing to technology such as irrigation and greenhouses that facilitate intensive farming.

4.6 Infrastructure and Agricultural productivities among Community-Based Farming Projects

Analysis of the relationship between infrastructure and agricultural productivities is presented in the subsequent sections

4.6.1 Descriptive Analysis of infrastructure and agricultural productivities among community-based farming project

The researcher wanted to know how much farmers agreed that infrastructure has an influence on agricultural productivities in community-based farming projects Their responses were evaluated on a Likert scale of 1 to 5, with 1 representing Strongly Disagreed (SD), 2 representing Disagreed (D), 3 representing Neutral, 4 representing Agreed (A), and 5 representing Strongly Agreed (SA). Table 4.10 summarizes the descriptive statistics results.

Table 4.9: Descriptive Statistics of Infrastructure

Item	Statement	SD	D	N	A	SA	Total	Mean	Std. Dev.
I1	Road network influence agricultural productivities	7	24	59	98	52	241	3.69	1.016
	Percentage (%)	**2.9**	**10.0**	**24.5**	**40.7**	**22.0**	**100**		
I2	Access to electricity influence agricultural productivities	11	32	55	98	45	241	3.56	1.079
	Percentage (%)	**4.6**	**13.3**	**22.8**	**40.7**	**18.7**	**100**		
I3	Access to water influence agricultural productivities	11	29	73	91	37	241	3.47	1.037
	Percentage (%)	**4.6**	**12.0**	**30.3**	**37.8**	**15.4**	**100**		
I4	Drainage infrastructure influence agricultural productivities	15	33	69	81	43	241	3.43	1.120
	Percentage (%)	**6.2**	**13.7**	**28.6**	**33.6**	**17.8**	**100**		
I5	Communication infrastructure influence agricultural productivities	6	21	61	98	55	241	3.73	0.991
	Percentage (%)	**2.5**	**8.7**	**25.3**	**40.7**	**22.8**	**100**		
	Composite mean and Std. Dev.							**3.576**	**1.0486**

Item I1 was created to determine the effect of the road network on agricultural productivities and returned a mean and standard deviation of 3.69 and 1.016 respectively meaning farmers were indifferent on the statement. A mean of 3.56 and standard deviation of 1.079 was returned for Item 2 which examined electricity access and agricultural productivities, demonstrating that farmers are also indifferent on this statement. The same applies to Item I3, I4, and 5 which examined perceptions on access to water, drainage, and communication infrastructure and agricultural productivities which yielded a mean and standard deviation of 3.47 and 1.037; 3.43 and 1.120; and 3.73 and 0.991 respectively meaning farmers are equally indifferent on these statements.

4.6.2 Correlation Analysis of infrastructure and Agricultural productivities among Community-Based Farming Projects

The Pearson Product Moment Correlation Coefficient was determined centered on farmer opinions to determine the strength of the association between infrastructure and agricultural productivities.

Table 4.10: Correlation Analysis Between Infrastructure and Agricultural productivities among Community-Based Farming Projects

Correlations

		Agricultural productivities	Infrastructure
Agricultural productivities among community-based farming projects	Pearson Correlation	1	0.098
	Sig. (2-tailed)		0.129
	N	241	241
Infrastructure	Pearson Correlation	0.098	1
	Sig. (2-tailed)	0.129	
	N	241	241

Table 4.5 shows that infrastructure and agricultural productivities have a positive, though weak correlation (r= 0.098; P<0.129), with insignificant relationship (p=0.129 >0.05 t-test table value.

4.6.3 Regression Analysis of infrastructure and Agricultural productivities among Community-Based Farming Projects

The coefficient of determination (R^2) predicted degree of variance in agricultural productivities with infrastructure.

Table 4.11: Model Summary on Infrastructure

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.098[a]	.010	.005	.46168

a. Predictors: (Constant), Infrastructure

The model summary illustrates infrastructure and agricultural productivities have a positive multiple correlation coefficient (R=0.098). According to the table, the regression model has a coefficient of determination of R2=0.010. The determinant of coefficient (R2) value produced by the model is 0.010. This means that a 0.1 percent improvement in our independent variable infrastructure may predict a 0.1 percent rise in the dependent variable agricultural productivities. No substantial association between the two variables is inferred since the correlation coefficient value is not statistically different from zero.

Table 4.12: ANOVA Regression Analysis Between Infrastructure and Agricultural productivities among Community-Based Farming Projects

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.495	1	0.495	2.322	.129[b]
	Residual	50.942	239	0.213		
	Total	51.437	240			

a. Dependent Variable: Agricultural productivities among community-based farming projects

b. Predictors: (Constant), Infrastructure

F-test returned 2,322 and the P-value is 0.129 in the ANOVA Table above. Our dependent variable, agricultural productivities across community-based farming projects, has a significant value of, indicating that There is no major direct association between the two variables since P=0.129 (p>0.05), therefore, null hypothesis of statistically no significant association between is accepted.

Table 4.13: Coefficients for Regression of Infrastructure and Agricultural productivities among Community-Based Farming Projects

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.785	0.238		11.686	<.001
	Infrastructure	0.101	0.066	0.098	1.524	0.129

a. Dependent Variable: Agricultural productivities among community-based farming projects

Table 4.14 above presents the coefficients for the regression on the infrastructure and agricultural productivities among community-based farming projects. The table gives regression coefficients with a P-value of 0.129. The regression constant at 2.785 is the value of agricultural productivities in the absence of infrastructure. Based on this, the conclusion is that there is a weak association between infrastructure and agricultural productivities among community-based farming projects (p-value=0.129).

4.6.4 Hypothesis 1 Testing

From the F-statistics in Table 4.8 indicates that $p<0.129$ which is less that t-test Table Value of 0.05. This means than the $P<0.129$ is insignificant. We therefore admit the null Hypothesis of no statistically significant connection between infrastructure and agricultural productivities and retain alternative hypothesis H1. Key informants were affirmative that farmers in the research area do not exclusively produce for the market because of the deprived state of roads. Due to poor roads infrastructure, transaction costs to reach far off markets is high, making farmers produce not to be competitive in the markets. Other variables such as access to water, electricity, drainage infrastructure, and communication infrastructure were also cited as insignificant in influencing farmers decisions on agricultural productivities.

4.7 Access to market and agricultural productivities among community-based farming projects

Analysis of the relationship between access to market and agricultural productivities is presented in the subsequent sections.

4.7.1 Descriptive Analysis of Access to market and agricultural productivities among community-based farming project

Farmers were surveyed to see how much they agreed that market access influences agricultural productivities in community-based farming projects. Their responses were evaluated on a Likert scale of 1 to 5, with 1 representing Strongly Disagreed (SD), 2 representing Disagreed (D), 3 representing Neutral, 4 representing Agreed (A), and 5 representing Strongly Agreed (SA). Table 4.15 summarizes the descriptive statistics results.

Table 4.14: Descriptive Statistics of Access to Market

Item	Statement	SD	D	N	A	SA	Total	Mean	Std. Dev.
AM1	Distance to nearest market influence agricultural productivities	7	23	56	88	67	241	3.77	1,051
	Percentage (%)	**2.9**	**9.5**	**23.2**	**36.5**	**27.8**	**100**		
AM2	Production volume influence agricultural productivities	8	16	40	72	105	241	4.04	1.081
	Percentage (%)	**3.3**	**6.6**	**16.6**	**29.9**	**43.6**	**100**		
AM3	Market information influence agricultural productivities	17	33	59	46	86	241	3.63	1.285
	Percentage (%)	**7.1**	**13.7**	**24.5**	**19.1**	**35.7**	**100**		
AM4	Contractual farming influence agricultural productivities	6	22	48	82	83	241	3.89	1.061
	Percentage (%)	**2.5**	**9.1**	**19.9**	**34.0**	**34.4**	**100**		
AM5	Producer organization membership influence agricultural productivities	6	9	28	59	139	241	4.31	0.987
	Percentage (%)	**2.5**	**3.7**	**11.6**	**24.5**	**57.7**	**100**		
	Composite mean and Std. Dev.							**3.928**	**211**

Item AM1 investigated if the distance to the nearest market has an influence on agricultural productivities in community-based farming projects. Mean and standard deviation of 3.77 and 1.051 respectively were registered indicating that they are undecided on whether or not this statement is true. Item AM2 was designed to see if production volume has an influence on agricultural productivity in community-based farming projects. This viewpoint had mean and standard deviation of 4.04 and 1.081 respectively. This indicates majority farmers agree output volume influence their agricultural productivities. Item AM3 was designed to see if market information has an influence on agricultural productivities in community-based farming projects. The mean and standard deviation of this perception was 3.63 and 1.285 respectively indicating farmers are undecided. Item AM4 was designed to see if contractual farming has an impact on agricultural productivities in community-based farming projects. This viewpoint had mean and

standard deviation of 3.89 and 1.061 respectively, showing that farmers are unsure whether contractual farming affects their agricultural productivities. Item AM5 investigated if participation in a producer group had an influence on agricultural productivities. This viewpoint returned mean and standard deviation of 4.31 and 0.987 respectively indicating farmers believe that membership in producer organizations has an influence on their agricultural productivities.

4.7.2 Correlation Analysis of Access to Market and Agricultural productivities among Community-Based Farming Projects

The Pearson Product Moment Correlation Coefficient was determined centered on farmer opinions to determine the strength of the association between financial access and agricultural productivities.

Table 4.15: Correlation Analysis of Access to Market and Agricultural productivities among Community-Based Farming Projects

Correlations

		Agricultural productivities	Access to market
Agricultural productivities among community-based farming projects	Pearson Correlation	1	.223**
	Sig. (2-tailed)		<.001
	N	241	241
Access to market	Pearson Correlation	.223**	1
	Sig. (2-tailed)	<.001	
	N	241	241

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4.5 shows weak but significant positive correlation (r= 0.223; P<0.001) and P< 0.05 t-test value.

4.7.3 Regression Analysis of Access to market and Agricultural productivities among Community-Based Farming Projects

The coefficient of determination (R^2) was applied to establish variance degree in agricultural productivities among community-based farming projects that explains their link to market access. To aid in understanding or explaining the degree of variance in agricultural productivities among community-based farming initiatives, ANOVA and the coefficient were computed.

Table 4.16: Model Summary on Access to Market

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.223[a]	0.050	0.046	0.45221

a. Predictors: (Constant), Access to market

The model summary illustrates access to markets and agricultural productivities have a positive multiple correlation coefficient (R=0.223). According to the table, the regression model has a coefficient of determination of R2=0.050. The determinant of coefficient (R^2) value of the model is 0.050. This implies that a 0.50 percent change in our independent variable access to land predicts a 0.50 percent rise in the dependent variable agricultural productivities. Correlation coefficient is substantially different from zero hence it is concluded a substantial association among the variables.

Table 4.17: ANOVA Regression Analysis Between Access to Market and Agricultural productivities among Community-Based Farming Projects

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.564	1	2.564	12.536	<.001[b]
	Residual	48.873	239	.204		
	Total	51.437	240			

a. Dependent Variable: Agricultural productivities among community-based farming projects

b. Predictors: (Constant), Access to market

Table 4.18 presents an ANOVA for the regression on the access to market and agricultural productivities among community-based farming projects. The above ANOVA Table provides F-test value of 12.536 and P-value of 0.001. The significant value p is .001 ($p<0.05$) indicates

significant linear association between the two variables. Therefore, we can reject our study's first null hypothesis of no statistically significant relationship between access to market and agricultural productivities.

Table 4.18: Coefficients for the Regression of Access to Land and Agricultural productivities among Community-Based Farming Projects

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.285	0.245		9.343	<.001
	Access to market	0.219	0.062	0.223	3.541	<.001

a. Dependent Variable: Agricultural productivities among community-based farming projects

Table 4.19 above presents the coefficients for the regression on the access to market and agricultural productivities among community-based farming projects. The table gives regression coefficients with a P-value of 0.001. The regression constant at 2.285 is the value of agricultural productivities in the absence of access to market. The result is that there is a robust relationship between market access and agricultural productivities in community-based farming projects (p-value=0.001).

4.7.4 Hypothesis 1 Testing

From the F-statistics in Table 4.8 indicates that $p<0.001$ which is less that t-test Table Value of 0.05. This means than the $P<0.001$ is significant. As a result, we reject the null hypothesis of no statistically significant association between agricultural productivities and market access, and we keep alternative hypothesis H1. Qualitative data gathered through key informant interviews indicate that market access has an influence on farmers purposes for production. For example, farmers who have consistent supply agreements with suppliers of schools, hospitals, hotels e.t.c. tend to be market oriented. Farmers who have close proximity to urban centers also tend to be market-oriented in their production.

4.8 Access to finance and agricultural productivities among community-based farming projects

Analysis of the relationship between access to finance and agricultural productivities is presented in the subsequent sections.

4.8.1 Descriptive Analysis of access to finance and agricultural productivities among community-based farming project

The researcher wanted to know how much farmers agreed that access to financing has an influence on agricultural productivities in community-based farming projects. Their responses were evaluated on a Likert scale of 1 to 5, with 1 meaning Strongly Disagreed (SD), 2 meaning Disagreed (D), 3 meaning Neutral, 4 meaning Agreed (A), and 5 meaning Strongly Agreed (SA). Table 4.20 summarizes the descriptive statistics results.

Table 4.19: Descriptive Statistics of Access to Finance

Item	Statement	SD	D	N	A	SA	Total	Mean	Std. Dev.
AF1	Availability of collateral influence agricultural productivities	7	16	47	68	103	241	4.01	1.074
	Percentage (%)	**2.9**	**6.6**	**19.5**	**28.2**	**42.7**	**100**		
AF2	Distance to credit source influence agricultural productivities	2	20	45	70	104	241	4.05	1.013
	Percentage (%)	**0.8**	**8.3**	**18.7**	**29.0**	**43.2**	**100**		
AF3	Financial literacy influence agricultural productivities	9	23	62	59	88	241	3.80	1.144
	Percentage (%)	**3.7**	**9.5**	**25.7**	**24.5**	**36.5**	**100**		
AF4	In-kind credit influence agricultural productivities	7	30	66	89	49	241	3.59	1.037
	Percentage (%)	**2.9**	**12.4**	**27.4**	**36.9**	**20.3**	**100**		
AF5	Awareness of credit sources influence agricultural productivities	11	27	65	84	54	241	3.59	1.092
	Percentage (%)	**4.6**	**11.2**	**27.0**	**34.9**	**22.4**	**100**		
	Composite mean and Std. Dev.							**3.808**	**1.072**

Item AF1 was designed to see if collateral availability has an influence on agricultural productivities and this registered a mean and standard deviation of 4.01 and 1.074 respectively meaning farmers agree collateral availability influences agricultural productivities. Item AF2 investigated if the distance to a loan source has an influence on agricultural productivities and this returned a mean and standard deviation 4.05 and 1.013 respectively meaning farmers agree distance to a finance source has an influence on their agricultural productivities. Item AF3 was designed to see if financial literacy has an influence on agricultural and a mean and standard deviation of 3.80 and 1.144 respectively were recorded meaning farmers are indifferent on this viewpoint. Item AF4 was designed to see if in-kind credit had an influence on agricultural productivities and this view returned a mean and standard deviation of 3.59 and 1.037 respectively showing farmers are unsure if in-kind credit has an influence on their agricultural productivities. Item AF5 was designed to see if people's knowledge of loan sources had an influence on their agricultural productivities and this perception had a mean and standard deviation of 3.59 and 1.092, respectively indicating that most respondents are undecided.

4.8.2 Correlation Analysis of Access to Finance and Agricultural productivities among Community-Based Farming Projects

Pearson Product Moment Correlation Coefficient was calculated to determine presence or absence of substantial association and amount of relationship between access to finance and agricultural productivities among community-based farming projects.

Table 4.20: Correlation Analysis Between Access to Finance and Agricultural productivities among Community-Based Farming Projects

		Agricultural productivities among community-based farming projects	Access to finance
Agricultural productivities among community-based farming projects	Pearson Correlation	1	0.086
	Sig. (2-tailed)		0.182
	N	241	241
Access to finance	Pearson Correlation	0.086	1

	Sig. (2-tailed)	0.182	
	N	241	241

There is a weak positive correlation between access to finance and agricultural productivities and the relationship is insignificant (r= 0.086; P<0.182).

4.8.3 Regression Analysis of Access to Finance and Agricultural productivities among Community-Based Farming Projects

Coefficient of determination (R^2) helped is determining degree of variance in agricultural productivities that explains their relationship with access to finance. To aid in understanding or explaining the degree of variance in agricultural productivities among community-based farming projects, ANOVA and the coefficient were computed.

Table 4.21: Model Summary on Access to Finance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.086[a]	0.007	0.003	0.46218

a. Predictors: (Constant), Access to finance

The model summary shows that access to finance and agricultural productivities have a positive multiple correlation coefficient (R=0.086). According to the table, the regression model has a coefficient of determination of R2=0.007. The model yields a coefficient determinant (R2) value of 0.007. This means that a 0.7 percent rise in our independent variable access to finance may predict a 0.7 percent increase in the dependent variable agricultural productivities. Correlation coefficient is insignificantly different from zero therefore there is no substantial relationship between the two variables.

Table 4.22: ANOVA Regression Analysis Between Access to Finance and Agricultural productivities among Community-Based Farming Projects

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.383	1	0.383	1.794	0.182[b]
	Residual	51.054	239	0.214		
	Total	51.437	240			

a. Dependent Variable: Agricultural productivities among community-based farming projects
b. Predictors: (Constant), Access to finance

An ANOVA for the regression on access to financing and agricultural productivities among community-based farming projects is shown in Table 4.23. The F-test result is 1.794, and the P-value is 0.182 in the ANOVA Table above. Our dependent variable, agricultural productivities among community-based farming projects, has significance of 0.182 ($p>0.05$) meaning there is an insignificant association hence null hypothesis of no statistically substantial association between access to finance and agricultural productivities is then accepted.

Table 4.23: Coefficients for Regression of Access to Finance and Agricultural productivities among Community-Based Farming Projects

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.813	0.250		11.251	<.001
	Access to finance	0.087	0.065	0.086	1.339	0.182

a. Dependent Variable: Agricultural productivities among community-based farming projects

Table 4.24 above presents the coefficients for the regression on the access to finance and agricultural productivities among community-based farming projects. The table gives regression coefficients with a P-value of 0.182. The regression constant at 2.813 is the value of agricultural productivities without access to finance. Based on this, the conclusion is that there is a weak association between access to finance and agricultural productivities among community-based farming projects (p-value=0.182).

4.8.4 Hypothesis 1 Testing

From the F-statistics in Table 4.8 indicates $p<0.182$ is insignificant meaning we admit the null hypothesis of no statistically significant relationship between agricultural productivities and access to finance. Key informants interviewed were of the opinion that access to finance influences farmers agricultural productivities, however, this is not very significant. Farmers typically require

finance to purchase inputs and technology. However, since these farmers hardly engage in technology-intensive farming such as irrigation, they hardly source for funds.

4.9 Access to technology and agricultural productivities among community-based farming projects

Analysis of the relationship between access to finance and agricultural productivities is presented in the subsequent sections.

4.9.1 Descriptive Analysis of Access to Technology and agricultural productivities among community-based farming project

The researcher wanted to know how much farmers agreed that technology has an influence on agricultural productivities in community-based farming projects. Their responses were evaluated on a Likert scale of 1 to 5, with 1 meaning Strongly Disagreed (SD), 2 meaning Disagreed (D), 3 meaning Neutral, 4 meaning Agreed (A), and 5 meaning Strongly Agreed (SA). Table 4.20 summarizes the descriptive statistics results.

Table 4.24: Descriptive Statistics of Access to Technology

Item	Statement	SD	D	N	A	SA	Total	Mean	Std. Dev.
AT1	Access to water and irrigation technologies influence agricultural productivities	13	32	71	58	67	241	3.56	1.182
	Percentage (%)	**5.4**	**13.3**	**29.5**	**24.1**	**27.8**	**100**		
AT2	Access to plant nutrition technologies influence agricultural productivities	7	19	70	97	48	241	3.66	0.978
	Percentage (%)	**2.9**	**7.9**	**29.0**	**40.2**	**19.9**	**100**		
AT3	Access to pest and disease management technologies influence agricultural productivities	8	27	58	79	70	241	3.73	1.099
	Percentage (%)	**3.3**	**11.2**	**24.1**	**32.4**	**29.0**	**100**		
AT4	Access to ICT influence agricultural productivities]	11	30	78	78	44	241	3.47	1.069
	Percentage (%)	**4.6**	**12.4**	**32.4**	**32.4**	**18.3**	**100**		
AT5	Access to post-harvest and processing	7	23	75	88	47	241	3.60	1.004

	technologies influence agricultural productivities							
	Percentage (%)	**2.9**	**10.0**	**31.1**	**36.5**	**19.5**	**100**	
	Composite mean and Std. Dev.						**3.604**	**1.0664**

The objective of Item AT1 was to see if access to irrigation and water technology had an influence on agricultural productivities in and the mean and standard deviation for this was 3.56, and 1.182 respectively meaning farmers are undecided about whether or not this viewpoint is true. The same applied to Item AT2 whose objective was to see if access to plant nutrition technology has an influence on agricultural productivities and registered a mean and standard deviation of 3.66 and 0.978 respectively. The objectives of Item AT3, AT4, and AT5were to see if access to pest and disease control technology, ICT, and post-harvest and processing technology respectively had an influence on agricultural productivities and means of 3.73, 3.47 and 3.60 respectively standard deviation of 1.099, 1.069 and 1.004 respectively were registered meaning farmers are indifferent of these statements.

4.9.2 Correlation Analysis of Access to Technology and Agricultural productivities among Community-Based Farming Projects

Pearson Product Moment Correlation coefficient was calculated and determined presence or absence of major association and magnitude of relationship between access to technology and agricultural productivities among community-based farming projects.

Table 4.25: Correlation Analysis Between Access to Technology and Agricultural productivities among Community-Based Farming Projects

		Agricultural productivities	Access to technology
Agricultural productivities among community-based farming projects	Pearson Correlation	1	0.136*
	Sig. (2-tailed)		0.035
	N	241	241
Access to technology	Pearson Correlation	0.136*	1
	Sig. (2-tailed)	0.035	
	N	241	241

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.5 shows that there is a weak positive correlation (r= 0.136; P<0.035) between access to technology and agricultural productivity among community-based farming projects, which is significant because the p value of 0.035 is less than the t-test table value of 0.05.

4.9.3 Regression Analysis of Access to Technology and Agricultural productivities among Community-Based Farming Projects

Coefficient of determination (R^2) was used in determining degree of variance in agricultural productivities among community-based farming projects that explains its relationship to access to technology. To aid in understanding or explaining the degree of variance in agricultural productivities among community-based farming projects, ANOVA and the coefficient were computed.

Table 4.26: Model Summary on Access to Technology

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.136[a]	0.019	0.014	0.45959

a. Predictors: (Constant), Access to technology

The model summary indicates access to technology and agricultural productivities have a positive multiple correlation coefficient (R=0.136). The regression model has a coefficient of determination of R2=0.019, as seen in the table. The determinant of coefficient (R2) value of the model is 0.019. This means that a 1% increase in our independent variable access to land may predict a 1.9 percent rise in the dependent variable agricultural productivities. There is substantial association between the two variables since correlation coefficient is considerably different from zero.

Table 4.27: ANOVA Regression Analysis Between Access to Technology and Agricultural productivities among Community-Based Farming Projects

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.954	1	0.954	4.517	0.035[b]

	Residual	50.483	239	0.211		
	Total	51.437	240			

a. Dependent Variable: Agricultural productivities among community-based farming projects

b. Predictors: (Constant), Access to technology

The F-test is 4.517, P-value = 0.035. Significant value p of 0.035 ($p<0.05$) implies that our dependent variable, agricultural productivities across community-based farming initiatives, and our independent variable, access to technology, have a significant linear relationship. As a result, we can rule out the fifth null hypothesis of our investigation, that there is no statistically substantial connection between agricultural productivities and access to technology.

Table 4.28: Coefficients for the Regression of Access to Technology and Agricultural productivities among Community-Based Farming Projects

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.758	0.184		14.952	<0.001
	Access to technology	0.107	0.051	0.136	2.125	0.035

a. Dependent Variable: Agricultural productivities among community-based farming projects

Table 4.29 above presents the coefficients for the regression on the access to technology and agricultural productivities among community-based farming projects. The table gives regression coefficients with a P-value of 0.035. The regression constant at 2.758 is the value of agricultural productivities in the absence of access to technology. Based on this, the conclusion is that there is a strong association between access to technology and agricultural productivities among community-based farming projects (p-value=0.035).

4.9.4 Hypothesis 1 Testing

From the F-statistics in Table 4.8 indicates that $p<0.0035$ which is less that t-test Table Value of 0.05. This means than the $P<0.035$ is significant. Therefore, null hypothesis of no statistically

significant relationship between agricultural productivities and access to technology is rejected, and alternative hypothesis H1 kept. Interviews with key informants revealed that access to technology significantly influences purposes of farmers production. Farmers who have invested in technologies such as greenhouse farming, chicken hatcheries, small scale irrigation using foot pumps tend to be more market-facing.

CHAPTER FIVE
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the findings based on data analyzed, draws conclusions based on the findings, and makes recommendations based on the conclusions.

5.2 Summary of Findings

These section summarizes the findings of the research objectives: Access to Land and Agricultural Productivities in Community-Based Farming Projects; Infrastructure and Agricultural Productivities in Community-Based Farming Projects; Access to Market and Agricultural Productivities in Community-Based Farming Projects; Access to Finance and Agricultural Productivities in Community-Based Farming Projects; and Access to Technology and Agricultural Productivities in Community-Based Farming Projects

5.2.1 Access to Land and Agricultural productivities among Community-Based Farming Projects

The study discovered a weak, positive association, r= 0.227; P>0.001, between access to land and agricultural productivities across community-based farming projects. The data also revealed that there is a statistically substantial association between them.

5.2.2 Infrastructure and Agricultural productivities among Community-Based Farming Projects

The study discovered a slight, positive correlation, r= 0.098; P<0.129, between infrastructure and agricultural productivities across community-based farming projects. The data also revealed that there is no statistically substantial association between them.

5.2.3 Access to Market and Agricultural productivities among Community-Based Farming Projects

The study discovered a weak, positive correlation, r= 0.223; P>0.001, between access to market and agricultural productivities among community-based farming projects. The data also revealed that there is a statistically substantial association between them.

5.2.4 Access to Finance and Agricultural productivities among Community-Based Farming Projects

The study discovered a slight, positive association, r= 0.086; P<0.182, between access to finance and agricultural productivities among community-based farming projects. The data also revealed that there is no statistically meaningful association between them.

5.2.5 Access to Technology and Agricultural productivities among Community-Based Farming Projects

The study discovered a slight, positive correlation, r= 0.136; P>0.035, between access to technology and agricultural productivities in community-based farming projects. The data also discovered that there is a statistically substantial association between them.

5.3 Conclusions

The study's purpose was to see how production factors influenced agricultural productivities in Suba Sub-County's Community-based farming projects. Objective one sought to determine how access to land influences agricultural productivities among community-based farming projects in Suba Sub-County. The study established that access to land positively and significantly influences agricultural productivities among community-based farming projects. The study concluded that land size, tenure, fertility, location, and use are key determinants of purpose of production among community-based farming projects. The second objective was to establish extent to which infrastructure influences agricultural productivities among community-based farming projects in Suba Sub-County. The study established that infrastructure positively but insignificantly influences agricultural productivities among community-based farming projects. The study concluded that road network, access to electricity, access to water, drainage infrastructure, and communication infrastructure are not key determinants of purpose of production among

community-based farming projects. Objective three sought to assess how access to market influences agricultural productivities among community-based farming projects in Suba Sub-County. The study established that access to market positively and significantly influences agricultural productivities among community-based farming projects. The study concluded that distance to nearest market, production volume, market information, contractual farming, and producer organization membership are key determinants of purpose of production among community-based farming projects.

Objective four aimed to investigate how access to finance influences agricultural productivities among community-based farming projects in Suba Sub-County. The study established that access to finance positively but insignificantly influences agricultural productivities among community-based farming projects. The study made the conclusion that availability of collateral, distance to credit source, financial literacy, in-kind credit, and awareness of credit sources are not key determinants of purpose of production among community-based farming projects. Objective five aimed to determine the extent to which technology influences agricultural productivities among community-based farming projects in Suba Sub-County. The study established that access to technology positively and significantly influences agricultural productivities among community-based farming projects. The study concluded that access to water and irrigation, plant nutrition, pest and disease management, ICT, and post-harvest and processing technologies are key determinants of purpose of production among community-based farming projects.

5.4 Contributions to the Body of Knowledge

Results of this study will help Non-Governmental Organizations (NGOs), Government of Kenya (GoK), the County Governments and the Sub-Counties to formulate and implement effective community-based projects that support market-oriented farming. The study's gaps and shortcomings will aid in a improved understanding of the influence of production factors on agricultural productivities in community-based farming projects. These include access to land, infrastructure, market, finance, and technology. The study's findings will contribute to the formulation of successful policies on community-led agricultural projects in Kenya, allowing for the achievement of improved agricultural value as outlined in Kenya's Vision 2030. Finally, the

study will also contribute to scientific knowledge to be used for both academic purposes and community-led agricultural projects at regional, national and international levels.

5.5 Recommendations

According to the study's findings, there exist a statistically significant association between agricultural productivities and access to land, market, and technology among community-based farming projects. Based on these findings, development actors such as the county government, the national government, and non-state actors should articulate policies and plans, develop programs, and design and implement projects which facilitate access to land, markets, and technology to encourage community-based farming projects. On the other hand, even though the relationship between infrastructure and access to finance and agricultural productivities among community-based farming projects is statistically insignificant, they may act as enablers of successful community-based farming projects. Policies on inclusive financial access for farmers and improved infrastructure should be a key priority of County Government, national Government, and other key stakeholders.

5.6 Suggestions on areas for Further Research

All of the factors of production exhibited lower coefficients of determination (R^2), implying that other variables outside the factors of production could impact the agricultural productivities among community-based farming projects. Additional study is necessary in this area to determine the impact of other factors including entrepreneurial spirit, county and national government policies, NGO activities, and family characteristics, among others. This study ought to be repeated in diverse areas of the country for results comparability.

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APPENDIX

Appendix 1: Survey Questionnaire

Dear Esteemed Respondent, my name is Gordon Wanzare currently undertaking my postgraduate studies at the University of Nairobi, Kisumu Campus. I have Developed a research proposal entitled Influence of Factors of Production on Production Purposes among Community-Based Farming Projects in Suba Sub-County, Kenya. The Proposal has been approved by the University for data collection and that is why I hereby seek your consent to voluntarily participate in this study by responding to all the sections of the questionnaire as per the given instructions here below;

S/N	QUESTION
	SECTION A: RESPONDENT CHARACTERISTICS
1.	What is your gender? (a) Male (b) Female
2.	What is your age? (a) 18-22 yrs (b) 23-27 yrs (c) 28-32 yrs (d) 33-37 yrs (e) 38-42 yrs (f) 43-47 yrs (g) 48-52 yrs (h) 53 yrs and above
3.	What is your marital status? (a) Single (b) Married (c) Separated (d) Divorced (e) Widowed
4.	(a) What is your highest level of educational qualifications? (b) No formal education (c) Primary (d) Secondary (e) Certificate (f) Diploma (g) Degree and above

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SECTION B: Access to Land and Agricultural productivities among Community-Based Farming Projects

This Section Contains items and statements on Access to Land and Agricultural productivities among Community-Based Farming Projects that require you to rate in a Likert scale of 5 to 1

depending on your level of agreement as follows; Strongly Agree (5) Agree (4), Neutral (3), Disagree (2), Strongly Disagree (1).

Item	Statement	Strongly Disagree (SD)	Disagree (D)	Neutral (N)	Agree (A)	Strongly Agree (SA)
AL1	Land size influence agricultural productivities					
AL2	Land tenure influence agricultural productivities					
AL3	Land fertility influence agricultural productivities					
AL4	Land location influence agricultural productivities					
AL5	Land use influence agricultural productivities					

SECTION B: Infrastructure and Agricultural productivities among Community-Based Farming Projects

This Section Contains items and statements on Infrastructure and Agricultural productivities among Community-Based Farming Projects that require you to rate in a Likert scale of 5 to 1 depending on your level of agreement as follows; Strongly Agree (5) Agree (4), Neutral (3), Disagree (2), Strongly Disagree (1).

Item	Statement	Strongly Disagree (SD)	Disagree (D)	Neutral (N)	Agree (A)	Strongly Agree (SA)
I1	Road network influence agricultural productivities					
I2	Access to electricity influence agricultural productivities					
I3	Access to water influence agricultural productivities					
I4	Drainage infrastructure influence agricultural productivities					
I5	Communication infrastructure agricultural productivities					

SECTION C: Access to Market and Agricultural productivities among Community-Based Farming Projects

This Section Contains items and statements on Access to Market and Agricultural productivities among Community-Based Farming Projects that require you to rate in a Likert scale of 5 to 1 depending on your level of agreement as follows; Strongly Agree (5) Agree (4), Neutral (3), Disagree (2), Strongly Disagree (1).

Item	Statement	Strongly Disagree (SD)	Disagree (D)	Neutral (N)	Agree (A)	Strongly Agree (SA)
AM1	Distance to nearest market influence agricultural productivities					
AM2	Production volume influence agricultural productivities					
AM3	Market information influence agricultural productivities					
AM4	Contractual farming influence agricultural productivities					
AM5	Producer organization membership influence agricultural productivities					

SECTION D: Access to Finance and Agricultural productivities among Community-Based Farming Projects

This Section Contains items and statements on Access to Finance and Agricultural productivities among Community-Based Farming Projects that require you to rate in a Likert scale of 5 to 1 depending on your level of agreement as follows; Strongly Agree (5) Agree (4), Neutral (3), Disagree (2), Strongly Disagree (1).

Item	Statement	Strongly Disagree (SD)	Disagree (D)	Neutral (N)	Agree (A)	Strongly Agree (SA)
AF1	Availability of collateral influence agricultural productivities					

AF2	Distance to credit source influence agricultural productivities					
AF3	Financial literacy influence agricultural productivities					
AF4	In-kind credit influence agricultural productivities					
AF5	Awareness of credit sources influence agricultural productivities					

SECTION E: Access to Technology and Agricultural productivities among Community-Based Farming Projects

This Section Contains items and statements on Access to Technology and Agricultural productivities among Community-Based Farming Projects that require you to rate in a Likert scale of 5 to 1

depending on your level of agreement as follows; Strongly Agree (5) Agree (4), Neutral (3), Disagree (2), Strongly Disagree (1).

Item	**Statement**	**Strongly Disagree (SD)**	**Disagree (D)**	**Neutral (N)**	**Agree (A)**	**Strongly Agree (SA)**
AT1	Access to water and irrigation technologies influence agricultural productivities					
AT2	Access to plant nutrition technologies influence agricultural productivities					
AT3	Access to pest and disease management technologies influence agricultural productivities					
AT4	Access to ICT influence agricultural productivities					
AT5	Access to post-harvest and processing technologies influence agricultural productivities					

SECTION F: Agricultural productivities among Community-Based Farming Projects

This Section Contains items and statements on Agricultural productivities among Community-Based Farming Projects that require you to rate in a Likert scale of 5 to 1
depending on your level of agreement as follows; Strongly Agree (5) Agree (4), Neutral (3), Disagree (2), Strongly Disagree (1).

Item	**Statement**	**Strongly Disagree (SD)**	**Disagree (D)**	**Neutral (N)**	**Agree (A)**	**Strongly Agree (SA)**
PP1	I produce for home consumption					
AT2	I produce mainly for home consumption and sell surplus					
AT3	I produce either for home consumption or market					
AT4	I produce for market					
AT5	I produce primarily for market with surplus for home consumption					

Appendix 2: Interview Schedule

Introduction

Thank you for accepting to be interviewed as part of the field research on "Influence of **Factors of Production on Agricultural productivities among Community-Based Farming Projects in Suba Sub-County**". As mentioned in the interview request letter, this research forms part of the requirement for the award of the degree in Master of Arts in Project Planning and Management of the University of Nairobi. Your details will not be revealed in the report and also your response will not be recorded in a matter that my reveal your identity. Your response will be treated in strict confidence. The interview will last approximately 45 minutes.

Name:_____

Organization:_____

Designation:_____

Date of interview_____

Interview questions

1. What is the potential for agribusiness projects in Suba Sub-County?
2. What are the main factors influencing adoption of agribusiness projects by farmers in Suba Sub-County?
3. How are these factors mentioned in (2) above influencing adoption of agribusiness projects by farmers in Suba Sub-County?

Appendix 2: Research Authorization (University of Nairobi)

Appendix 2: Research Authorization (National Commission for Science, Technology and Innovation)