AGRIBUSINESS INCUBATION, INSTITUTIONAL SUPPORT AND IMPLICATION ON LIVELIHOOD SECURITY: A CASE OF SELECTED SUB – COUNTIES IN BUNGOMA COUNTY, KENYA

BY

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DECLARATION

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This thesis is dedicated to my daughters Bola Maria and Shania Nancy as a source of inspiration in their academic pursuit. To the father of my children, Mr.Gilbert Masibo Murunga, thank you for the support, encouragement, friendship, prayers, love and the sacrifices you have made for me to pursue this course.

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ABSTRACT

Globally, agribusiness is a critical driver of economic growth with strong multiplier effects. In Africa the benefits of agribusiness are highly constrained and yet there exists potential in agribusiness incubation and institutional support that act as a conduit to secure livelihoods. The main objective of the study was to assess the implications of agribusiness incubation and institutional support on livelihood security in Bungoma County. The specific objectives were to: examine the effect of physical capital for agribusiness incubation on livelihood security; evaluate the impact of financial capital for agribusiness incubation on livelihood security; assess the influence of social capital for agribusiness incubation on livelihood security, and determine the mediating effect of institutional support on agribusiness incubation capitals and livelihood security. The study was guided by the DFID Livelihood Framework. Pragmatic paradigm was employed in the study. A cross-sectional analysis of Bungoma North, Kanduyi, Bumula, Mt Elgon and Webuye West sub-counties, with a total household population of 194,513 was done. Sub-counties were purposively sampled forming the clusters of the study. Simple random sampling was applied to select a sample size of 399 households, and purposively selected, 23 key informants and 10 FGDs. Data was collected using questionnaires, observation schedules, document reviews and interview guides. Qualitative data was thematically analyzed and presented as narrations. Descriptive statistics was analyzed through frequencies, percentages and means. Inferential statistics employed ANOVA, Chi-square test, and logistic model. The findings show that agribusiness productivity is constrained by the small land parcels (77.1% own below 3ha), pests and diseases (95.1%), means of bulk transportation (94.5% rely on motorcycles), and storage (58.8%). Crop production accrues low returns (80.7% earn below Ksh 20,000) with the inability of households to meet credit requirements or access external markets. Credit access and welfare are significant predictors of membership to a social group {$\chi 2$ (1, 367) =4.879, p=0.027, <0.05} and {$\chi 2$ (1,367) =27.679, p=0.000} respectively. Market prices and bureaucracy were major market constraints {F (4,366) = 5.775, P= 0.000} and {F (4,366) = 3.425, P = 0.009} at the 0.05 alpha level respectively. Minimal impact accrued from the financial capital mediated by institutional support (β =.820, p=0.465). In conclusion, integrated capital oriented strategies and policies are essential in reducing risks and building resilience among agro entrepreneurs , to achieve a sustained increase in production. Institutional support is critical to the optimal agribusiness transformation and mobilization of the agribusiness capitals to enhance productivity, comparative advantage and competitiveness. The study recommends institutional support efforts to be harmonized with the community's inherent potential for the attainment of the desired livelihood security. The adoption of a holistic approach is critical for addressing the physical, financial and social agribusiness capital needs concurrently.

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ABBREVIATIONS AND ACRONYMS USED

ABI - Agribusiness Incubation

ASDSP- Agriculture Sector Development Support Programme

CIDP - County Integrated Development Plan

DFID - Department for International Development

IS -Institutional support

KNBS- Kenya National Bureau of Statistics

LS - Livelihood Security

NALEP-National Agriculture and Livestock Extension Programme

NARIGP - National Agriculture and Rural Inclusive Growth

OECD - Organization for Economic Co-operation and Development

PCA - Principal Component Analysis

PLS -SEM -Partial Least Squares Structural Equation Modeling

PRSPS- Poverty Reduction Strategy Papers

SLA - Sustainable Livelihood Approach

SLF - Sustainable Livelihoods Framework

UNDP-United Nations Development Programme

WDR - World Development Report

SDGs-Sustainable Development Goals

OPERATIONAL DEFINITION OF TERMS

Agribusiness - Market-oriented agriculture with multiplier effects critical in the transformation of households from low productivity and consequent poverty traps**.**

Agribusiness Incubation – The process of providing conducive conditions for enhancing the productivity of agricultural capitals to create marketable surplus and competitive products.

Agribusiness Capital- Physical, financial and social assets for agribusiness that households rely upon to enhance productivity, competitiveness and consequent livelihood security.

Financial Capital - Equity, borrowed capital or household reserves invested to acquire assets, carry out regular operations to spur agribusiness productivity and income**.**

Incubation- Provision of conducive conditions to ensure growth

Institutional Support –state and non- state intervention to upscale the functioning agribusiness contributing to more resilient and better livelihoods.

Livelihood security –household protection from income and asset shocks through enhanced income, employment opportunities, food security, and increased agribusiness productivity and competitiveness.

Physical Capital- Goods and services provided by the ecosystem (natural) and the productive assets and capabilities (built-up capital) that a household relies upon to enhance agribusiness productivity, competitiveness and returns.

Social Capital – Collective action that facilitates the coordination and cooperation of agropreneurs for mutual benefit and enhanced investments in agribusiness.

Sustainable Development Goals- Global goals to enhance livelihood security through varied stakeholder partnerships.

CHAPTER ONE

INTRODUCTION

1.1 Overview

This chapter introduces the agribusiness context and the existent policy frameworks to address the growing gap in Kenya. The key issues discussed in this chapter include the background of the study, statement of the problem, objectives and hypothesis, justification of the study, the scope of the study, limitations and assumptions of the study.

1.2 Background of the Study

Globally, most countries are dependent on agriculture as a critical driver of economic growth. Agribusiness offers promising opportunities to accelerate food security and drive agriculture-led economic growth (Payumo *et al*, 2017). Investments in agribusiness result into substantial forward and backward linkages, stimulating demand for agricultural goods, related inputs, services and creation of on- and off-farm jobs (UNECA, 2014; World Bank, 2011; Yumkella *et al.*, 2011).

Agribusiness has the inbuilt potential to contribute to the growth of jobs, income generation, poverty reduction, nutritional changes, health and overall food security. Improved productivity across the agri-business value chain provides a solid basis for rapid, inclusive economic growth and poverty reduction (Yumkella *et al*., 2011).

Agribusiness comprises farmers, seed companies, fertilizer, agrochemical companies, agricultural equipment, food manufacturing, marketing/trade, finance, research, distribution and marketing operations providing services for farm producers (Gandhi, 2014). The value of global agricultural commodities is forecasted to grow fivefold in 50

years (FAO, 2014). The US, Europe, Brazil, Argentina and Australia have dominated the agrarian markets, and several emerging economies are now net exporters. Apart from conventional commodities (grains, meat, milk, sugar, palm oil, rubber, coffee, tea, cocoa, etc.), fresh, high-value commodities are domestically consumed by the rising middle class and are increasingly being exported to rich foreign markets by developing economies. Smallholders maintain a small portion of final value of agro products with the highest value being retained by import, processing or retail firms. The structural factors, market failures and colonial heritage hinder the fair participation of farmers in the agribusiness markets thereby limiting the effectiveness of market-led agricultural growth (Bruni and Santucci, 2016; FAO, 2017).

Regional programs recognize the need to focus on the growth of agricultural enterprises in order to achieve development goals. For example, the CAADP supports agribusiness development to foster economic development through its new Agribusiness Strategy and Flagship Program for Africa's New Partnership for Development (NEPAD). The NEPAD program aims at developing robust agricultural companies and building a competitive agricultural sector that promotes employment and adds value in African agriculture (CAADP, 2012). Despite the agribusiness potential to wealth creation, the benefits have been uneven especially in Africa where the link between agriculture and the business sector is relatively weak (Payumo *et al.*, 2017). The sector faces various barriers that hinder their competitiveness, prevent the generation of a critical mass for commercial returns and markets access (Abdula, 2008; Konig, *et al.*, 2013).

In developing economies, overall poverty levels have risen despite the enhanced demand for agro-based products that offers diversification and value addition opportunities (FAO, 2007). Increases in per capita income, increased urbanization and the increasing number of working women create a growing demand for high value goods and processed foods. The increasing demand for agricultural products is facilitated through international trade and communications (Da Silva & Baker, 2009). There is rapid but uneven modernization in domestic markets. The increased urbanization and shifts in customer preferences and purchasing power have led to a rise in global modern organized retailing of agricultural products globally (Reardon and Huang, 2008; WBCSD and SNV, 2008).

In order to reverse the global underdevelopment patterns, agricultural transformation is crucial (UNIDO, 2013). The transition in the agribusiness chains of the low- and middle-income countries experience significant barriers for the involvement in local, national and global markets of small-scale producers and agro-processors. Barriers to smallholder access to supermarket networks and decreased labor demand threaten livelihoods. The involvement of poor farmers in integrated value chains is constrained by the low financing, market and transport access and inability to attain the set of standards relating to quality, traceability and certification. With proper institutional support, smallholders may become more entrepreneurial and extend into other value chain nodes(Ekboir, 2012). The concentration of purchasing power in a few retail chains requires suppliers to maintain large stocks (Timmer, 2014). Sadly, economic agents with weak negotiating power bear the cost of these market adjustments (FAO, 2017).

Intervention to promote agriculture in commodity markets has the potential to turn comparative benefits into competitive advantages with an enormous effect on growth (World Bank, 2011). Institutional support is necessary throughout the agri-business value chains, including input supply, advisory services, output aggregation, processing, quality control, distribution and marketing. There are isolated results in sub-Saharan Africa, but progress has been thwarted in scaling up the benefits of agricultural production (World Bank, 2013; ACET, 2014). Innovative institutional arrangements are needed in order to attract investments which are key to the growth of the agri-business sector (Babu *et al*., 2014).

Smallholder farmers ability to benefit in supply chains can be strengthened through vertically coordinated fair contracts with processors and traders. Different business models, national and international value chain organizations, institutional arrangements and policies have been established in recent decades to provide incentives and support services for smallholders, boost their sustainable production and promote market access (Rao and Qaim, 2011). These include participatory guarantee schemes, marketing cooperatives, training centers, private traders and local public procurements structures that play an extensive role in linking farmers to markets (FAO, 2017).

Agribusiness is a unique strategy for realizing the potential for development in the wake of the aforementioned bottlenecks facing livelihoods in developing countries. The dire performance in the agribusiness scenario prompts countries to think and act strategically to be in a position to cope with challenges (UNIDO, 2012). Developing a viable and vibrant agribusiness strategy in Africa is a development challenge as well as an opportunity.

Agribusiness exhibits strong multiplier effects on growth through stimulating increased production with great potential in wealth creation for livelihoods (Schneider, 2016). In this study, agribusiness incubation seeks to harness knowledge and information infrastructures to encourage demand-driven research and for-profit entrepreneurship in the agricultural sector. It depends intrinsically on the condition of the agribusiness ecosystem. This mechanism offsets agribusiness market risks through the provision of shared facilities, market access, technologies, financial services, mentoring, and networking.

A wide spectrum of actors must be organized to grow a functioning agribusiness sector. Interventions to transform comparative advantage into competitive advantage in differentiated product markets can have tremendous development impact. The development of a competitive indigenous agribusiness sector requires effective innovation and entrepreneurship, which will enable innovative enterprises to start and expand. Good infrastructure, effective policies, regulations and access to appropriate financing, innovation and entrepreneurship skills are critical enablers (Ozor, 2013).

1.2.1 Agribusiness Policy Frameworks in Kenya

Multiple policy frameworks support and inform agribusiness practice in Kenya. For example, the Economic Recovery Strategy for Wealth and Employment Creation (ERS) was launched in 2003 and embraces agriculture as the leading productive sector for economic recovery. ERS supports agricultural institutions and investment in research and extension necessary for sustainable economic development (GOK, 2010).

The 2004 Strategy for Revitalizing Agriculture (SRA) supports the Government's vision to transform Kenya's agriculture into a productive, profitable and competitive sector that offers high quality and profitable jobs (GOK, 2010). The aim of the SRA is to reverse the decline in agricultural productivity by empowering farmers to benefit from economies of scale in the access to inputs, services, product markets, promote value addition, agro-processing and financial service (Cuellar, *et al*., 2006; Alila and Atieno, 2006).

The National Agriculture and Livestock Extension Programme (NALEP) mobilizes farmers' common interest groups (CIGs) to encourage value addition and processing in line with the Government's overall policy on agriculture. NALEP institutionalizes demand driven, farmer led extension services, increased effectiveness and private sector involvement in the delivery of extension services (Cuellar *et al*., 2006).

The Kenya Vision 2030 recognizes the farming sector as a main sector from which 10% annual growth rates can be achieved. Three quarters of the population in Kenya is dependent on agriculture as the largest export earner. Vision 2030 advocates for smallholder agriculture transformation from subsistence into innovative, commercially-oriented, globally competitive modern agriculture. It recognizes that the agrarian industry is key to the transition of livelihoods and yet it is a sleeping giant that has not realized the potential of the sector (GOK, 2012). Agribusiness can incorporate small-scale farmers in the sector in a variety of creative ways. These are through farmer cooperatives, contract farming, improved packaging and storage. (GOK, 2012).

The Kenya Agribusiness Strategy Policy Document acknowledges that agriculture contributes to about 25% of the Gross Domestic Product and provides a livelihood to three quarters of the population and yet its potential is unrealized. The Policy observes the factors that lead to agricultural productivity fluctuations include the over-independence on rain fed agriculture and low levels of agro-processing. Agricultural exports are sold in their raw, crude and semi processed forms with inadequate land use that degrades the quality of Kenya's natural resources resulting into low productivity levels in agriculture. The average yields for the most commodities are low and the transport infrastructural conditions are poor. Smallholder farmers are highly dispersed negatively influencing the demand for productive investment. Most vehicles are under-maintained and frequently overloaded, leading to high transit costs of the agricultural produce and inputs. The Strategy calls for private sector and other stakeholders investments in agribusiness and related opportunities to trigger agribusiness growth. (GOK, 2012).

Despite the value of agribusiness in development, the existent policy frameworks and the opportunities for agribusiness in Bungoma County, the agribusiness sector still lags in productivity and competitiveness. The County exhibits high poverty incidence with 58 to 71% of the population living below the poverty line. It is against this background that the study sought to assess the implications of agribusiness incubation and institutional support on livelihood security in Bungoma County.

1.3 Statement of the Problem

Globally, agribusiness plays a critical role in the transformation of the agricultural sector. Agribusiness offers promising opportunities to accelerate agricultural sector development, increase food security, address poverty, create employment and drive agriculture-led economic growth. In Sub Saharan Africa, the agribusiness opportunities manifest through rapid urbanization, increased consumer demand for diverse quality food products and the interconnectedness of the food markets. Agribusiness is critical to the attainment of the Sustainable Development Goals (SDGs) (FAO, 2018; Nuthalapati et al, 2018) especially through enhanced food security, poverty reduction and gender equity through job creation and income generation. Despite the available opportunities for agribusiness to flourish, In Kenya the sector has not been sufficiently exploited due to enormous contextual barriers that hinder its competitiveness, prevent the generation of a critical mass for commercial returns and accelerate economic development as envisaged within devolution and the Kenya Vision 2030 (GOK, 2012; KIPPRA, 2020;Muhunyu *et al*, 2020)). Three-quarters of the population depends on the agricultural sector for their livelihood and survival but the sector faces enormous challenges from the slashing of social spending under Structural Adjustment that produced massive reductions in the entitlements of the smallholder farmers.

The situation was further exacerbated by the withdrawal of agricultural subsidies, the reduction of extension services, and the elimination of subsidized credit. These characteristics negatively affected agribusiness uptake, enhanced the households' socio-economic vulnerability and insecurity for smallholder farmers. Based on the 2014 Kenya Economic Survey (KNBS, 2014), Bungoma County is listed among the five top

contributors to national poverty at a rate of 3.79%. The economy of Bungoma County is mainly agricultural and the area experiences high rainfall throughout the year. Also, the County is a breadbasket for the region and beyond especially due to its strategic location on the Northern corridor. The ballooning population and the creation of new municipalities in the County are key opportunities for agribusiness to flourish. The opportunities manifest further in the County's strategic location on the Northern corridor and hosting Chwele, a second largest open-air market in Kenya. Agribusiness is not fully embraced as a source of livelihood as envisaged within devolution and the Kenya Vision 2030. Unemployment; food insecurity; food imports; low value addition; low yields; homogenous crop products; low market participation; general apathy towards farming; the enhanced climate change vulnerability; and the inability of farmers to breakeven are key pointers to the livelihood menace in Bungoma County.

This study identifying the pre-existing household agribusiness capitals is an avenue of matching assets to available opportunities. Based on the DFID Livelihood Framework, a larger asset base translates into greater livelihood opportunities and livelihood security. Agribusiness incubation transforms the quantities and qualities of crop products and enhances the participation of producers in the value chain which is crucial to the optimal maximization of economic benefits. To this effect, this study sought to assess the implications of agribusiness incubation and institutional support on livelihood security in selected sub-counties in Bungoma County, Kenya.

1.4 Research Objectives

The study's general and specific objectives are as follows:

1.4.1 General Objective

The broad objective of the study was to assess the implications of agribusiness incubation and institutional support on livelihood security in selected sub-counties in Bungoma County, Kenya.

1.4.2 Specific Objectives

The specific objectives include:

i. Examine the effect of physical capital for agribusiness incubation and livelihood security;
ii. Evaluate the impact of financial capital for agribusiness incubation and livelihood security;
iii. Assess the influence of social capital for agribusiness incubation and livelihood security;
iv. Analyze the mediating effect of institutional support on agribusiness incubation capitals and livelihood security.

1.5 Hypotheses

$H_0$1: There is no significant relationship between physical capitals for agribusiness incubation and livelihood security.

$H_0$2: There is no significant relationship between financial capitals for agribusiness incubation and livelihood security.

$H_0$3: There is no significant relationship between social capitals for agribusiness incubation and livelihood security.

$H_0$4a: Institutional support does not significantly mediate the relationship between physical capital for agribusiness incubation and livelihood security.

$H_0$4b: Institutional support does not significantly mediate the relationship between financial capital for agribusiness incubation and livelihood security;

$H_0$4c: Institutional support does not significantly mediate the relationship between social capital for agribusiness incubation and livelihood security.

1.6 Scope of the Study

The study focused on establishing the implications of agribusiness incubation and institutional support on livelihood security in Bungoma County, Kenya. The study was carried out in five selected sub counties of Cheptais, Bumula, Kanduyi, Bungoma North and Webuye West with a total population of 194,613 households . Questionnaires were administered to the household heads within the sampled size. The researcher focused on crop production by farming households within the selected sub counties. Further the researcher limited the study to establishing the influence of physical, financial and social capitals for agribusiness incubation on livelihood security. Considerable emphasis was placed on the status of agribusiness capital, the building blocks by which farming households can construct their routes out of poverty. The findings applied to the farming households in the selected five sub-counties in Bungoma County.

1.7 Limitations of the Study

The study was limited to households in five sub-counties (Kanduyi, Bungoma North, Bumula, Cheptais and Webuye West) in Bungoma County and conceptually confined to agribusiness incubation, institutional support and livelihood security. The low educational background of the majority of respondents was a barrier to communication

necessitating the recruitment and orientation of research assistants within the specific sub-counties and the simple wording of the questionnaire. The vastness and heterogeneity of the study area were addressed by proportionately distributing respondents as per population census and choosing the most appropriate sampling technique. The findings in the study were limited by the extent to which the respondents were honest, careful and without bias in responding to the survey instrument. The generalizations in the study were limited to the population in Bungoma County in the obtained database although a response rate of 92 per cent was above tolerable rates for the study and it helped to lower the margin of error when generalizing the results. Livelihoods security has many dimensions and multiple-causality thus the combination of research methods (mixed methods) to minimize errors.

1.8 Justification of the Study

This study is aligned with the livelihood promotion priority areas of the Sustainable Development Goals, Vision 2030, the Millennium Development Goals, the Kenya National Agribusiness Strategy and the County Government of Bungoma Strategic Plan (2013) that advocate for the commercialization of agriculture and value addition. The Kenya Agribusiness Strategy Paper forms the basis of agribusiness policies that seek to address the bottlenecks to the productivity and competitiveness of agribusiness and advocates for stakeholder partnerships in boosting agribusiness in Kenya. Previous studies have focused on the strategies for increasing agriculture production, agriculture innovation systems that enhance land productivity and enhance incomes without adopting a multi-pronged theoretical approach and taking stock of the available capitals for supporting the agribusiness uptake, productivity and competitiveness. For instance

studies by Kamau and Nyongesa (2017) and Simiyu (2014) adopt a value chain approach to food security and poverty reduction in Bungoma County by focusing on the productivity of the maize value chain.

This study adopted a holistic approach to address the root causes of the poor performance of agribusiness in Bungoma County whose 58 to 71% of the population lives below the poverty line. The socio economic vulnerability in Bungoma County is further manifested through the massive unemployment; food imports; low value addition; low yields; low market participation; general apathy towards farming; climate change vulnerability; and high poverty indices. The study addresses the growing gap in agribusiness dependent livelihoods in Bungoma County.

1.9 Significance of the Study

The study findings are crucial to agriculture-dependent communities in Kenya and emerging economies whose socio-cultural, psychological and economic circumstances are similar to the study region. The findings inform policy makers and planners on context specific strategies to secure livelihoods in relation to agribusiness capital access and usage. These results inform stakeholders support or intervention for improving agribusiness incubation action plans and comprehensive strategies for livelihood promotion. The findings add knowledge and supplement empirical evidence regarding different aspects of livelihood situations and contribute to the literature on livelihood strategies. Consequently, communities will use the study findings to minimize their vulnerable household conditions. The recommendations therin will guide government and devout partners to mitigate the obstacles to agribusiness productivity and competitiveness

in emerging economies**.** The outcome of the study, that is, livelihood security enriches policy to enhance food security, poverty reduction, equity, market competitiveness, youth employment and economic development. The findings of the study apply to Cheptais, Bumula, Kanduyi, Bungoma North and Webuye West Sub Counties in Bungoma County in Kenya.

1.10 Chapter Summary

This chapter illustrates the potency of agribusiness in addressing the menaces in weak economies by floating agribusiness opportunities for job creation, income generation, enhancing food security, poverty reduction and overall wellbeing. Despite the agribusiness potential, the benefits have been uneven in Africa with minimal benefits accruing to smallholders agropreneurs. The benefits of agribusiness as strategy for overcoming poverty in poor economies has not been fully embraced as envisaged within devolution, the Kenya Agribusiness Strategy, the Kenya Vision 2030 and the SDGs. The socio-economic vulnerability in Bungoma is manifested through the massive unemployment; food imports; low value addition; low yields; low market participation; general apathy towards farming; climate change vulnerability; and the consequent inability of farmers to breakeven threaten the functionality of agribusiness. The study objectives are derived from the livelihood capitals in the DFID Livelihood framework that facilitates the matching of the agribusiness capitals to opportunities. The findings inform policy on enhancing resource productivity, competitiveness and consequent livelihood security.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

This chapter presents a synthesis of the literature relevant to understanding the key concepts, theoretical review, empirical literature, literature review gap, conceptual framework and chapter summary.

2.2 Key Concepts

The key concepts in the study include the agribusiness incubation which is the independent variable, institutional support representing the mediating variable, and livelihood security being the dependent variable.

2.2.1 Agribusiness

Agribusiness is a broad term entailing suppliers of inputs, agribusiness retail, traders and exporters. Davis and Goldberg (1957) described agribusiness as the sum of all operations involved in the production and distribution of farm supplies; farm production operations; and the storage, processing, and delivery of commodities and products resulting from the farm. Roy (1980) describes agribusiness as the co-coordinating science of the provision of inputs for agricultural production and then the production, processing and distribution of food and fiber. Agribusiness is defined by Ricketts and Rawlins (2001) as comprising profit-driven enterprises engaged in the provision of agricultural supplies and/or the processing, marketing, transport and distribution of agricultural materials and consumer goods.

Babu and Caitlin (2015) divided the concept agribusiness into four major categories: agricultural input industry to increase agricultural production, such as agricultural machinery, appliances and tools; fertilizers. Agroindustry: Food, beverages; tobacco items; products of wood, leather and leather; textiles, footwear and clothing; wood and wood products; manufactured rubber; and agricultural materials-based construction products; machinery for agricultural commodities processing including machines, instruments, storage, cooling and spare parts; Various enterprises, including storage, transport, ICT and packaging equipment, and design for enhanced marketing, distribution, financing and distribution.

2.2.2 Business Incubation

According to Lose and Tengeh, (2015), the idea of business incubation emerged in the 1960s in the USA as an initiative to help new SMEs become creative and innovative in the creation and growth of networks, management skills, and markets for their products and services. The incubation principle has allowed many developed countries to adopt policy to encourage economic development and sustainable economic growth.

The first incubator was established in the United States in Batavia, New York, in 1959, and the aim was to help start-up companies that needed guidance and venture capital to get their ideas off the ground. The concept has its roots in nurturing in a safe environment to grow small companies. Industry practitioners, private and public entities operate incubators, and universities also run incubation programs (Levakova, 2012; Lose and Tengeh, 2015).

Business incubators are considered to be companies that promote the creation and growth of small and medium-sized enterprises through the provision of various services, such as infrastructure access, marketing, financial support and networks. It is a special institutional arrangement concerned with the growth of a community's entrepreneurial culture. However, since they are likely to be affected by the 'incubator syndrome,' the founder remains responsible for making the company succeed (Levakova, 2012).

The entire idea of incubation is attitudinal in that incubation transforms a community's attitude to facilitate and promote the success of emerging companies, depending on three fundamental factors: an entrepreneurial and learning environment; ready access to monitors and investors; and or market visibility (European Commission, 2002; Levakova, 2012). A business incubator is an important economic and social development tool with many results in job growth, entrepreneurship promotion, marketing of technology and technology transfer (Al-Mubaraki *et al*., 2014).

2.2.3 Agribusiness Incubation

The incubation of agribusiness is a way of advancing new approaches to accelerate the growth of innovative, technology-enabled agro-processing companies. It is a process that creates an atmosphere in which start-ups can be nurtured and encouraged to succeed (FARA, 2015). It is the provision of a comprehensive service to small and medium-sized enterprises with growth potential (SMEs). The approach can concentrate on one or a few sub-sectors or value chains, or on a wider model that allows potential agribusiness enterprises to expand based on local market conditions (Bhattarai *et al*., 2013). Incubation aims to create a supportive business climate that supports start-up, survival,

and growth. It gives priority to enterprisess based on verifiable competitive advantages with credible growth potential (FARA, 2015; World Bank, 2011).

Agro-incubation plays a key role in motivating farmers to provide an identified market destination for high-quality sustainable farm production (Haggblade *et al*., (2012). This process enables access to basic inputs, credit, capacity building, market knowledge and provides an atmosphere that allows farmers to access markets. Incubation acts as a catalyst to reduce poverty by improving business management skills, marketing strategies, knowledge access, technology for meeting standards, and providing adequate infrastructure. Ideally, it should enhance equity in the distribution of economic gains in value chains, reduce market distortions and build relationships between value chain players (World Bank, 2011).

Agribusiness incubation offers opportunities to alleviate smallholder farmers' current constraints. The process serves as an entry point to business and financial networks, link to the business community and gives farmers access to capital (UNDP, 2012). They support smallholders with potential for growth (World Bank, 2011) and serve as an intervention for economic growth by combining the strengths of the private and public sectors.

2.2.4 Livelihood Security

The livelihood concept was first put forward by the Brundtland Commission (WCED, 1987) on sustainable livelihood security. Based on the works of Robert Chambers and Gordon Conway (1992), a livelihood comprises the capabilities, assets (material and social resources) and activities required for a means of living that requires the skills,

resources (including both material and social resources). Livelihoods are complex and multifaceted comprising of assets, activities and outcomes shaped by structural factors (Amekawa, 2011). Based on the livelihood approach, income is a significant poverty predictor but does not completely account for vulnerability and should not be seen as an end in itself (Chambers, 1989; Sen, 1999; Pradipta et al., 2015).

Livelihoods are conceptualized by a number of variables that influence how people meet their basic needs, cope with vulnerability and take advantage of opportunities (Chambers and Conway, 1992). Livelihoods differ depending on those involved, the assets available, the activities carried out and the resulting effects (Chambers, 1989). The focus is on the interests and experiences of the individuals themselves.

Human security and livelihood security concepts are closely related. Livelihood protection focuses on individuals and recognizes justice, human rights, capabilities and sustainability as its normative basis (Bohle, 2009; Chambers and Conway, 1992). It relates to the secure ownership of resources and income-earning opportunities, or access to them, to compensate for risk, ease shocks and meet contingencies. A livelihood may consist of a combination of on-farm and off-farm operations that together provide a range of livelihood strategies. The risk of livelihood failure determines the level of vulnerability of a household to income, food, health and nutrition, (Chambers and Conway, 1992).

The failure to shield households from income and asset shocks, results into decreased expenditures in health, nutrition, and schooling across generations(Alderman *et al*., 2013; de Janvry *et al*., 2006; Jensen, 2000; Thomas *et al*., 2004). Along gender lines, negative shocks may have unequal consequences, and women bear the greater burden. Shocks may

increase pressure on common land, increase poaching and invasion of protected areas, and increase disputes between pastoral and agricultural communities (Barrett, 2007; Etzold, 2013).

2.2.5 Livelihood Capitals

Livelihood capitals are the fundamental material, social, tangible and intangible assets that people use to create their livelihoods. These resources are built as different types of "capital" to emphasize their position as a resource base that derives different product streams and builds livelihoods (Scoones, 1998). Access to assets and activities is allowed or impeded by livelihood policy or institutional context, as well as by external factors such as individual, environmental, physical, financial and social resources (vulnerability contexts). Based on the DIFD Sustainable Livelihood Framewok, there are five livelihood capitals, that is, the human, natural, financial, physical and social capitals as discussed in this section.

2.2.5.1 Human Capital

Human capital includes the knowledge, experience, job skills and good health that, when combined, enable communities to engage and achieve their goals with different livelihood strategies. The quantity and quality of the available workforce is determined by human resources and varies according to the size of the family unit, education level, leadership capacity, health status, and so on. Human capital is an intrinsic value asset that affects livelihoods and is necessary to optimize all other capital types. It is vital for the achievement of positive results in any dimension regarding livelihoods (UNDP, 2015).

Human capital incorporates the knowledge, experience, capacity to work and good health that together enable individuals to carry out various livelihood activities and achieve their livelihood goals. Variables such as health and labor constitute human capital. Based on Ding *et al*., (2018), all other capitals depend on the quantity and quality of human resources owned by households, and it is the main determinant of how they seek distinct livelihood means and objectives (Pradipta *et al*., 2015). The entirety of personal, social, technical and business skills is considered to be an essential investment resource, the use of which contributes to the effectiveness of production (Bazylevych, 2016; Rubavel, 2019).

2.2.5.2 Natural Capital

Natural capital refers to the stock of natural resources that supplies flows of valuable goods and services. Natural capital includes land, subsoil assets, forests, water, fishing and air. Natural capital goods and services provide inputs for agriculture, manufacturing and services. Complementing natural capital with human, physical and social capital greatly increases its productive capacity (World Bank, 2012).

Meeting the needs of the people for food, fuel and fiber depends on sound natural resource management. Manufactured goods also depend on sustainable natural capital production. Natural capital refers to four main categories: renewable extractable resources (fisheries, natural forestry, land, water); renewable cultivated resources (crops, livestock, aquaculture, forest plantations); non-renewable resources (oil, gas, coal, minerals) and ecosystems that provide regulating services (watershed management, climate regulating services, nature-based tourism) (Brandt *et al*., 2013).

2.2.5.3 Physical Capital

The physical capital encompasses the household's productive assets. This include basic infrastructure, that is: transport, shelter and buildings; water and sanitation facilities; energy and communications; and producer goods (tools and equipment). This stock of material human made resources can be utilized to generate a future flow of income (Mankiw and Taylor, 2015). Physical capital is broken down into two categories: essential infrastructure (transport, building, water supply); and producer goods (tools and equipment) needed to support livelihoods (DFID, 2000). Usually, the following infrastructure components are crucial for sustainable livelihoods: access to housing; safe buildings; access to roads and transport; access to water and sanitation; clean and affordable energy; and access to information/communication (UNDP, 2017).

2.2.5.4 Financial Capital

Financial capital refers to the financial tools used by individuals to attain their subsistence goals. Finance is an important building block for livelihoods, the availability of cash or equivalent enables individuals to implement various livelihood strategies (UNDP, 2015). Financial capital refers to the purchasing power or medium that reflects saved-up financial assets in the form of a currency that corporations or individual entrepreneurs use to invest in starting or expanding a business that is, buying or acquiring physical capital. This capital is accumulated to earn income and generate capital gains in order to manufacture goods or to provide services (Curtiss, 2012).

Savings are the preferred form of financial capital since they do not have attached obligations and do not typically require dependency on others. They are in the form of

cash, bank deposits or liquid assets such as livestock and jewelry. Credit-providing institutions, pensions, or other state transfers, payments for environmental services and remittances are the most common kinds of inflows. These inflows must be reliable in order to have a meaningful contribution to financial resources (UNDP, 2015). Debt and equity are the two most important sources of financial capital. Debt can also be acquired through non-financial entities, such as suppliers of goods and services (trade credit) in the supply chain, or through other firms (inter-enterprise credit), informal sector individuals, or through government agencies.

2.2.5.5 Social Capital

Social capital is one of the main assets for sustainable livelihoods and refers to the connectedness and trust between people. It refers to institutions, relations, attitudes and values that govern people's interactions and contribute to the social and economic development (Grootaert *et al*., 2002). Connections can be seen in various ways: bonding (within groups), bridging (intergroup) and linking forms with agribusiness research and development agencies (Pretty, 2003). Social capital promotes shared communication and collaboration and increases the benefits of investment in physical and human capital (Albrecht *et al*., 2013). Communities with different stock of civic and social networks are better over time in controlling poverty and vulnerability (Ibrahim *et al*., 2017; Narayan and Cassidy, 2001).

Social capital helps speed up the growth of social welfare, since it is not an individual's exclusive property, but a function of the social system (Ibrahim *et al*., 2017). As social

capital builds up, it enhances community development through facilitating repair networks and mends economic and political disintegration (Mayer and Rankin, 2002).

2.2.6 Institutional Support

Institutional support consists of bodies and organizations whose decision-making and active support in the form of legislation, financial and non-financial assistance bring about many improvements to the functioning of enterprises (Lisowska 2014). Institutions encompass a variety of agencies, policy and processes that can influence the decisions taken by households about their assets and asset access.

In terms of the livelihood framework, institutions affect the various livelihood assets or capitals by regulating access, influence how, where, when and by whom they are used. Institutions may also shift the context in which people are living in ways that will impact their vulnerability (Aneta, 2012).

DFID (2000) regards institutions as the hardware that shapes legitimate governance structures. Institutions are the structures by which systems operate, without which there is no legislation. Individuals and collective communities impose rules, allow markets to operate, reach into the broader public and private domain from central government.

Institutional processes work on all levels, from the family to the international arena and from the private sector to the public. They influence access to livelihood capitals, strategies and policy making bodies and power, terms and conditions of exchange

between different types of capital and return to any particular livelihood strategy. They directly affect whether people can achieve a sense of inclusion and well-being. Institutions determine access to assets and influence decision making processes (DFID, 2000).

2.3 Theoretical Review

Various theories are applied in understanding agribusiness incubation, institutional support and livelihood security. These include the modernization theory, the neo-liberal, and DFID Livelihood approach.

2.3.1 Modernization Theory

The modernization theory partly informed the study by advocating for agriculture modernization as a mechanism of enhancing livelihood security (Yah and Chen, 2015; Ye, 2015). Agriculture is a key engine for growth in the light of changing global context. Developing economies experience weak investment climates in terms of infrastructure and institutions that constrain investment in agro-based industries (Haggblade *et al.*, 2008; OECD, 2006). Poor households function at a subsistence level and do not have the management and organizational capacity necessary to switch from household food production to high value crop production. However, increasing high-quality crop production enables smallholder farmers to compete on national and international markets and eventually boost their livelihoods (World Bank, 2013; Yumkella *et a.l*, 2011).

The modernization theory postulates that economic development brings massive changes in economic, social and political systems. The pioneers of modernization theory, Walter

Rostow, W.A. Lewis, Talcott Parsons and Daniel Lerner, felt that the rest of the world should take the Western model of modernity into account, pushing civilization forward like the West (Knickel *et al*., 2017).

In Kenya, the declining productivity and severe consequences of farmers' and private-sector investments levels affect agriculture (Nwachukwul, 2008). Ineffective policies and bureaucracy lead to high transaction costs, high risks, reduced profit margins, and collectively, generate disincentives for investment in the sector (Knickel, *et al*., 2017; Cardno, 2017).

Rwanda implemented the modermisation strategy in the form of the Crop Intensification Program (CIP). The CIP is aimed at prioritizing six food crops (maize, wheat, manioc, beans, Irish potatoes and rice) and at ensuring that agricultural practices across the country become more standardized. The Program focuses on land use consolidation, fertilizer distribution, improvement in seed, provision of proximity services, better handling and storage after harvest (Ndushabandi *et al*., 2018).

Similarly, China's re-establishment of household production autonomy and independent markets for agricultural output was a step toward a market-based economy and rapid economic development. Freed from joint work teams and attracted by the high price on the market, farm households moved from production of cereal to cash and livestock production. These reforms in production and marketing allowed farmers to have more choice in their production, marketing and income earning opportunities (Reynolds, 2016).

Agribusiness has a potential effect on overall growth, poverty decline and the pace of economic transformation (Mellor, 2017). Through modernization, the following can be achieved: increased domestic food and labor supply necessary for industrial employment; increased domestic market size for the manufacturing sector; increased domestic saving supply; or supply of foreign exchanges received by exports from agriculture. Modernization therefore allows for a sustainable agricultural development path that increases the quality of life, guarantees food for present and future generations and provides farmers with adequate income (Adegoye and Dittah, 2018; Reynolds, 2016).

This study embraced the transformation of agriculture from its conventional labour based to technology based (Tagarirofa, 2017). The success of agriculture emanates from reduced costs of production, increase in production potential and emphasis on increasing productivity of land and labor to fill the yield gap (Patel, 2013).

2.3.2 Neoliberal Theory

Neoliberalism was used in the 1980s to describe a wave of market deregulation, privatization and the withdrawal of the welfare state (Venugopal, 2015). It advocates for a tightly delimited role of the state and market friendly mechanisms (Pritchard, 2014). The market is viewed as the centre of all economic activity and the most efficient allocator of resources. Market centrality and efficiency determine the exchange value and maximization of utilities (Thompson, 2014).

Under neoliberalism, the strong control of the multinationals is constantly seeking to conquer new markets, coordinate production and marketing processes. The State's apparatus remains in charge of market regulation, development of knowledge, labor organization, trade agreements, monetary policies, market safety, climatic risks and food

security promotion. In addition, neo-liberalism grants corporations, an influence that extends beyond their market share through complex networks (Thompson, 2014; Ioris, 2018).

Neoliberalism systemically displaces conventional agriculture and undermines farmers' capacity to fight the impact of capitalist agriculture (Pritchard, 2014). In the developing world, the neoliberal economic transition has worsened food insecurity by removing social security nets, rising hunger and inequality, reducing domestic food production and depriving export profits. The reduction in social costs under structural modification exacerbated food insecurity by creating massive reductions in the rights of the poor (World Bank, 2011). With government price controls and subsidies reduced, the necessary costs outweigh the means of smallholders who face ruinous competition from developed producers. Domestic food prices have been depressed by the influx of cheap, subsidized food from the United States and the EU, with wealthy farmers switching from food production to the cultivation of more lucrative export crops.

Poor farmers' livelihoods are threatened as declining farm prices coincide with the reduction of agricultural subsidies, extension programs and subsidized loans. Land ownership became concentrated in the hands of wealthier farmers. On both large and small farms, domestic food production decreased and reliance on imported food increased. Consequently, the focus on export production increased inequality by strengthening the privileged status of large-scale farmers (Gonzalez, 2015).

With the rise in value of cash crops, the landowners increased rents, withdrew farming rights and land shareholdings, or just expelled landholders to rent land to more wealthy,

high-value, farmers. These wealthy landholders also increased their holdings by purchasing the plots from small-scale farmers whose capital was lacking and whose livelihoods for the export market became increasingly difficult. The net result was increasing economic polarization with an ever more wealthy and poor majority (Ioris, 2018; Gonzalez, 2015). Neoliberal policies have ultimately generated contradictory outcomes for agriculture in developing countries and have exacerbated socioeconomic disparities and alienated various social classes.

2.3.3 The DFID Sustainable Livelihood Model

The DFID 'Sustainable Livelihood Framework' (SLF) is one of the most widely used livelihood frameworks in development practice. The DFID, in 1997, adopted the Chambers and Conway's definition of livelihoods:

> "*A livelihood comprises the capabilities, assets and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base"* (Chambers and Conway, 1997).

The goal of DFID is to eradicate poverty in poorer countries through a versatile and adaptable strategy oriented to local environments and priorities identified in a participatory way. The DFID Sustainable Livelihood Strategy is people-centered; the focus is on individuals rather than resources. In addition, the strategy is holistic in terms of considering the livelihoods of stakeholders as a whole and it is highly dynamic to learn from changes, reduce negative impacts, and promote positive outcomes. Similarly, the model appreciates the intrinsic ability of all to overcome limitations and achieve potentials. The starting point for contributing to the robustness and willingness of

stakeholders to achieve their goals is to recognize these strengths rather than the needs and issues. The approach bridges the gap in micro-macro relationships to achieve sustainable growth (Kollmair *et al*., 2002).

The vulnerability context in the model frames the external environment in which people exist. It includes vital trends, shocks and seasonality, over which individuals have little or no influence, but which have a significant impact on livelihoods and asset availability. Vulnerability arises where individuals have inadequate capacity to respond effectively and thus experience harmful threats or shocks.

Livelihoods assets/capitals refers to the strengths of individuals (assets or capitals), and determine how individuals turn their strengths into positive outcomes for survival. To achieve livelihood results, individuals need a variety of assets. The SLF distinguishes five types of assets/ resources on which livelihoods are built, namely human, social, natural, physical and financial capital (DFID, 2000). A greater asset base translates into higher livelihood prospects and stability for livelihoods.

Livelihood strategy refers to the variety, combination of activities and choices that people make to achieve their livelihood goals. It is a dynamic process in which people mix activities to satisfy their different needs (DFID, 2000). Livelihood strategies are directly dependent on the asset status, policies, structures and processes. Poor people compete, and one household's living strategy can have an effect (positive or negative) on another household's strategy (DFID, 1999).

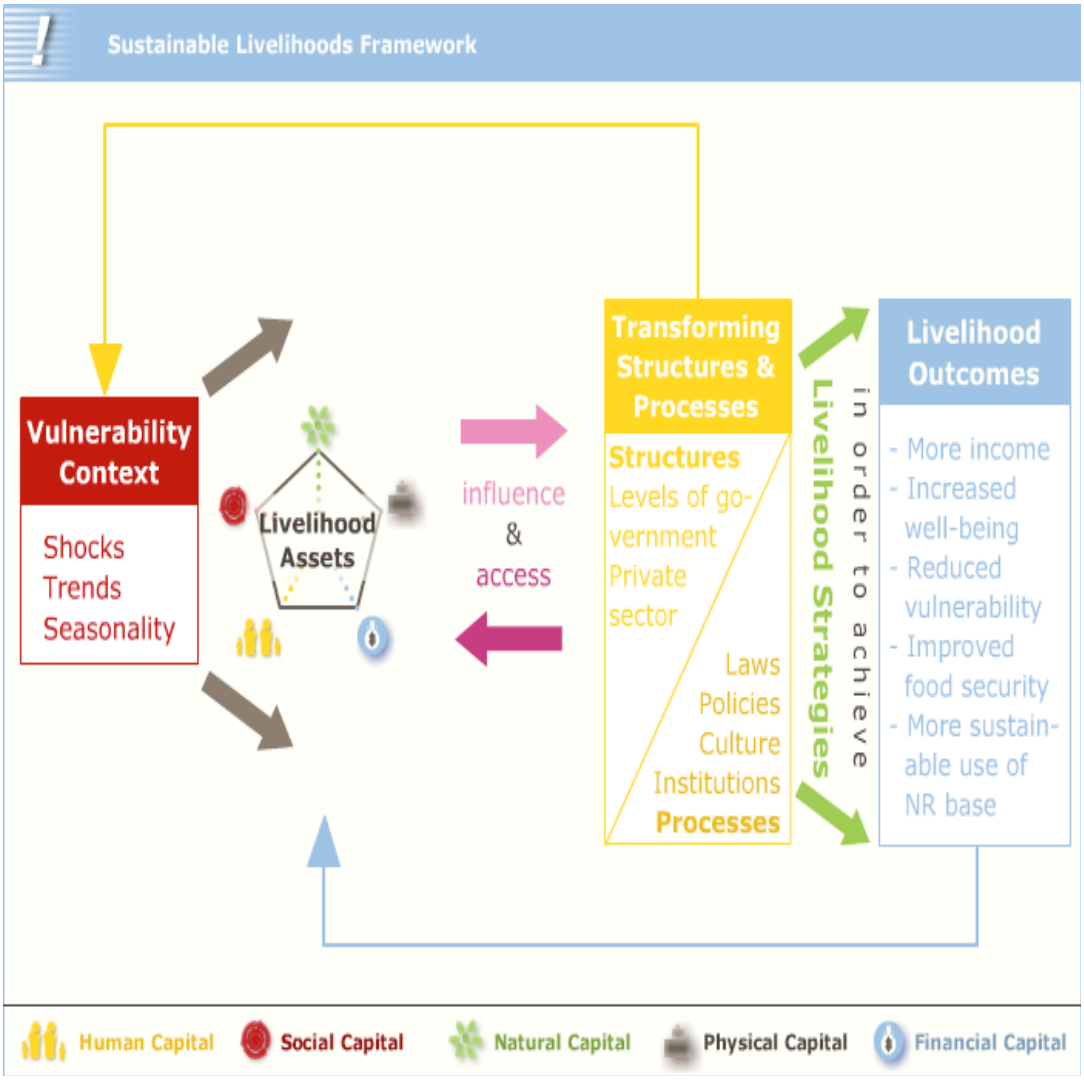

Figure 2.1: The DFID Sustainable Livelihood Framework

Source: DFID 2000

2.4 Empirical Literature

The study examined past studies to address the research questions and gain a deeper understanding of the study topic in varied contexts to appraise the points of convergence and divergence.

2.4.1 Agribusiness and Development

In sub Saharan Africa where agriculture is depended upon by a majority of people, agribusiness offers significant opportunities for economic growth and youth employment. A booming agribusiness sector provides strong growth linkages through provision of affordable food, processed goods and increased demand for high value services (Alemayehu, 2014; Payumo, *et al*., 2017).

The World Bank (2011) notes that agribusiness generates significant multiplier effects through its forward and backward linkages. The market for high-value food production and exports of agriculture products provides opportunities for agri-business. Konig *et al*. (2003) and Mabaya *et al*. (2010) reinforce the need for agri-businesses to be more competitive on national, regional and foreign markets due to the interconnectedness of markets. Based on Haggblade (2011), productivity gains stem from new technology growth, input-production specializations, agro processing and distribution, economies of scale and increased competition. In developing economies, the deficient technological capabilities hinder expansion of agribusiness, as the linkage between agroindustry institutions and value chains is very weak (Konig *et al*.2013 and GIMPA, 2013).

Alila & Atieno (2006) note that farms in Kenya lack the organizational and management capabilities needed to switch to high value crop manufacturing. Whilst agriculture's poverty reduction potentials are greater than the growth potential of other sectors, developing countries have failed to turn their comparative advantage into competitive advantage and consequently lost value-added revenue and job opportunities (Ntale *et al*., 2014; Ntale, 2013; World Bank, 2013).

IFAD Strategic Framework 2007-2010, emphasize the support for growth oriented entrepreneurs engaged in downstream activities to effectively connect to profitable value chains. Global improvements in agricultural marketing systems and production technologies open up opportunities for small farmers but seldom benefit them. It is imperative to ensure better access by poor people to the skills and organization to enable them exploit markets. The growth of agricultural production potential and marketing opportunities is a powerful catalyst for reducing poverty (IFAD, 2011).

According to Bamber and Fernandex-Stark (2013); Evers *et al*. (2014); Fernandex-Stark *et al*. (2011), conformity to standards excludes the involvement of small holders because they are complex and expensive. Smallholders' commercialization results in food diversity, food sufficiency and is necessary for the development of a dynamic and competitive agriculture sector, but a wide range of capabilities is required. Despite the difficulties in realizing this opportunity, the World Bank (2013) offers a positive view of the potential role of agribusiness in creating growth and jobs in Africa.

2.4.2 Africa's Agribusiness Strategy

Strong synergies exist between agribusiness, agricultural production and poverty reduction in Sub Saharan Africa. Efficient agribusiness stimulates growth and poverty reduction. Agribusiness offers opportunities for accelerating innovations, food security, addressing hunger, improving youth employment and driving agricultural-led economic growth. Various initiatives are taking place in Africa including agribusiness incubation, capacity building, training and information transfer. Partnerships between stakeholders such as government, international organizations and the private sectors aimed at improving the management of the agricultural value chain across Africa (Payumo *et al*., 2017).

A range of initiatives have solicited the incorporation of smallholders and creation of jobs in agri-business market. They include Afri Banana Products Ltd, a value-chain production innovation agribusiness incubator for bananas, an incubator founded by ICRISAT in Uganda. The incubator comprises the Uganda Industrial Research Center for Agri-Business, the University of Science and Technology Mbarara, the Kenya Agricultural Research Institute, the Uganda National Board of Societies and Technology and a group of public universities and research bodies like the Kyambogo University in the leading institution. Its activities include tissue culture seedlings, banana fiber, briquettes and biogas among other activities. Since its formation in 2015, the incubator has cultivated up to now 39 entrepreneurs, commercialized six traditional and modern biotechnologies, and helped generate jobs in Africa for more than 420 people (Payumo *et al.,* 2017).

According to Yumkella (2011), Accra-based African Agricultural Incubators Network (AAIN) is a private-sector initiative that strengthens agri-business incubation and commercialize farm innovations. AAIN provides technical support for agribusiness creation through incubation and mentorship, off-taking innovation and marketing analysis technologies for agro-enterprise incubation in Africa.

The Comprehensive African Agricultural Development Programme (CAADP) observed that the global success of agribusinesses is unprecedented due to unfair access to land, land reform problems, limited skills and expertise to enhance the effectiveness of production and shift away from subsistence level. In addition the limited capital access to purchase inputs, finance startups, expansion, support new technology, the weak institutional environments and support systems curtail agribusiness progress. Opportunities manifest in the form of its huge reservoir of land, natural and human resources, uncultivated land suitable for agriculture, the youth bulge, expanding global market for agricultural products, and the demand for high-value food products. The need to modernize and diversify African agriculture and to create opportunities to participate in the agricultural value chain is necessary to speed up economic growth and poverty reduction while contributing to CAADP, the Sustainable Development Goals (SDGs), and the Continental Agricultural Policy (CAADP, 2017).

The Continental Agricultural Strategy (CAS) offers a structure to encourage and grow an inclusive and robust agricultural sector that promotes agricultural value chains across the continent, creates jobs, generates wealth and retains it across the chains. It provides for an African agriculture sector supported by private investments and public-private

partnerships. It is inclusive and covers a wide spectrum of the value chains from the farm to the fork. The CAS is a base for the promotion of dynamic farming and agricultural trade in Africa. This Strategy aims at improving the cooperation in the production, produce, storage, marketing, exporting, and consuming among various actors in Africa's agri-business landscape (AUDA-NEPAD, 2019).

The NEPAD observes the sparse, scattered domestic market; unstable market prices; small quantities and long distances from largely landlocked production sites; unorganized and unskilled producers; smallholders with no capital to improve production and generate investable surpluses; withdrawal of the state from direct production functions in order to create and maintain a climate conducive to private sector initiatives; and poorly defined property rights. African agriculture represents a generally iu89tuncompetitive, unattractive and poorly productive economy, which is considered to be a risky place for investment (NEPAD, 2003).

CAADP (2017) and NEPAD (2003) estimate that 70% of Africa's value chain actors are smallholder farmers with minimum involvement in the productive segments of the value chain. The general lack of development of the value chains into sustainable and effective organizations has partly contributed to poor market development and marginalization of the main players. The links to global agricultural markets are weak resulting into inadequate incentives for quality improvement, creative innovation and rapid adjustment to changing patterns of demand and market opportunities for processed and higher value agro-industrial products. Policies for reducing supply-side rigidities as well as trade reforms aimed at eliminating trade distortions affecting agro-industrial exports are not

given sufficient attention at national and continental levels in terms of formulation and implementation. Addressing the unfulfilled potential of agriculture is imperative for Africa.

2.4.3 Agribusiness Practice in China

In spite of its biophysical and environmental limits China has done remarkable work to feed 22 percent of the world's population with 9 percent of the planet's arable land(Yu and Wu, 2018). Huang and Rozelle (2018) note that China's agriculture has been structurally transformed over the last 40 years with significant diversification and commercialization with high value commodities. The main investments target: land improvement; irrigation; massive improvements on transport; and markets to improve production and connect smallholders with retailers and consumers. During the reform period, China made major investments in road infrastructure.

Schneider (2016) emphasizes the state's key role in determining the course of market expansion and the destination of profits. In addition, there are strong public private partnerships, political will to limit the TNCs degree of control and ownership, and the preference of state and private elites to lead the agrarian transformation. Zhang *et al*.(2015) noted that the state and private elites in China collaborate to consolidate a robust domestic agrifood industry, as a new frontier in the access to capital and markets abroad. Public funding assists national agricultural processors in providing primary products through contract farming to rural producers. With regard to ensuring access to foreign supplies and markets, government policy is increasingly encouraging agri-

business firms to invest in foreign land and agricultural resources, to develop operations in processing food in other countries and to export agro-food items.

Based on Yu & Wu.(2018), technological advancement is the major driver of growth that is: irrigation, chemical input, genetically modified (GM) crops and mechanized machines. The mechanization of large crop production reached 65% of all cultivated land in 2016 while the land institutional reform, the separation of contract rights allows for land transfers and facilitates the formation of large farms and the efficient use of machinery. Land transfer moves land from less productive to highly productive households, and the use of machinery lowers production costs by replacing labor (Schneider, 2016; Yu & Wu, 2018).

The primary cause of long-term agricultural productivity growth in China over the last couple of decades is agricultural technological change. The growing productiveness of grain has allowed the country to phase out its limited land and water resources for the production of cash crops and livestock. Since the mid-1990s, China's increase in agricultural productivity has also relied on biotechnology innovation (Huang and Rozelle, 2018).

2.4.4 Physical Capital for Agribusiness

Based on Scoones (1998), physical resources matter a great deal and infrastructure is a core poverty variant. The cost of opportunities due to inadequate infrastructure prevents schooling, access to health care and income generation. For example, without the necessary transport infrastructure, fertilizer cannot be efficiently distributed, agricultural

yields remain poor, and the transport of goods to the market becomes difficult and costly. Narayan *et al*. (2000) note that a key constraint to the livelihoods is the difficulty of bringing produce to market, especially during the rainy season.

2.4.4.1 Physical Capital and Agriculture Productivity

The gap between farm yields and potential yields reflects constraints, such as insufficient adoption of more productive technologies, a lack of market integration and gender inequalities in small-scale farming (FAO, 2011). A UNDP study (2012) observes that despite Africa's potential owing to its vast natural resources, arable land and water resources, food security remains elusive. The Continent experiences low productivity and low technology adoption, which prevents adequate food production.

Wiggins (2014) notes that Africa's agricultural output is a function of the expansion of the area under cultivation rather than intensification. Hofstrand (2012) states potential options that could lead to increased production of foodstuffs; either increases yields per hectare or increases cultivable land quantity. However, it is not feasible to expand agricultural land, as arable land is limited; the latter is the only viable option. However, increasing productivity may also pose a major environmental danger, since the majority of adopted technologies often involve intensive use of inputs, including fertilizers and agrichemicals, that can have negative environmental effects (Kiplimo and Ngeno, 2016; AGRA, 2013).

OECD (2011) states that the efficient use of land, labour and other inputs through technological advancement, social innovation and new business models is a key to

sustainable agricultural growth. Based on UDA (2016), the change in farming practices tends to increase overall total factor productivity (TFP) which is the key contributor to agricultural production growth in high-income countries. Whilst production has increased mainly through agricultural expansion in low-income countries, growth in TFP has significantly increased over the last decade. A number of large countries, including Brazil, China, Indonesia, Russia, and Ukraine have increased their TFP growth rates above average in their region. In Sub-Saharan Africa the overall TFP growth is lagging, while the 2000's saw above-average growth rates amongst other countries as Benin, Cameroon, Congo, Kenya, Mali and Sierra Leone (Yu & Nin-Pratt, 2011). However, the great potential for much higher agricultural production in Sub-Saharan Africa has not been realized. Sustainable agricultural mechanization is deemed a key strategy for achieving long-term increases in agricultural output in the region.

Mechanization in the long run will encourage sustainable intensification of production systems and build a more resilient agriculture sector. For smallholders, the promotion of innovation that leads to higher TFP growth is necessary to ensure sustainable and productive agriculture (Tschirley *et al*., 2015).

2.4.4.2 Physical Capital and Post-Harvest Losses

Post-harvest losses contribute to economic losses for farmers and higher prices for consumers in the value chain. Reducing food and waste losses improves food supply and enhances global food security. Post-harvest losses (PHL) occur at harvest, processing, handling, transport and distribution, storage (pesticides, spillage, spoilage and contaminations), and at marketing. FAO and WB (2010) estimate a loss or waste of a

third of the food produced worldwide in a world where over 870 million people starve, reflecting a loss of 1.3 billion tons of food each year (Meybeck *et al*., 2011). The World Bank (2011) study revealed that after harvest in sub-Saharan Africa (SSA) large food volumes are lost every year, estimated at USD 4 billion per year on grain alone. Affognon *et al*. (2015) indicates that this degree of food loss over the last decade is above the overall amount of food aid to SSA and therefore equates to the annual value of cereal imports. PHLs are estimated to be equivalent to the annual calorific demand for 48 million people. Thus, investing in the reduction of post-harvest losses is a fast response to improving food security.

According to Nwaigwe (2016), PHLs include losses of both weight and quality, as well as loss of opportunity arising from producers' inability to access markets. PHLs also result into low market values for produced grains, due to substandard quality grains or inadequate market information. GIZ (2013) emphasizes that reducing food losses provides a significant route to food security, poverty alleviation and improved nutrition. In addition, PHL reduction has beneficial environmental and climate effects as it improves efficiency and decreases the use of processing resources or the expansion into fragile environments, in order to produce food that is lost and not consumed.

Onyango & Kirimi (2017) estimates the PHLs in Kenya at 12-20% of overall national production. Losses emanate from spillages during handling; rotting and afflotoxin contamination due inadequate/inappropriate storage technologies; losses to pests; and inefficient processing technologies. The evolving climate patterns have changed the harvest time, thus preventing proper drying of grain and providing favorable conditions

for the buildup of grain pests and disease. Farmers without proper storage facilities suffer tremendous losses, their produce is rained on, lost to rot or face extreme infestation with pesticides and diseases that pushes the sale of produce immediately after harvest, when prices are low.

Figure 2.2: Improved Metal Silos in Kenya

Source: Gitonga *et al,* 2015

Mishra *et al*. (2012) proposes that the bulk of world maize, wheat, rice, sorghum and millet production must be kept in warehousing for periods ranging from one month to over one year in order to feed the world population. The key role of storage is to reduce market supply volatility, both from one season to the next and from one year to the next, by releasing the surplus goods on the market in lean seasons. Nwaigwe (2019) reaffirms the need for the off-season market to meet average demand by storage of excess supply during harvesting time. In addition, Onyango and Karimi (2017) propose the following methods to address post-harvest losses; timely harvesting, proper drying, storage hygiene, grain treatment, improved techniques of processing and transport. The use of

metal/plastic silos and hermetic bags decreases losses from pests significantly. Better transport networks as well as the promotion of good on-farm and off-farm produce handling and management practices through extension and warehouse facilities must be encouraged.

2.4.4.3 Physical Capital and Land Fragmentation

In Sub-Saharan Africa the key problem is the decreasing farm size, which logically means a diminution of food production levels in both ownership and consumption. Demetriou (2013) identifies the four key factors leading to land fragmentation patterns as inheritance, population growth, land markets and historic/cultural perspectives., The culture of heritage is the main factor behind Africa's shrinking arable farm sizes. The majority of communities in Sub-Saharan Africa are marked by a patrilineal succession culture with land shared among heirs. When people increase, not only does the size of holdings decrease, but they are increasingly fragmented into small plots, scattered over a wide area (Kiplimo and Ngeno, 2016).

In the aftermath of declining land holdings and the intensification of land, especially in developing countries, the interest is renewed to try to understand the effect of land fragmentation on food production and resolve it (Demetriou *et al*., 2013; Monchuk *et al*., 2010; del Corral *et al*., 2011; Wan & Cheng, 2010; Sauer *et al*., 2012). The biggest issue today in Africa is that farm volumes in densely populated small-scale farming areas are decreasing over time, with over half of the rural farmers owning less than one hectare of land (Jayne *et al*., 2012). The discrepancy between landholding and food production has cast doubt upon the sustainability of household subsistence and market surplus

production. The findings of Kiplimo and Ngeno (2016) indicate that land division eventually leads to fewer, unsustainable holding units.

2.4.4.4 Physical Capital and Market Integration

Remunerative markets are a crucial element in enhancing agriculture entrepreneurship and profitable investments in productive agriculture. Productivity growth and market integration reinforce each other, while the limits on participation are multifaceted (Barrett, 2010; FAO, 2013). Market oriented production has the potential for welfare gains and facilitating market participation is crucial in exiting poverty (Kirimi *et al*., 2013).

FAO (2014) utility of the household livelihood assets provides insights into the contributing factors to the low participation in markets. Producer assets are a critical factor in determining household's ability to engage in and benefit from formal markets. Understanding the gap between available assets and those required to successfully benefit in specific markets is essential in designing an upgrading strategy. Assets are a poverty proxy, a useful tool for measuring and tracking the effect of value chains on poverty (Rakodi, 2014).

Olwande and Mathenge (2011) have established a close relationship between market participation and exiting poverty in a study on the market share among rural poor households in Kenya. The household's capacity to create a marketable surplus to contribute to poverty reduction is strengthened through access to productive assets. Furthermore, markets provide farm production the opportunity to earn income from the sales of agricultural produce and thereby help to reduce food insecurity and poverty

(FAO, IFAD and WFP, 2013). Output is driven by markets, as farmers aim to fulfill the demands of the quantity and qualities of customers including the other end users (Arias *et al*., 2013; Bolwig *et al*., 2010; Mooney & Hunt, 2009; USAID, 2012).

Muriithi & Matz (2014) assume that using inputs to raise productivity enhances farmers' ability to generate adequate marketable surplus to address the low productivity. The challenge of poverty reduction and income improvement calls for a change from development of subsistence to commercialized farming. Local geographical constraints, restricted productive asset and institutional structures restrict the access of smallholder farmers to agricultural markets.

Barrett (2010) argues that heterogeneity among smallholder holdings should be seen in three dimensional areas, that is: access to household assets and productivity of assets against their livelihood needs; connectivity to different markets (geographical proximity); and knowledge asymmetries, power relations and transaction cost. The integration of the market is focused on the access and utilization of assets and other related resources or the tradeoffs of household resources (Altieri and Toledo, 2011; Bolwig *et al*., 2010).

Market participation calls for effective policies and strategies which create and maintain an environment for small producers to integrate into markets (FAO, 2013). Muriithi & Matz (2014) advocate for domestic market diversification; credit provision; price stabilization strategy by removal of intermediaries and storage to mitigate price pressures. There is need to understand the agricultural commodities that offer opportunities for sales, income and poverty alleviation.

Benefits of market participation are not limited to higher earnings and financial capital, but have different and nuanced impacts on the entire spectrum of livelihood capitals. Studies conducted in this respect by Singh (2008); Minten *et al*. (2005) and Neven *et al*. (2009) indicates that formalized market providers experience greater certainty about the timing and prices of sales resulting into greater security through contractually-defined payments and guaranteed incomes. In their research, higher incomes are not as relevant as income stability. Vulnerability and risk mitigation are closely related to higher sales, security and stability.

Farmers face non-remunerative markets in Africa that are disincentive productivity efforts. The Continent offers unfinished goods, for which prices are stagnant or dropping, and yet a strong domestic market is a building block for export markets. The market environment is highly unpredictable and this has generated significantly new opportunities for some farmers, especially those producing export crops in communication enabled areas. It has created significant problems for those seeking to produce and sell staples at the agricultural margins, typically stronger and bigger market intermediaries create weak trade terms and little control over what is offered. For market growth, African governments and their development partners have an important role to play in accelerating the pace of market development, eliminating or reducing barriers to market access, both by special help in areas where markets are slow to spontaneously grow and by easing market participation (CAADP, 2017; NEPAD, 2003).

2.4.5 Financial Capital for Agribusiness Incubation

Financial access is critical for agricultural sector growth and transformation from subsistence to commercial agricultural production. Financing for agricultural investment, even for large investors, is restricted in developing countries. Financial institutions are unwilling to take on the risks in the agricultural sector such as droughts, floods, pests and diseases or trafficking costs. The lack of understanding of agricultural financial risks and opportunities therefore deprives the sector of much-needed financing to boost production, manufacturing and marketing (IFC, 2013; Ruete, 2015).

FAO & World Bank (2013) and Anandaja, (2011) point out that farmers need financing to increase production and for product diversification. This involves financing of inputs, production equipment,and marketing (processing, packaging and transport). The funding can also focus on infrastructures, such as rural transport systems, water and irrigation systems, sanitation, electricity, storage and telecommunications. These ventures are expensive and need substantial funding.

Ruete (2015) concludes that the change from subsistence to commercial agricultural production still needs funds yet in the present global financial system, a number of factors hinder the development of strong financing services. In rural areas transaction costs are higher than in urban areas, as the populations with poor networks are spread further and agricultural risk factors discourage lending from financial institutions. This includes the risks of development associated with natural disasters, the low collateral capacity of farmers and market volatility. Funding for investment in agriculture, even for

large investors, is scarce in developing countries where agriculture is a source of livelihood.

The usability and creativity of financial instruments and services unique to the sector is generally weak. Financial services may in some cases not suit all types of agricultural operations that have diverse needs with regard to timing of payments, amounts and risks. In the seasonal agriculture, for example, financing is required, in particular phases of the development process and financial goods can only be sold in large farms with soundtrack records and can therefore not meet the customer's unique needs (IFAD, 2009).

The CAADP (2017) indicates that the absence of records and statistics on agriculture in developing countries is a problem for financial providers in determining credit suitability. Due to the real and perceived risk of agribusiness, appropriate, reliable, adequate funding for agriculture is a necessity for the private sector. Agribusinesses in Africa have limited access to finance, face high financing costs, have low physical and services infrastructure. In addition, agribusiness actors, entrepreneurs and companies have rampant financial illiteracy and weak business skills. Furthermore, innovative new financial structures for fostering investments in agricultural and agro-industry and agro-business are underdeveloped or non-existent, including conventional domestic and external investments. Equally, the value chain financing, multi-institutional financing and private sector led voucher systems are underdeveloped, weak or totally absent. Ties between official and informal financial institutions and incentive based risk-sharing schemes for agrarian lending, guarantee funds, venture capital funds and crop insurance,

which are main creative mechanisms for de-risking agribusiness perform poorly or are non-existent.

2.4.5.1 Sources of Financial Capital

Two major forms of value-chain financing exist: internal finance between participants on the basis of their associations and external financing outside the value chain. Internal finance encompasses commodity funding, trade loans, IT loans, selling business loans and leading company loans. External financing comes from outside the supply chain, for example, a microcredit bank would cover the expense of buying fertilizer for a farmer.

IFAD (2012) states that agricultural value chains can be financed more indirectly and built within the interconnected relationship among suppliers, buyers, producers and banks. Agricultural transactions are financed with a view to reducing cost and risk, improving productivity and growing the chain actors' credit profile by reducing lending risk. The different actors in the value chain are financed with different instruments and financial service providers. In developing economies, the informal financing is usually used at the producers end, while more advanced financing instruments are used at the other end of the value chain. Financing involves farmers and all other actors, including input suppliers, processors, traders and exporters. Funds are required in order to get food from the farm to the consumers, and varied agriculture financing mechanism allows a large range of actors to be financiers. The various actors cover different risks and tools. Producers play key role acting within the informal sector and also in complex organization systems, such as saving and credit cooperatives or mutual credit guarantee schemes.

In the developing countries in particular, savings are the most common source of finance. It takes the form of collective savings and non-formalized group funding systems. For example, the tontine is a small savings and credit scheme organized by small groups of Senegalese people (Balkenhol and Gueye, 1992). Women in Ghana developed groups called Susu groups to fund farming activities between them, using a system that distributes collection and payment obligation among group members (IFAD, 2000). The aim is to extend the access of poor and disadvantaged communities to affordable and responsible financial products and services (Principles for Responsible Investment, 2013). It includes savings, credit, insurance, remittances, payments and guarantees to access finance. Micro-financing has become increasingly common, with specialized banks or organizations offering small loans and savings services while often accepting various assets as collateral. Close ties with the community and the awareness of customers' risk profiles are the strength of microfinance organizations.

The World Bank (2009) asserts that, in the case of equity financing, funding could be provided by commercial banks, agricultural development Banks, NGOs, cooperatives or investors. Beneficiaries may also benefit from government funding or international development banks (World Bank, IFAD). Leasing and factoring provides farmers and entrepreneurs more dynamic and creative financial instruments such as leasing and factoring. Leasing is used to fund farm machinery, vehicles and supplies. For factoring it is necessary for a business to sell its invoices at a discount to a third party (factor) to boost the cash flow. These mechanisms are designed to reduce some of the conventional agricultural lending risks. They are an alternative choice to rent machinery, equipment and other assets related to production for borrowers with limited collateral and credit

history. In other cases, weather-based insurance can boost access to financing against bad weather. While farmers prefer production loss insurance, the evaluation is too cumbersome and subjective for many financial institutions and will rarely be given in countries lacking good statistics (World Food Program and IFAD, 2011). Finally, credit guarantee schemes guarantee groups without access to credit by covering the share of the loan's default risk and the lender recovers the guarantee value in the event of default (OECD, 2010).

Various types of financing can be combined with the involvement of different actors. Development banks, for example, can borrow from financial institutions, which can be intermediaries for lending or securing producers, which can also be funded by local banks at the same time (Agrifin, 2010).

FAO (2001) proposes the creation of government financial institutions in agriculture regulated by the Central Bank. For example, Agriculture Bank of Ghana, the Agricultural development Bank Limited of Nepal, are major state-owned banks in their countries. They are mostly overseen by other government departments, such as agriculture and finance ministries. Governmental intervention covers: payment of indemnities, reduction in social security contributions, tax exemptions during sector crises, and private insurance subsidies. Israel, for example, covers part of producers' insurance premiums and in Brazil Garantía Safra, was developed as a disaster relief program to offset small farmers for weather-based and other production losses (OECD, 2013). Indeed, the secret to the success of farm business enterprises is adequate financing.

2.4.5.2 Barriers to Financial Capital

Wabwoba *et al*. (2015) noted that credit facilities are not easily accessible to small farmers and where available, conditions/requirements are not pleasant. The stringent conditions such as collateral (title documents) or surety and guarantors not willing to guarantee each other are some of the factors that impede access to credit. Many rural dwellers do not have securities and fear that if the loans were not paid back, their property will be auctioned out, hence only a limited number have access to agricultural loans from equity banks and Agricultural Finance Corporations. This findings are similar to the study by Wanjala (2012) carried out in Kakamega County which ascertained that members of self-help groups feared taking loans. Most of them, particularly older households, rely only on financial help from their children to allow them to buy food and some of these households are poor due to the exploitation of banks or microfinance institutions. The institutions charge very high rates of interest on loans given to farmers, so many farmers refrain from requesting for the loans. In addition, there are very few saving and cooperative societies in Kenya.

2.4.6 Social Capital for Agribusiness Incubation

The existence of social capital has the potential to improve socially egalitarian conditions within society for sustainable agriculture practices. Social capital encourages community self-help that facilitates groups to work together easily to solve collective problems and determine their growth. The creation of social capital in farming communities is a positive factor in sustainable development efforts (Salau and Atta, 2012).

Knox *et al*. (2004) note that collective action has proven to be successful in improving farmers' empowerment in the innovation framework. Groups enhance dialogue consultations, facilitate field days, cultivates efficient use of resources, enhance the mutual trust of farmers and consensus building. They provide an opportunity to share ideas, labour and information exchange creating a multiplier effect to technology adoption.

Heemskerk and Wennink (2004) claim that the linking factor, the capacity of social groups to act in their mutual interest, is one of the main forms of social capital for innovation growth. The institutional view about social capital indicates that the key determinants of the strength of communities and networks are the political, judicial, and institutional environment (Grootaert *et al*., 2002). Historically, public agricultural research and extension have linked farmers to innovation. Currently, farmers' associations and other local organizations support their own innovation systems.

Public, private and community/civil society have no independent access to capital for innovation for sustainable and equal development (Grootaert *et al*., 2002). In rural areas, there is an immense wealth of social capital for innovation and training that awaits mobilization.(Collion, 2004; Rondot, 2004; Place *et al*., 2002).

2.4.6.1 Group Belongingness

Connectedness and trust between people decreases costs of operations and encourages cooperation. Acquisition of social capital is through participation in informal networks, registered organizations, associations of various types and the social movements. Social capital plays an essential role of managing risks, shocks and opportunities, strength to

confront poverty and vulnerability, resolve disputes and valuable knowledge sharing (Adepoju *et al*., 2011).

In Siriwardana and Jayawardena (2014), farmers are benefiting mutually from the activities of the groups. A social group facilitates participants to meet and negotiate personal interests. Some members gain power and status through groups and organizations. Farmers associations reduce transaction costs, improve marketing infrastructure, reduce farm costs and facilitates the delivering of supplementary services. Similarly, Choupkova and Bjornskov (2002), note that the benefits of farmer groups include: initiating and establishing a culture of cooperation and coordination for their benefits; conducting collective actions to overcome common problems; improving resource management strategies resulting in the growth of the local market and rural economy; developing networks among members and facilitate members to share ideas and find ways for mutual supports. Farmers' groups help extension agents to improve farmers' knowledge and practical skills of agricultural technologies. Autio and Wennberg (2010) show strong group level effect on entrepreneurship while Jayawardena and Abeyrathna (2013) confirmed this in a study conducted in Sri Lanka in which the findings ascertained an important relationship between the degree of group interaction and farmers' entrepreneurial behavior.

The local institution's sustainability requires member's participation (Shah and Baporikar 2012). This promotes a sense of belonging and responsibility (Munasib and Jeffrey 2011). The social sanctions influence the conduct of participants in the irrigation, farming and economic activities. It includes the distribution and allocation of water, cropping

schedules, rituals, meetings, processes for credit and loans, membership and management activities (Albrecht *et al*., 2013).

Social networks promote co-operation, ease coordination, raise awareness of emerging technology, provide farmer-led group-based training in new practices, and maintains ties with government agencies (Pretty, 2003). It enhances technical targeting; improved local ownership; secure livelihoods; shortened period between research and adoption; increased effect on human and social capitals, joint experimentation and innovation sharing (Knox *et al*., 2004).

2.4.6.2 Opportunities and Challenges of Social Groups

Social capital helps alleviate poverty by providing helpful knowledge for disadvantaged citizens, stimulating development and redistributing revenue. There can be both blessing and scourge for social ties; moreover, their absence can contribute to a lack of vital resources. Connectedness has significant consequences for sustainable growth and the elimination of poverty as well as on the welfare of the poor by enhancing their result. It helps to increase efficiency of development programs by increasing farm production, management of common resources, sanitation, lending and education (Grootaert and Bastelaer, 2002) .

Okunmadewa, *et al.* (2005) study indicates that social assets comprising social capital include norms, values and attitudes that predispose people to cooperate with others based on trust, reciprocity and obligations. These structured networks enhance and strengthen other forms of capital. This recognition explains groups (social connections) as a

significant pre-requisite for the needy to benefit from certain programs of poverty reduction (Adepoju *et al*., 2011).

2.4.7 Institutional Support for Agribusiness Incubation

Agri-business has great potential to contribute to a variety of economic and social development processes, that is, the generation of employment, income, poverty reduction, improvements in nutrition, health and food security. Institutional support supports greater productivity growth throughout the value chain from farms, firms and distributors a sound basis for rapid economic growth and the reduction of poverty (Yumkella *et al*., 2011).

In Babu, *et al*. (2014), agribusiness plays an important role in the transformation of the farming industry in sub-Saharan Africa. The demand for high-value foods provides a chance for the manufacture and export of these goods increasingly. Enabling conditions are necessary for the sustainable agribusiness production needs and these include a stable macroeconomic environment, good public governance (functioning regulatory institutions, enforceable commercial laws and property rights), sufficient infrastructure and basic services. Historically, the agribusiness environment is characterized by the presence of a high capacity interventionist state with aggressive allocation of resources and demand management strategies. It is important for agro-enterprises to develop the industrial capability and capacity; upgrading technology and innovation in terms of product processes, strengthening managerial efficiency and cross-border cooperation for agro-processing products to be traded; improve infrastructure and energy security; promote standardization and quality management measures and create accreditation

bodies; promote institutional services and mobilize public-private agri-business cooperation. It is imperative for Africa's agribusiness sector to increase their size and competitiveness.

Furthermore, Babu *et al*. (2015) notes that the most significant challenge is to develop and improve production capacity and skills in order to address the constraints associated with the growth of efficient industries that compete in international, regional and domestic markets. The World Bank (2013) estimates that the international market, which needs ICT communication and logistics performance, is highly competitive in price and product quality. Suppliers are required to meet conformity standards and specifications expected by consumers in developed countries and by the rising middle class of emerging economies. In many African countries, new supermarkets and retail stores grow rapidly. The presence of smallholder farmers in the supply chain is a key problem and they need support to join productive value chains.

In Africa there is a general lack of public-private partnerships with limited interaction between agribusinesses and public agencies, providers of support services (e.g. suppliers of inputs, finance institutions), development partners and smallholders. This has contributed to the failure to share the costs and risks of public and private-sector operations. These include research and infrastructure development, which are crucial to accelerating agri-business development and success. The absence and weakness of partnerships result into inadequate development of value chains that are significant in minimizing poverty, generation of wealth and involvement of smallholders. This has restricted additional capital through viable supply chain partners such as agribusiness

buyers, to farmers and via contractual ties such as contract agriculture, warehouse receipts, forward contracts and lead firm financing (NEPAD, 2003).

2.4.7.1 Agribusiness Institutional Support Actors

The players in the agribusiness value chains include farmers and traders; fertilizer, pesticide and seed suppliers; rural service companies; transporters and processors; and technology and finance providers. For successful agribusiness, structured resource mobilization is required to increase the efficiency production factors such as land, labor and technology. This is done through the enhancement of expertise and know-how in fields such as administration and marketing, financial and investment capital, adoption of quality control and food safety measures, and innovative and adapted technologies.

Comparatively, the private sector owns most of the agribusiness resources and tools. UNIDO (2013b) concludes that private investors play a critical role in supporting agribusiness ventures in weak economies. They offer a variety of structured products ranging from debt to equity, address investors' varying risk and diverse market needs. Agribusiness investor services include exchanging fundamental knowledge on agribusiness and value chains, innovative funding sources and enhancing partnerships with the public sector.

According to FAO and World Bank (2013) and IFC (2013), global agriculture governance is shared among growing numbers of national and international institutions. The United Nations (UN), mainly through the Food and Agriculture Organization (FAO), defines formally international agricultural policies and guidelines and the World Trade Organization is responsible for agricultural trade policies. The World Bank and larger

regional development banks have a huge effect through their financial support on agriculture in developing countries. Transnational companies, private foundations and civil society organizations have gained control over agricultural governance over the last few decades. Following the global food crisis of 2007-2008, new organizations such as the G8 and the G20 have taken part and already agricultural institutions have become more focused on food security, rural growth, and climate.

Furthermore, the World Trade Organization governs international trade in agricultural products under the 1995 Agriculture Agreement; it sets maximum tariffs for import of agricultural products for member states; commits member states to reduce average tariffs on agricultural imports, and limits export subsidies for special circumstances. OECD countries have generally decreased subsidies linked to trade distortions, in compliance with WTO and other international organizations' guidelines and regulations, by replacing them with those deemed economically neutral, restrictive input, or production. Currently, global and regional economic integration, urbanization, privatization and the decreased position of the national governments present threats and opportunities to agro-entrepreneurs. The entrance into isolated areas of the market economics opens up opportunities to produce and develop new products. This presents major challenges in the emerging and transitional economies, which face rising rivalry and market uncertainty (Ruete, 2015).

IFAD (2012) further notes that governments and other support organizations are confronted with challenges that force them to make fundamental changes in policies, strategies, employee skills and organizational linkages in order to respond to

developments in global markets and encourage sustainable jobs in the agro-industry. Most institutions of support are inadequately familiar with the requirements of regional and foreign markets. To link a diversity of forces into a functioning agribusiness sector, appropriate institutional arrangements are required.

Kenya's Agri-Business Strategy recognises the low productivity in the Kenyan agri-business sector due to the poor management, insufficient skills, and limited access to inputs/ services. It is crucial to identify and cultivate the special roles of various actors to promote, synergize and encourage agri-business growth and its competitiveness. The government's role is, in line with the Strategy, to provide services, such as information, expansion and advisory services and to provide an environment that allows the Kenyan agribusiness sector to enhance competitiveness (institutional, legal, infrastructure, etc.). The Strategy further appreciates those farmers' organisations, in the area of marketing, training, creativity and quality standards central to farmers' mobilization. Commodity associations boost investment in their respective supply chains and improve competition by providing knowledge and ensuring that the members contribute to the implementation of the agri-business strategy (GOK, 2012).

UNIDO (2013) points to the need to develop and provide creative goods and services that address the needs and demands of small producers and actors in the value chain, including financial, insurance, savings and loan co-operative organizations, and microfinance institutions. Their services must be customized to the needs of value chain actors to access markets and increase their competitiveness. NGOs have comparative advantage and capacity in establishing alliances and market access. Recognizing the

importance of agriculture in poverty reduction on a bi-lateral and multi-lateral basis, Kenyan donors have historically a deep interest in supporting the farming sector. Bilateral and multi-lateral donors include Finland (DANIDA), Germany (GTZ), the African Development Bank, the European Commission, FAO, IFAD, WFP, UNDP, and Japan (JICA), Sweden (SIDA), USA (USAID) and the World Bank. The donors meet through the Agricultural Donor Coordination Group to coordinate and harmonize their support. The 2010 Joint Agricultural Sector Review (JASR) observe that while donors seem to be keen to coordinate and harmonize their initiatives, in practice there is substantial overlap and competition of donor projects and programs.

UNIDO (2013) explains that regulators have a regulatory climate that encourages quality assurance and product safety to increase competitiveness. Farmers need support to comply with the required standards/regulations and access markets.

The Kenyan Government of (2012) identifies the media and ICT as vital actors in the dissemination of information and the development of a modern picture of agriculture and agribusiness. To make the use of digital technology services for knowledge sharing and business management, the provision of communication technology for farmers and other actors in the value chain is important. To grow agribusiness, a large number of agents have to be mobilized in addition to the strengthening on a well-functioning institutional environment.

2.4.7.2 Institutional Support and Capacity Building

Africa suffers from lack of capacity building and growth of human capitals suited to agribusiness. Agribusiness actors are unable to neither meet diverse demands of domestic, regional and international markets nor improve the value chain capacity. As a result, growth in agribusiness is stifled by the actors' inability to meet the standards, production efficiency, viability, cost competitiveness, ability to strategically integrate and align its agribusiness policies and strategies (NEPAD, 2003).

Advances from Babu *et al*. (2015) show that the majority of small-scale farmers in Africa face a multitude of technical, institutional, and policy constraints that impede their involvement in agribusiness. The low technology adoption prevents farmers from increasing their production and reaching local markets. Agribusiness requires a favorable policy climate and increased private sector innovations. In order to enhance the capacity for agribusiness, education and training must correspond to the context specific needs of the sector in order to support agricultural transformation and overall economic growth (Babu and Blom, 2014; World Bank 2013).

Babu (2015) posits that several systems-level skills are needed to establish and effectively enforce policies and programs supporting the growth of agribusiness in Sub-Saharan Africa, that is, technology innovation, markets, institutions and policies. The policy mechanism must be able to recognize challenges and opportunities for agri-business growth. The system is expected to reinforce the ties between farm researchers, expanding companies and producers at the production; reinforce and encourage cooperation at the market level between government and public research institutions in order to facilitate innovation; and participatory mechanisms should be developed under

the policy framework. While the poor performance of the agribusiness in Africa is associated with the limited capacities between agro-enterprise institutions and individuals in the sector, it should be noted that increasing agribusiness output creates demand for relevant capacity building activities that establish a dual causality between the supply and demand for the agribusiness capacity.

For farmers in emerging economies, production technology remains a major challenge. The capacity of farmers to adapt to the internal and external market systems remains restricted and the competitiveness of small farmers on the world markets is further reduced (ACET, 2014). Given the subsistence nature of agriculture, progress towards agribusiness growth needs raising farmers' entrepreneurial capacity (Yumkella *et al*., 2011). While farmers are being increasingly recognized in Sub-Saharan Africa as a major contributor to agricultural transformation, the connection to innovation systems remains small. Institutional advances are therefore critical to improve the coordination of particular value chains horizontally and vertically (Yumkella *et al*., 2011; Babu *et al*., 2015).

2.4.7.3 Institutional Support and Agribusiness Inputs

Agricultural inputs are significant components of the agribusiness value chain and yet the use of inputs is limited with serious implications on agricultural productivity and the availability of raw materials for agro-industrial processing. For example the agrochemical use in African agriculture is very poor in comparison with other developing regions (Yumkella *et al*., 2011).

In Kenya the gaps in yield are driven by factors such as limited and/or delayed seed access, weak farming practices, low mechanization, severe post-harvest losses and rising climate-change uncertainty. Ali-Olubandwa *et al*. (2011) points to the lack of technical know-how about improved agricultural practices among farmers in West Kenya attributed to the high extension personnel to farmers ratio, limited transport and funding for extension services. As a result, western province has small farmers with no demand and technological information to compete with the many traders who have flooded the market. There are poor links between researchers, extension staff and farmers, and thus knowledge about new and improved technologies is lacking. The use of uncertified seed, late planting, lack of funds, and varied range of seeds in the market.

The World Bank (2013) concludes that farm inputs must be available, affordable, accessible and of high quality for agriculture to be prosperous. The improvement of the productiveness and income of small-scale farmers in developing countries relies on the access to seeds, fertilizers and agro-chemicals. On the contrary, AGRA (2013) and FAO (2013), observe that agro-dealers have set high prices, maximized profit and yet failed to realize the anticipated returns on investments and hence reduced their ability and incentives to reinvest in the next season. The decline in agribusiness profitability prevents input suppliers from engaging with other stakeholders in building the long-term ties required to reverse this trend.

2.5 Literature Review Gap

Despite the growing number of studies in agribusiness, these studies are more focused on the value chain single challenges and opportunities within agribusiness practice. There

exists limited literature that acknowledges the agro-based smallholder household vulnerability contexts in terms of the available and context-specific capital resources (bottom-up approach). Several studies utilize the value chain approach (Kamau and Wanjala, 2017; Kamau, 2018; and Simiyu, 2014) that is, maize production as opposed to this study's broad base that examines the interrelated capitals crucial in crop value chains from the farm to the fork. The existing literature does not adequately address the gaps in institutional support from the various stakeholders who are a crucial component in the agribusiness incubation process.

Most studies in Bungoma (Nyale *et al*, 2019; Wekesa *et al*, 2018; and Wabwoba *et al*, 2017) associate agriculture productivity to food security as opposed to market supply and overall livelihood security. Further, the utility of a multi-dimensional theoretical lens is crucial in addressing the gaps in agribusiness uptake as adopted by this study. The agribusiness context is in most cases generalized negating the contextual variances within African economies and in this case between sub-counties in Kenya. Gaps exist in examining the potential role of varied institutional support in mediating the agribusiness capitals to attain livelihood security that this study aims to fulfill.

2.6 Conceptual Framework

The conceptual framework in Figure 2.3 portrays the relationship between agribusiness incubation, institutional support and livelihood security. The study modified the DFID Livelihood Framework model into the conceptual framework. Capitals for agribusiness incubation are the stock of resources on which households draw to generate income from agribusiness, meet the basic needs, manage risk, and cope with stresses and shocks

associated with agribusiness practice. The assumption made is that a larger asset base translates into greater agribusiness productivity, competitiveness, opportunities and consequent livelihood security. Appropriate agribusiness incubation entry point depends on the position of households on the livelihood pathway, in this case, the state/level of agribusiness capitals. In this study, the household's agribusiness uptake depends on the livelihood capitals/assets (physical, financial and social) crucial to up scaling agribusiness performance. Agribusiness incubation has the potential to strengthen and facilitate linkages between households and acts as a conduit for the exchange of information, technology, products, inputs and business-oriented values in ways that can push poor households out of poverty traps. Agribusiness incubation compensates for unique, high-risk agricultural conditions and high price variability in agribusiness markets. Institutional support mediates the agribusiness incubation capital and livelihood security, it entails the agency interventions to induce agribusiness uptake and performance that ultimately translates into enhanced agricultural productivity, product competitiveness and market linkages. Institutional support connotes the mediating variable, that is, agency intervention to mobilize for the optimal utilization of the agribusiness resources to enhance agribusiness productivity and competitiveness. These agencies include the government, non-governmental organizations, private and farmer organizations.

Ultimately, livelihood security is the envisioned livelihood outcome and it refers to the secure ownership and access to resources and income-earning opportunities to offset risks ease shocks and meet contingencies of the agro entrepreneurs. Livelihood security counters poverty, social exclusion, isolation, vulnerability and insecurity that constrain

households from taking risks associated with agribusiness that could lead them out of poverty. The inability to protect households from income and asset shocks result in long term consequences through reduced investments in health, nutrition, education among other livelihood needs.

Independent Variable

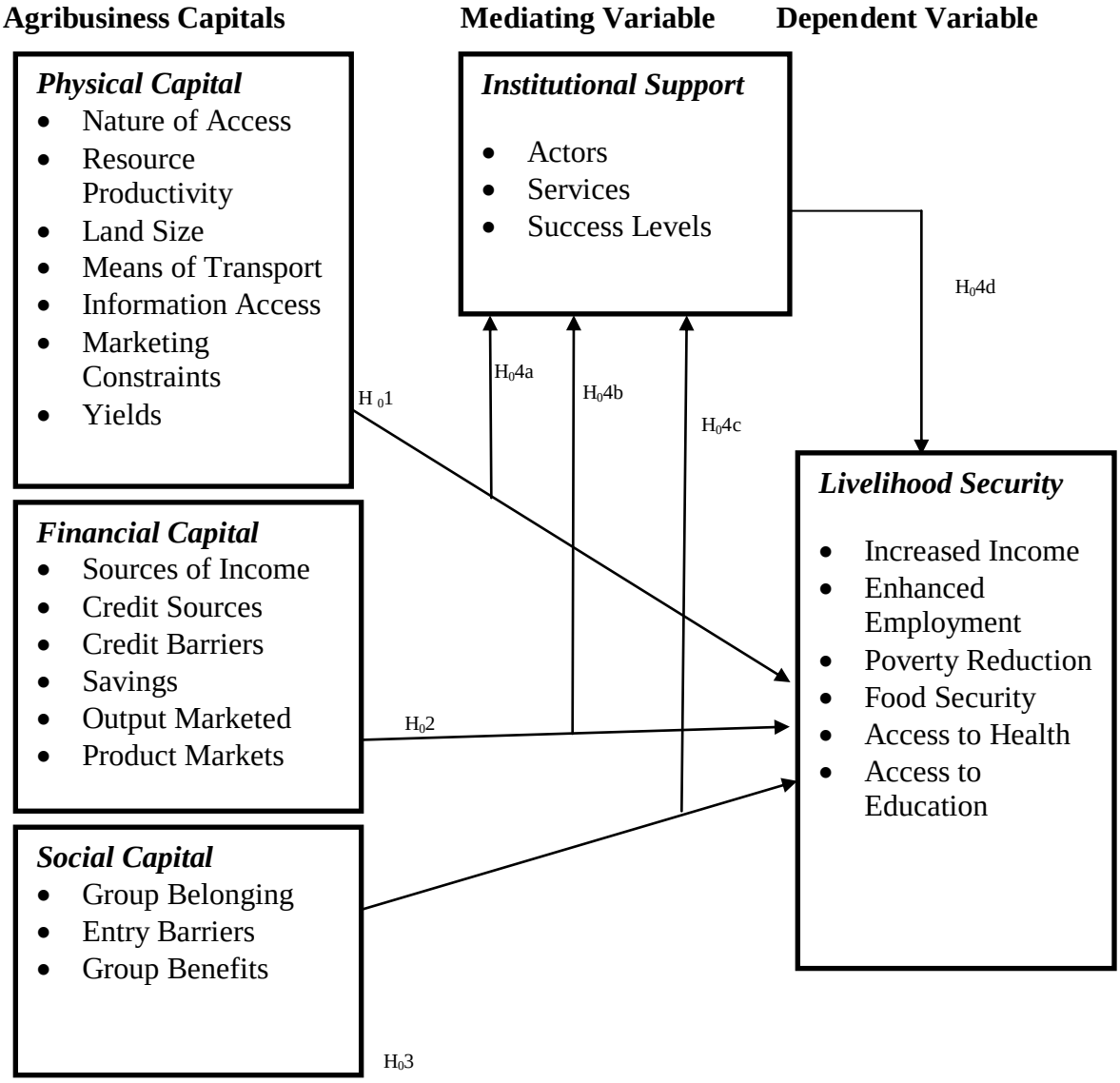

Figure 2.3: The Conceptual Model of Agribusiness Incubation, Institutional Support and Livelihood Security

Source: Researcher, 2020

The direct effect (agribusiness incubation capitals to livelihood security flow) is represented as $H_0$1, $H_0$2 and $H_0$3 while the indirect effect (agribusiness incubation

capitals, institutional support to livelihood security flow) is represented as $H_0$4a, $H_0$4b and $H_0$4c, whereby the institutional support is a mediator variable.

2.7 Chapter Summary

Agribusiness incubation relies upon the ownership and access to local agribusiness capital, the institutional environment that informs the extent of agribusiness uptake that ultimately transforms into livelihood security. Through these, a window is guaranteed for agribusiness oriented households' empowerment to provide high quality, sustainable production with expanded market destinations. The study is unique and multi-dimensional in attacking the livelihood challenge through the review of factors that determine agribusiness performance and its combined use of theoretical approaches in addressing the livelihood menace. The modernization and neoliberal affirm the need for market-oriented strategies of high-value products as demanded in the competitive global market. The adoption of the DFID livelihood model is aligned with the need for an asset-based approach to development. The reviewed literature acknowledges the growth gap in the physical, financial and social capitals that has made the attainment of livelihood security elusive in agriculture-dependent economies. The strengthening of the agribusiness capitals is a significant pre requisite for the households to exit poverty. For successful agribusiness, structured resource mobilization is required to increase the efficiency of production factors such as land, labor and technology. This study is enriched by the knowledge of the household asset base that affects the agro-entrepreneurs ability to translate their comparative advantage into competitive advantage in order to secure their livelihoods.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Overview

This chapter presents the procedure used in conducting the study. The chapter describes the study area, the adopted philosophical paradigm, research approach, design, the target population, sampling size, sampling techniques, data sources, data collection instruments, methods of data analysis, reliability and validity of research instruments, ethical considerations and chapter summary.

3.2 The Study Area

Bungoma County is one of the 47 counties in the Republic of Kenya that highly depends on agriculture. The County borders Kakamega on the Eastern side, Busia County on the western side and Trans Nzoia County on the northern side. The County lies along the Trans-African Highway that joins Kenya and Uganda with a population of nearly 1.5 million. Bungoma County is located on the Southern slopes of Mt. Elgon and lies between latitude $0^0$28` and latitude $1^0$30` North of the equator, and longitude $34^0$20` East and $35^0$ 15` East of the Greenwich Meridian. The County's climate favours agriculture as temperature ranges between a minimum of 15 degrees with an upper maximum of 30 degrees centigrade with an average rainfall of 1500 mm. It is regarded as a highly agricultural County able to produce significant amounts of the Nation's food stock, because of its favourable climate. The County also hosts Chwele, the second largest open-air market in East Africa after Karatina. The majority of Chwele's food items are

produced in Mt. Elgon and supplied to various parts of East Africa (CIDP Bungoma County, 2013).

The upper highlands (UH), lower highlands (LH), upper midlands (UM) and lower midlands are the major agro-ecological zones (LM). The area of food crops in the county is 201,655 ha, while that of non-food crops is 86,423 ha. Maize, beans, millet, sweet potatoes, bananas, Irish potatoes and a wide variety of vegetables are the major food crops. The industrial crops include sugarcane, cotton, palm oil, coffee, sunflower and tobacco. After Trans Nzoia, Uasin Gishu and Nakuru counties, Bungoma is the 4th largest producer of maize and beans (Bungoma County CIDP, 2013).

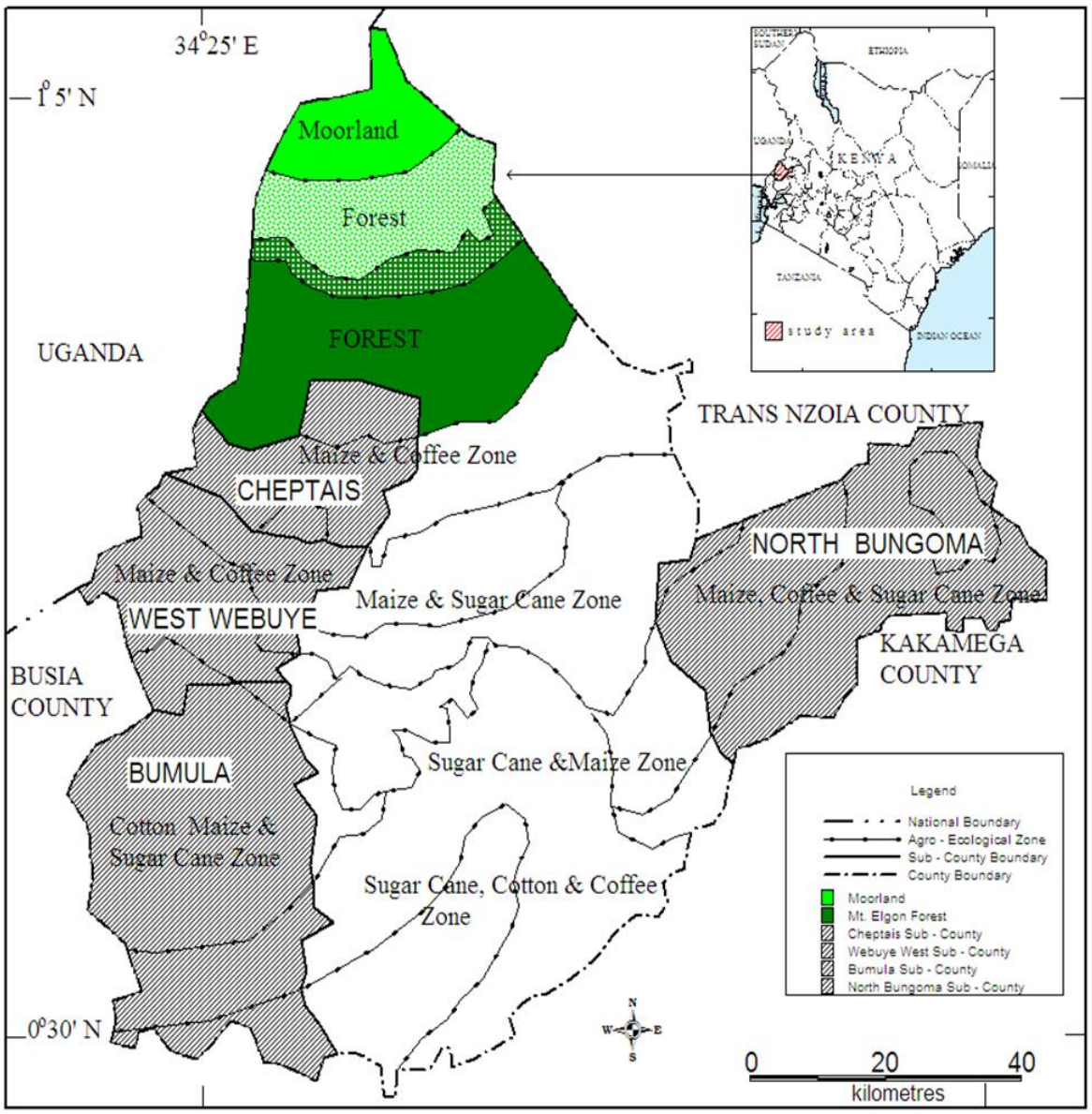

Figure 3.1: Map of Bungoma County showing Agro – Ecological Zone.

Moi University Geography and Environmental Studies Department GIS Lab.

3.3 Philosophical Paradigm

This study adopted the pragmatic philosophical paradigm that embraces mixed methods of research (Tashakori and Teddlie, 2003). The focus is on the consequences of research, on the primary importance of the question asked rather than the methods. Pragmatism is

pluralistic and oriented towards what works and practice. The approach combines deductive and inductive thinking, as the researcher mixes both qualitative and quantitative data (Cresswell and Clark, 2007).

The pragmatic worldview was relevant to the study, since it allowed the collection of qualitative method through the use of key informant interviews and focus group discussions, to listen to people and determine the existing situations. In addition, the quantitative methods through the use of sets of questionnaires for collecting and analyzing relevant data to find solutions to the investigated problem which was the assessment of agribusiness incubation, institutional support, and its implication on livelihood security in Bungoma County, Kenya.

3.4 Research Approach

The study employed a mixed-method approach. By mixing the datasets, this study provides a better understanding of the challenge of sustaining rural livelihoods in Bungoma County than if either dataset had been used alone. Mixed methods research provides strengths that offset the weaknesses of both quantitative and qualitative research (Cresswell and Clark, 2007). The study acknowledges that there are drawbacks to all methods; biases inherent in any particular method may neutralize or cancel other methods' biases. In order to provide a detailed overview of the research issue, this study used simultaneous procedures to combine quantitative and qualitative data. In this design, during the analysis, the investigator collected both types of data at the same time and then incorporated the information into the overall outcome interpretation. In order to examine

various questions or levels or units in a household or group, the researcher nested one type of data within another, larger data collection technique.

3.5 Research Design

The study adopted the concurrent triangulation, informed by the mixed method approach. This design was found appropriate since it attempts to describe a more complete understanding of the agribusiness ecosystem. Creswell and Clark, (2011) assert that concurrent triangulation design allows cross-validation or corroboration of findings, provides well-validated and substantiated findings compared to other designs and data collection takes less time.

3.6 Target Population

The target population in the study comprised of all the households in the five sub-counties in Bungoma County which include: Webuye West, Cheptais, Kanduyi, Bungoma North and Bumula Sub Counties with 194,613 households. The study population included households, government officials and representatives from private and non-governmental organizations.

3.7 Sample Size and Sampling Procedures

The sample size is a group of subjects selected from the general population and is considered representative of the real population for the study. The sampling procedure is a process or technique of choosing a sub group from a population to participate in the study. The individuals selected represent the large group from which they were selected**.**

3.7.1 Sample Size

This study applied the simplified formula for determining a sample size according to Yamane (1973) which applies due to the availability of knowledge on the sample size. According to the KNBS (2019), the 5 selected sub-counties: Bumula, Cheptais, Kanduyi, Webuye West and Bungoma North have a total of 194,613 households.

The Yamane (1973) formula was used to calculate the sample size from the population considering 95 % confidence level and at p = 0.5. Size of the sample was calculated as follows:

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

Where,

N is the population size

e is the level of precision.

This formula was used for the population, in which N = 194,613 with ±5% precision. Assuming 95% confidence level and p =0.5, the sample size was as follows

$$n = \frac{194613}{1+194613(0.05)^{2}}$$

$$n = 399$$

A sample size of 399 was proportionately divided based on the number of households among the five selected sub-counties as shown in Table 3.1

Table 3.1: ***Sample Size by Sub Counties***

Selected Sub County	**No. of households per sub-county**	**Sample Size Per Sub County**	**Wards in Sub Counties**	**Households per Ward**
Cheptais	26,326	54	Cheptais, Chesikaki, Chepyuk, Kapkateny	18
Bumula	44,954	92	Bumula, Khasoko, Kabula, Kimaeti, South Bukusu, Siboti	13
Kanduyi	69,151	142	Marakaru/Tuuti, Khalaba, Bukembe West, Bukembe East, Musikoma, West Sangalo, East Sangalo, Township	16
Webuye West	32,839	67	Misikhu, Sitikho, Matulo, Bokoli	17
Bungoma North	21,243	44	Mbakalo, Naitiri/Kabuyefwe, Milima, Ndalu/Tabani, Tongaren, Soysambu/Mitua	7
Total	194,613	399		

Source: Researcher, 2020

3.7.2 Sampling Procedures

The study applied purposive sampling, simple random sampling and systematic sampling.

3.7.2.1 Purposive Sampling

Purposive sampling was employed to select the key informants for the study based on the purpose of the study, knowledge, experience and the researchers own judgment, and they were selected based on their in-depth information. 14 key informants were selected. Purposive sampling was used to identify key informants, that is, the 5 sub-county agribusiness officers, lead person from Mabanga research institute, ASDSP, NARGP, NALEP, NARIC, agribusiness NGO (CREADIS), Chwele market and 5 agro-processing industries.

The information gathered from the key informants was used to synchronize with data gathered from the households. The study population was selected from households in Bungoma County. There are 10 sub-counties in Bungoma County namely Bumula, Kabuchai, Webuye West, Webuye East, Bungoma North, Kanduyi, Cheptais, Mt. Elgon, Kimilili, Sirisia. Purposive sampling was applied to select 5 sub-counties based on the agro-ecological representation, that is, the study identified Bumula, Webuye West, Bungoma North, Cheptais and Kanduyi sub-counties.

3.7.2.2 Simple Random Sampling

Simple random sampling was applied in the selection of the households which is the unit of analysis. The study respondents within the selected units were household heads. A sample of 399 households in the five sub-counties was deemed appropriate. Simple random sampling was applied in selecting a proportionate sample of households in each ward within the 5 selected sub-counties.

3.7.2.3 Systematic Random Sampling

The first household was selected randomly in a specific ward, and then every subsequent 10^{th} household was selected for the interviews. In this study, a homestead arrangement was considered as one household to overcome errors of duplication of responses due to similarities among households in one homestead.

3.8 Data Sources

The study applied both the primary and secondary data sources.

3.8.1 Secondary Data Sources

Books, journals, reports and internet documents were used as secondary sources of data supporting or supplementing the empirical findings of the study. Published literature on livelihoods and agribusiness development was used. This involved the retrieval of published reports from libraries and documentation centers in Kenya. The main secondary sources utilized include books, research reports, policy documents and journal articles, theses and dissertations. This data added to the knowledge of sustainable livelihoods and agribusiness incubation.

3.8.2 Primary Sources

Primary data on agribusiness technology incubation, institutional support and rural livelihood security was collected. This was done through the collection of information from households and key informants. The collected information complemented the

secondary data. Key informant interviews were administered to elicit data that served to confirm some of the information collected from the household heads.

3.9 Data Collection Instruments and Procedures

The data collection instruments included: Questionnaires, in-depth interviews, field observation, focus group discussions and document analysis. The researcher was concerned with the knowledge, skills, decisions and consequent behaviors of the respondents. This information was best collected using the selected instruments as advocated by Canvery *et al*., (2007) and; Oso and Onen, (2005).

3.9.1 Questionnaires

Questionnaires were the main instruments for administering all the research questions to the household heads. Closed-ended questionnaires were used to collect information from 399 households. Questionnaires were administered to the sampled household heads in Bumula, Webuye West, Bungoma North, Kanduyi and Mt Elgon sub Counties. The questionnaire was useful in gathering data from household heads on the agribusiness capitals, the agency support and implications on livelihood security for the households within the five sub-counties in Bungoma County. The questionnaires were administered by the researcher to the respondents in their private setting.

3.9.2 Interview Schedules

Key informants for qualitative evaluation were chosen from the five sub-counties. Semi-structured interviews were used in key informant interviews to direct the process of the

interview. In a normal and comfortable situation, the interviews were performed and the interview process was kept flexible and open. The interviews explored the institutional efforts by a variety of institutional agencies towards ensuring livelihood security through agribusiness incubation. The key informants were selected based on working experience with the households and knowledge of the study area.

Through the semi structured interviews, the study took advantage of the respondents' long-term knowledge on the various alternatives adopted to transform livelihoods and in the process explored the place of agribusiness incubation. The key informants included the 5 sub-county agribusiness officers, 2 crop officers, 3 SACCO officials, 3 Cooperative officials and 4 non-governmental organization leaders, 3 Ministry of Agriculture Programme officers.

3.9.3 Focus Group Discussions (FGDs)

Five focus group discussions were conducted each comprising of 8 to 10 participants in the five selected sub counties in different days. That comprised of representatives of farmers (small scale and large scale); women and youth groups, faith-based organizations; opinion leaders and businessmen. Gathering information from FGD is useful in comparing perceptions and priorities. The views of the representatives provided relevant information needed to intercept the growth gaps and provide entry points for intervention. The information collected from the focus group discussions complemented the data collected from questionnaires and key informants interviews.

3.9.4 Document Analysis

Documents written objectively on agribusiness incubation, institutional support and livelihood security were reviewed and analyzed. Secondary data was obtained through the review of relevant information from journals, reports, websites and books. The information was relevant in the identification of the knowledge gaps and was used to supplement data that was collected through the questionnaires, key informant interviews and the focus group discussions.

3.9.5 Observation

Observation is an effective data collection technique when the data is deemed sensitive and when a high degree of reliability and accuracy is required (Kothari, 2004). Throughout the field survey, the direct observation was conducted with the details noted in a diary and photographs taken with permission where appropriate. During discussions with the respondents and main informants, field observations were noted (Werner, 1993). The researcher spent a considerable amount of time studying the relationship of households with the market, as well as the commodity, the dealers, the consumers, the kinds of technologies used, the assets retained. Participatory observation, direct observation and special observation, together with a checklist, were used in this study to achieve validity, confirmation and cross-checking.

3.9.6 Pilot study

Orodho (2008) argues that a pilot study is a small scale study of the bigger version that comprises all activities done during the real study. Pilot testing of the tools, that is, the questionnaires and interview schedules were conducted in Vihiga County and the pre-field analysis took place in one week before fieldwork to help enhance clarity, remove ambiguity from the instruments and reframe the tools of the study. The reliability was tested at 0.75 which confirmed the tools reliable for the study**.**

3.10 Methods of Data Analysis and Presentation

The data collected was cleaned and the questionnaires were immediately coded from the field based on the objectives of the analysis. This editing verified whether replies, accuracy and relevance to the goals were complete and logical. Errors or omissions were corrected in the completed items of the questionnaires. The answers from the interview schedules, the observation schedules and the review of the related documents were coded according to the intensity of the reference by assigning them to similar categories and themes in the questionnaires. The responses were interpreted on the basis of the accuracy of the evidence and logical themes that were adduced them. During data processing, descriptive and inferential statistics were used on each objective set using the computer package-Statistical Package for Social Sciences- (SPSS version 23). Frequencies and percentages were calculated for descriptive statistics. The chi-square test, analysis of variance, logistic regression was used for inferential statistics in order to test the importance of relationships between variables.

3.10.1 Analysis of Variance

Analysis of Variance (ANOVA) as a statistical technique was used to analyze the variance to which the response was subject to its various components corresponding to the sources of variation identified. To test the equality of the sample means of two categories of households, an F test at 90% confidence level was used. ANOVA assesses potential differences in a scale-level dependent variable by a nominal-level variable having 2 or more categories. ANOVA was used to determine whether there was any statistical significant difference between the mean ratings of market constraints within the five selected sub-counties. In this study, ANOVA results indicated statistically significant differences for some of the items; in addition the Scheffe post hoc analysis for multiple comparisons (Table 4.4) was conducted to determine which means differ from each other in the five selected sub-counties in the study area.

3.10.2 Chi Square

For evaluating relations between categorical variables, the Chi Square statistic is widely used. The null hypothesis of the Chi-Square test is that the categorical variables in the population have no relationship; they are separate. To conclude the hypothesis with 95% certainty, the value of the assumed significance labeled (which is the p-value of the Chi-Square statistic) should be less than 0.05. (Which is the alpha level associated with a 95 percent confidence level). If the *p*-value is less than 0.05 the conclusion made is that the variables are not independent of each other and that there is a statistical relationship between the categorical variables.

In this study, chi-square was used to test whether there was a relationship between land ownership and resource productivity; agribusiness institutional support and (resource productivity, size of the land, factors limiting agribusiness production; additional agribusiness services provided by a financial institution, impact on membership benefits). Besides, it was used to test whether gender, education and income played a significant role in determining social group belongingness. It was also used to establish the correlation among the sources of income. The method was applied on all the independent variables.

3.10.3 Logit Regression

The study met the Logistic Regression Specification Tests as indicated in Appendix X. The logistic regression was used to predict a categorical (generally dichotomous) variable from a collection of predictor variables. It is often chosen if combinations of continuous and categorical variables are the predictor variables. The projected dependent variable for logistic regression depends on the likelihood that a given topic will be in one of the categories (for example, the probability that one is a member of a social group or not).

The study considered a bivariate logistic regression, using the membership to a social group as the dichotomous criterion variable and associated benefits as predictor variables. Membership to a social group was coded = 1, non-membership to social group = 0. The regression model predicts the logit, that is, the natural log of the odds of having made one or the other decision.

That is, P (Event) = $\frac{1}{1+e^{-z}}$ (ẏ) where

$$\dot{y}=b_0 +b_1x_1$$

Where ẏ, is the predicted probability of the event which is coded with 1 (membership to a social group) rather than with 0 (not a member of a social group)

The model had three predictor variables: The general logistic model was in the form of;

$$Y=b_0 +b_1x_1+ b_2x_{2+\ldots\ldots} b_nx_n$$

$$\text{logit (y)= natural log(odds)} = \ln\left(\frac{\pi}{1-\pi}\right)= Z=b_0 +b_1x_1$$

3.10.4 Principal Component Analysis (PCA)

Principal Component Analysis is applied in the selection of key components with effect on optimizing the association between data and its prediction. Thus, by removing the weaker components, that is, those with low variance, the data size is reduced ((Lever *et al*., 2017). In this study, there were 10 items on agribusiness support services provided by various stakeholders. Principal Component Analysis (PCA) was used to eliminate those items that had a low variance to sustain items that captured most of the variability among the services being provided. This minimized the loss of data and recognized new causes of greater significance.

3.10.5 Partial Least Squares Structural Equation Modelling.

PLS-SEM estimates partial model structures by combining principal components analysis with ordinary least squares regressions (Mateos-Aparicio, 2011). PLS-SEM is referred to as variance-based, as it accounts for the total variance and uses the total variance to

estimate parameters (Hair *et al*.,2017b).By integrating principal components analysis with ordinary least square regressions, PLS-SEM estimates partial model structures (Mateos-Aparicio, 2011). PLS-SEM is referred to as variance-based, as the total variance is used for estimating parameters (Hair *et al*., 2017).

The study adopted the SMART PLS 3 software to establish the existing relationship between key latent variables that affect livelihood security using the partial least square structural equation (PLS-SEM) modelling method. The path model's analysis consists of the structural model and the measurement models. While developing the path model, the sequence of the constructs and the relationships between them were observed to ensure that they represent the hypotheses and their relationship to the theory being tested. Exogenous latent variables only have arrows that point out of them and never have arrows pointing into them. Constructs considered dependent in a structural model (i.e., those that have an arrow pointing into them) often are called endogenous latent variables and are on the right side of the structural model.

This modelling approach leads to more parsimony and reduces model complexity. Physical capital, financial capital and social capital were considered to consist of various constructs that contribute to livelihood security. Hierarchical component model (HCM) was used in order to reduce the number of relationships in the structural model, making the PLS path model more parsimonious and easier to grasp.

3.11 Reliability and Validity of Research Instruments

In this study, the need to test the content and construct validity of the research instruments was inevitable. Gay and Airasia, (2000) defines the reliability of the research instruments as the degree to which an instrument consistently measures whatever it is supposed to measure. In the present study, the test-retest method was employed where data was collected from Vihiga County and the obtained data were subjected to Pearson Moment Statistical analysis.

For this study, three forms of the validity of the designed and developed instruments were conducted. These were face validity which normally, refers to "the degree to which an instrument appears to measure what it claims to measure" (Gay and Airasia, 2000). This validity was used in this study to find and establish the correctness of the research instruments. Content validity is normally used to establish to what degree the designed instrument measures an intended content area. In this study, content validity was used to determine whether the designed items were relevant and focused on the expected content. This was done by consulting lecturers in the Department of Development Studies and the university appointed supervisors. In the case of construct validity which focuses on the design of the research instruments, it was used to determine and establish the perfectness of the designed instruments. This was done by consulting experienced researchers, specialist research instrument design and statisticians. The study utilized the Cronbach's Alpha reliability analysis and the discriminant validity- Fornell-Larcker criterion as indicated in Appendix XI , XII and XIII.

The purpose of validation was to ensure the tools measure trustworthiness, credibility, transferability, confirmability and dependability to provide accurate, relevant and reliable data/information.

3.12 Ethical Considerations

The study upheld the rights of the study population's anonymity and absolute confidentiality. Informed consent before data collection was critical for the study as well as the voluntary participation and freedom to discontinue from the interview/discussion. The researcher was cautious enough to ascertain and explain beforehand the absence of any known risk or benefit and assurance of protection from harm. Commitment to objectivity, originality, integrity and good faith in the conduct of the inquiry was central to the study. Appropriate citations and references were reflected including a research declaration by the researcher was embedded in the questionnaires administered for the benefit of the respondents.

Permission to carry out research was sought from relevant authorities like obtaining a clearance letter from Moi University authorizing the researcher to proceed for field work and research permit from NACOSTI for permission to participate in the fieldwork activity.

3.13 Chapter Summary

Bungoma County, the study area, highly depends on agriculture. The pragmatic worldview was relevant to the study, since it allowed the collection of qualitative and quantitative data through the use of key informant interviews, focus group discussions,

questionnaires, observation, document analysis and photography. The choice of the concurrent triangulation design was informed by the mixed method approach. This design was found appropriate since it attempts to describe a more complete understanding of the agribusiness ecosystem. The target population in the study comprised of all the households in the five sub-counties in Bungoma County which include: Webuye West, Cheptais, Kanduyi, Bungoma North and Bumula Sub Counties with 194,613 households. The study applied purposive sampling, simple random sampling and systematic sampling. Frequencies and percentages were calculated for descriptive statistics. The chi-square test, analysis of variance, logistic regression was used for inferential statistics in order to test the importance of relationships between variables. Validation was done to ensure the tools measure trustworthiness, credibility, transferability, confirmability and dependability to provide accurate, relevant and reliable data/information. The study equally upheld ethical considerations.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Overview

This chapter entails data presentation, analysis, and interpretations based on the research objectives. The broad objective of the study was to assess the relationship between agribusiness incubation, institutional support and livelihood security in Bungoma County in Kenya.

The specific research objectives that provided the field study framework were to;

i. Examine the effect of physical capital for agribusiness incubation on livelihood security.
ii. Determine the impact of financial capital for agribusiness incubation on livelihood security.
iii. Assess the influence of social capital for agribusiness incubation on livelihood security.
iv. Analyze the influence of institutional support on agribusiness incubation capitals and livelihood security.

4.2 The Response Rate

According to Hair *et al*. (2010), the response rate in survey study is a significant concern because it ensures the questionnaires collected are valid for data analysis. In this study, a total number of 399 questionnaires were distributed to 54 households in Cheptais, 92 households in Bumula, 142 households in Kanduyi, 67 households in Webuye West and

44 households in Bungoma North sub-counties. 378 questionnaires out of 399 distributed were retrieved. Therefore, this makes the response rate of 94.7 % though; out of the 378 collected questionnaires, 11 questionnaires were excluded from the analysis due to incompleteness and problems of outliers as explained in Table 4.1 which implies that only 367 (92%) were found to be useful for further analysis. This high response rate greatly contributed to the overall success of the field study.

Table 4.1 ***Response Rate***

No	Response	Frequency	Per cent (%)
1.	No. of distributed questionnaires	399	100
2.	Questionnaires retrieved	378	94.7
3.	Unusable questionnaires	11	2.86
	Incomplete and ineligibility	7	1.82
	Univariate and a multivariate	4	1.04
4.	Returned and usable questionnaires	367	92

Source: Researcher, 2020

4.3 Preliminary Analyses Tests

There are several steps required to prepare data ready for analysis. These include data coding, screening, missing value check and the assessment of outliers.

4.3.1. Data Coding and Screening

According to Tabachnick and Fidell guidelines, the survey data was screened for many possible problems about missing data (2013). No one can overemphasize the importance

of the data screening in any data analysis process, especially quantitative studies, because it provides the excellent basis for a significant result. The quality of the production and analysis depends on the quality of the preliminary data monitoring (Hair *et al*., 2010). The questionnaires returned (367) that were completed were entered into the SPSS v23 variable view page. Every item/question was being coded and called in the same latent format, based on its major variable initials. Questionnaires left blank or lacking substantial numbers were discarded and were not included in the study.

4.3.2. Missing Value Check

Due to the effect of missing data in the study, measures were taken by the researcher to avoid the issue of missing data right from the data collection field to reduce the incidence (Hayes, 2012; Hair *et al*., 2010). Upon receipt, each questionnaire was carefully reviewed to make sure that all questions were answered properly. The variables with missing values were ignored and retained since they had missing values of 5% or fewer of the cases as indicated by Tabachnick & Fidell,(2013).

4.3.3 Assessment of Outliers

Further data screening included the treatment and evaluation of outliers. Outliers are extreme data set scores or values that can have a substantial effect on the research and the study outcome (Hair *et al*., 2010). The existence of outliers in a data set for regression-based analysis will seriously mislead the regression coefficient estimates and lead to inaccurate results (Verardi and Croux, 2008). In this analysis, two forms of outliers were assessed: univariate and multivariate. Univariate outliers can be identified by either standardized values (Z score) or by using frequency distribution tables, including

histograms, plots of boxes and normal likelihood plots. The analysis uses a standardized threshold of variable values (z-scores) greater than 3.0 and less than -3.0, which Tabachnick and Fidel (2013) consider to be outliers. Using standardized values as possible univariate outliers, a total of 4 cases were thus identified. Univariate outliers were removed from the dataset because the precision of the data analysis methodology may be affected.

4.4 Household Demographic Profile

Demographic statistics profoundly affect how important decisions are made. Demographics comprise an array of socioeconomic information, including the gender, age and marital status, level of education, income and number of people in the household which provides an aggregate picture of a population.

4.4.1 Age of Household Heads

The age of the household head has an implication on the decision making and investment capacity in agribusiness**.**

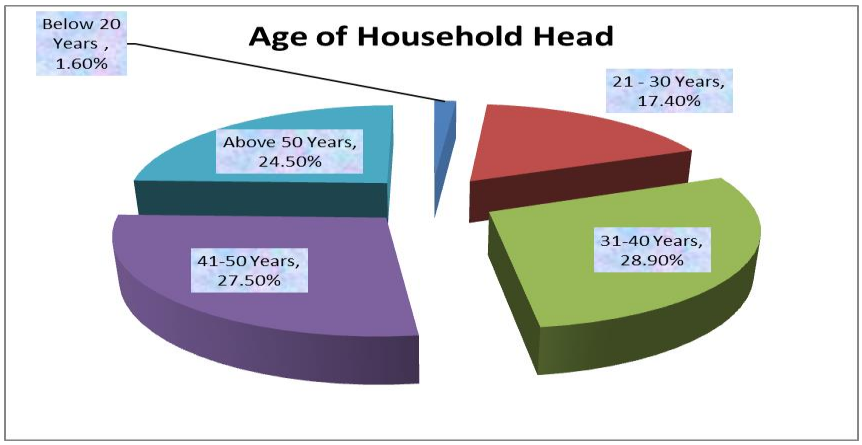

Figure 4: 1 Age of the Household Heads

Source: Researcher 2020

The study findings revealed that the ages of household heads below 20 years were 6 (1.6%); 21 to 30 years were 64(17.4%), 31 to 40 years were 106(28.9%), 41 to 50 years were 101 (27.5%) and above 50 years were 90 (24.5%). This implies that the majority of the household heads belong to the productive age category. This means the household heads can engage in longer labour hours resulting in more productive and competitive agribusiness. If this scenario informs their investment decisions they would invest more in agribusiness in anticipation of more output and income to support the young and elderly populations. Most of the population in Bungoma is youthful but on the contrary, a key informant revealed that the youths have a negative attitude towards agribusiness and agriculture, generally viewed as old fashioned and dirty, and they tend to prefer being engaged in white-collar jobs denying agriculture sector the youthful energy.

A study by Ngeywo, *et al*. (2015) on the influence of gender, age, marital status and farm size on coffee production in Kisii County observed that age is a key factor in the adoption

rate of technologies and performance, younger people tend to adjust faster and well to new technologies than the elderly who are conservative.

4.4.2 Gender of the Household Heads

Gender is a crucial determinant of the level of participation, investment and decision making on the agribusiness value chains. Nature of society has pre-assigned roles for men and women in the agribusiness process. A research by Crossley *et al*. (2009) states that women have a high burden on their farms, such as weeding crops and generally have little say on economic decisions within the family.

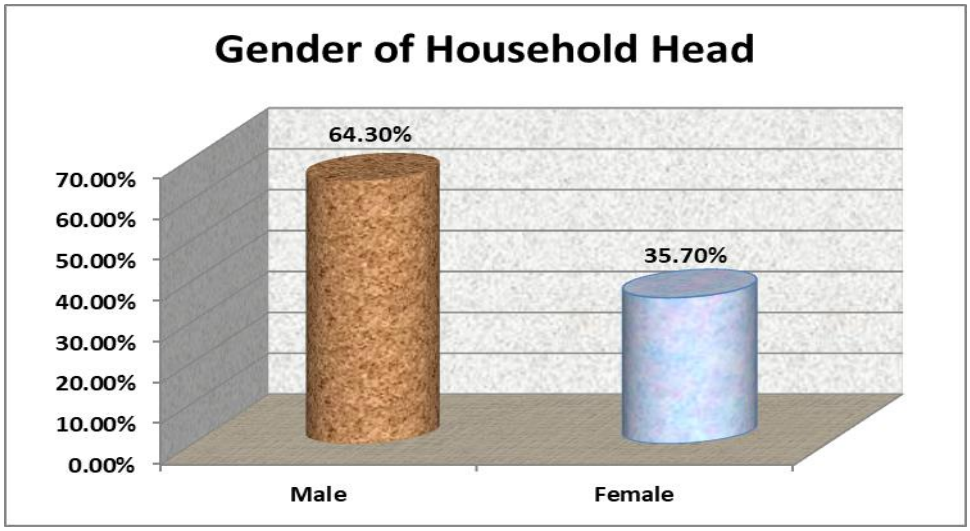

Figure 4:2: Gender of the Household Heads

Source: Researcher 2020

The findings show that there are more male-headed households at 236 (64.3%) than the number of female-headed households at 131 (35.7%). Being a patriarchal society, men are the decision-makers in the community. A key informant in Kanduyi revealed that generally, men have greater access and control over incomes and productive assets

resulting in positive implications on the agribusiness productivity and returns that translate into improved livelihoods. In Bungoma, though women are the major participants in agriculture in terms of labour provision, organization of the production process and main sellers of agro products in the market, they are not the main decision-makers at the household level and experience limited access to productive resources.

Auma *et al.* (2010), study by comparison of male-female headed households and agriculture production in marginal areas observed that female heads of households were significantly less educated, owned or cultivated smaller farms, used less family labor in comparison with male-headed families. Female-headed households were less efficient, producing nearly half of male household production and disposing off produce in local markets with negative effects on the food security and marketing integration. The study concluded that female households need to be explicitly targeted to minimize the low productivity traps through the provision of cheap agriculture credits and/or subsidies to improve farm productivity.

The focus group discussions revealed that the institutional interventions are mostly channeled through the groups. Most of the group members are women who have lesser influence in decision making and in most cases women have no capability of sustaining the agribusiness projects initiated contributing to the high failure rates of the projects.

4.4.3 Marital Status of the Household Head

The marital status has influence on the level of household asset endowments.

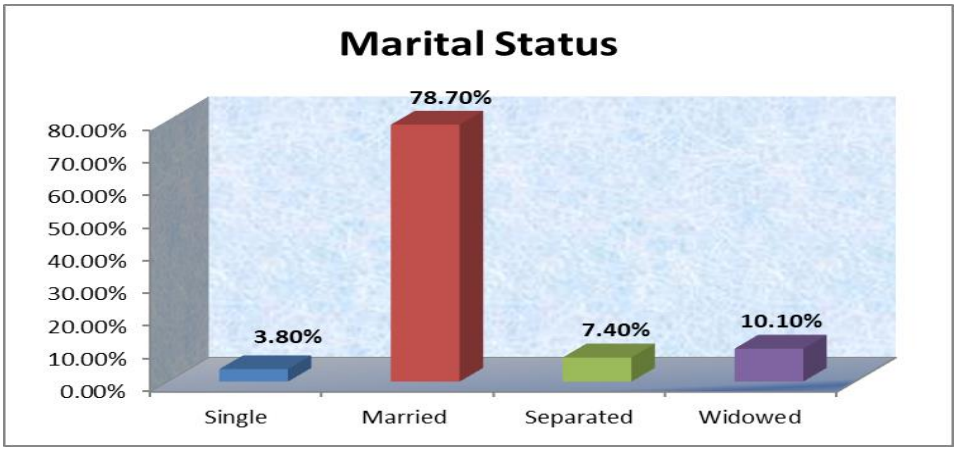

Figure 4:3: Marital Status of the Household Heads

Source: Researcher 2020

The study findings indicate the marital status of the household heads is as follows: single 14 (3.8%), married 289 (78.7%), separated 27 (7.4%), and widowed 37 (10.1%). The majority of the respondents are in a marital union implying a high probability of influence from both genders in decision making in product choice, storage, market and disposal which results in enhanced levels of agribusiness uptake by the households.

Based on Kiriti and Tisdell (2003), married women are comparatively more active in the development of cash crops than the unmarried women because the husbands tend to have more land than food crops, according to a study of marital status, farming status and other factors. Married women work more hours on non-cash food crops as well as non-food cash crops, with rising commercialization than unmarried ones. They further noted that, as husbands decide more on cash crops, married women seem to lose their ability to make decisions with the growth of agricultural commercialization. Married women in Kenya have little or no power to change the way food and non-food cash items are allocated.

4.4.4 Level of Education

Education is a powerful factor in leveling the field of opportunity as it provides individuals with the capacity to obtain a higher income and standard of living. It is a means of improving people's welfare. Inequality declines as the average level of educational attainment increases, with secondary education producing the greatest payoff.

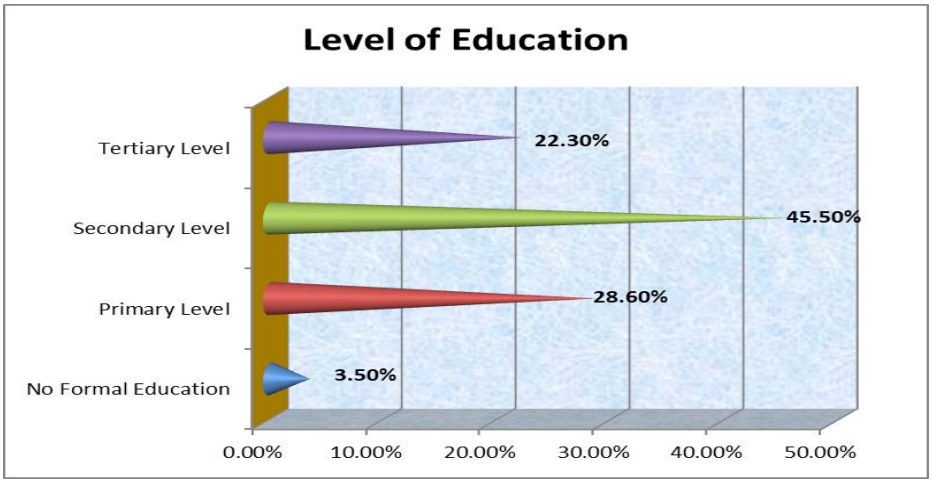

Figure 4.4: Education of the Household Heads

Source: Researcher 2020

The findings indicate that the households with no formal education are 13 (3.5%), Primary education 105 (28.6%), Secondary education 167 (45.5%) and tertiary 82 (22.3%). This implies that the study population is literate with the ability to learn and absorb new technology translating into better livelihoods. The majority of the household members have secondary education which is a critical component in enhancing dynamism and ability to modernize agriculture. Education is the basic human rights enshrined in Kenya's constitution. It increases the opportunities for employment; encourages gender equality and enables social goals to be accomplished. Globalization

and sustainable development goals require investment in good education in order to offer competencies and skills vital for agri-business. According to the Kenya Integrated Household and Budget Survey (KIHBS) 2015/16, 88.0 per cent of the county population aged 15 and over can read and write. This implies that the community can engage in and make informed decisions in the social, economic, environmental and political contexts.

4.4.5 Number of People in the Household

The number of household members is an indicator of the dependency level and influences the households' ability to save and invest**.**

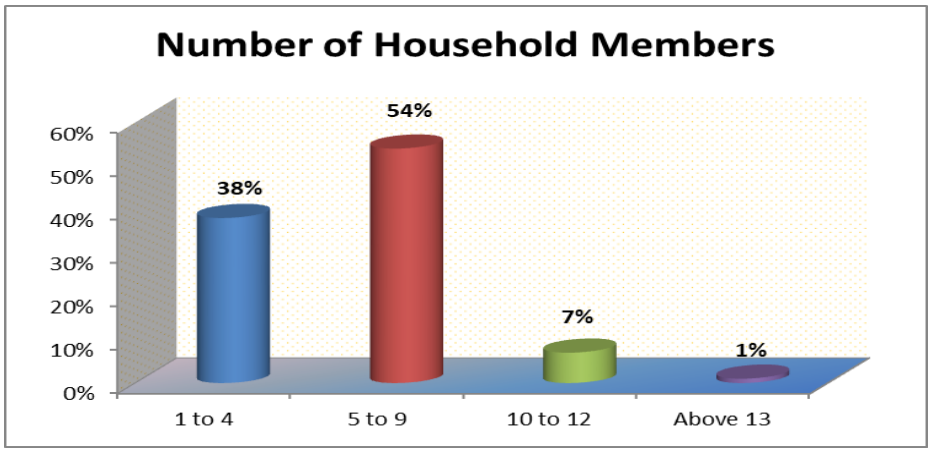

Figure 4:5: Number of Household Members

Source: Researcher 2020

The study findings indicate that the number of household members is as follows: 1-4 is 140 (38%); 5-9 is 199(54%); 10-12 is 26(7%), and above 13 is 2(1%). Majority of the households have more than 5 mouths to feed which compromises their ability to save and invest and reinforce subsistence livelihoods. This acts as an incentive to become more productive to sustain the high demand translating into more agribusiness uptake with

more returns. In households with more members, they can utilize the members in labour provision in all levels in the agribusiness process though the quantity of food intake and dependency ratio will be reinforced.

4.4.6 Range of Household Income

The range of household income informs household decision to invest in modernized agriculture and interact with various stages in the value chain.

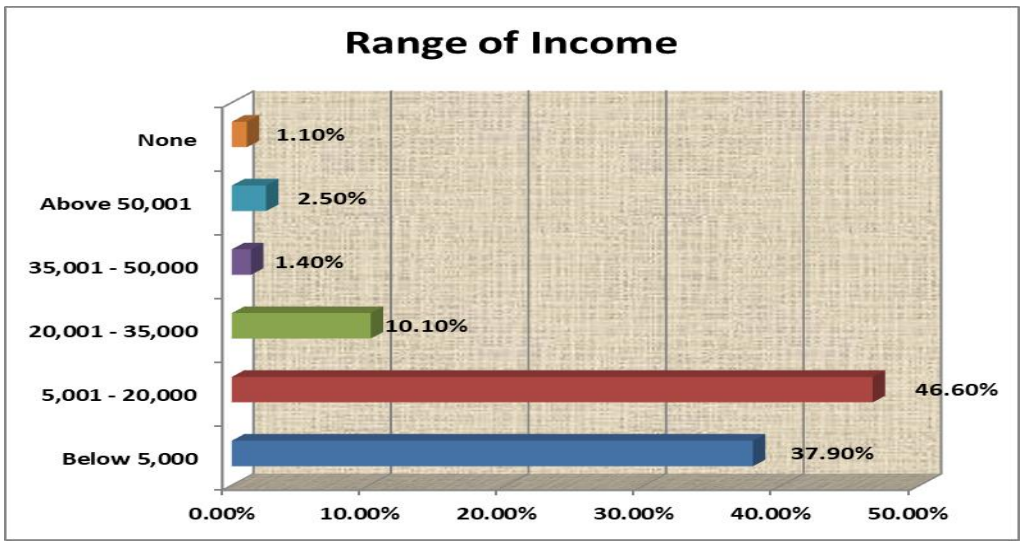

Figure 4.6: Range of Income

Source: Researcher 2020

In the study case, the majority of the households earn below KSh 20,000, that is, they are income constrained which is likely to have a negative repercussion on the agribusiness decisions both qualitatively and quantitatively**.** Income provides security and financial leverage and therefore affects the ability to consume and the viability of agribusiness (OECD, 2013). A key informant noted that most of the households cannot afford to purchase the necessary farm inputs and meet other costs of production due to low income

which translates to low farm output and consequent low incomes. The level of income is also affected by the size of land under cultivation resulting in diseconomies of scale in production. The focus group discussions revealed that it is based on the low-income status that farmers cannot afford the means of transport to access varied market destinations. This has enhanced their vulnerability in terms of their reliance on middlemen and sometimes the farmers cannot meet the cost of farm input, harvesting and have no alternative but to sell their crops on the farm and in most cases estimate the quantities. Though capacity building is done regularly through institutional support, the cost of implementation cannot be borne by the trainees who earn low incomes.

The farmers shy away from exploring new technologies for example the new seed varieties of cash crops due to the high input demands and initial capital. The low income levels contribute to the early disposal of harvests to meet immediate survival needs, in most cases; homogenous goods are sold at harvest time fetching low prices and returns to the households. The early selling of the harvests is also informed by the inability of the farming households to afford the additional storage and drying costs. The incomes are not just low but irregular due to the reliance on rainy seasons with definite planting and harvesting calendars resulting into irregular supplies with dry spells for most farmers who rely on a single cash crop (maize or sugarcane).

The low incomes have hindered farming households from acquiring modern equipment that would translate into high yields and low costs of production. Most households use the traditional equipment that is not cost-efficient in terms of labour input and output yet acquiring modern equipment especially the motorized ones is costly.

4.5 Physical Capital and Livelihood Security

The first objective of the study was to establish the influence of physical capital for agribusiness incubation on livelihood security. This study has conceptualized physical capital as being inclusive of natural capital. Information on the natural capital endowments and management is expected to enable the households to utilize resources in an optimal manner which may prove useful to livelihoods. Sustainable management of natural capital is essential for growth in agriculture and is vital for resilience and welfare gains. Natural capital goods and services underpin conventionally calculated economic growth by supplying inputs to production, manufacturing, services and ultimately increase agriculture's productivity and competitiveness (World Bank, 2015).

This section starts with the identification of types of natural capital, nature of access of the natural capital, knowledge for increasing resource productivity, size of the land on crop cultivation and hypothesis testing on the nexus between natural capital for agribusiness incubation, institutional support and livelihood security.

4.5.1 Types of Natural Capital

Natural capital is a basis of livelihoods and a key aspect in the development of the economy in which other capital resources are made. Natural capitals contribute to the fiscal revenue, income and poverty reduction with massive direct benefits to livelihoods. According to Hirut and Giovarelli (2013), for farming households, land plays a pivotal role in shaping and directing livelihoods. The intertwined social, institutional and political factors differentiate land from other resources. Land is never merely a commodity; it is a factor of production, a source of heritage, a family or collective property.

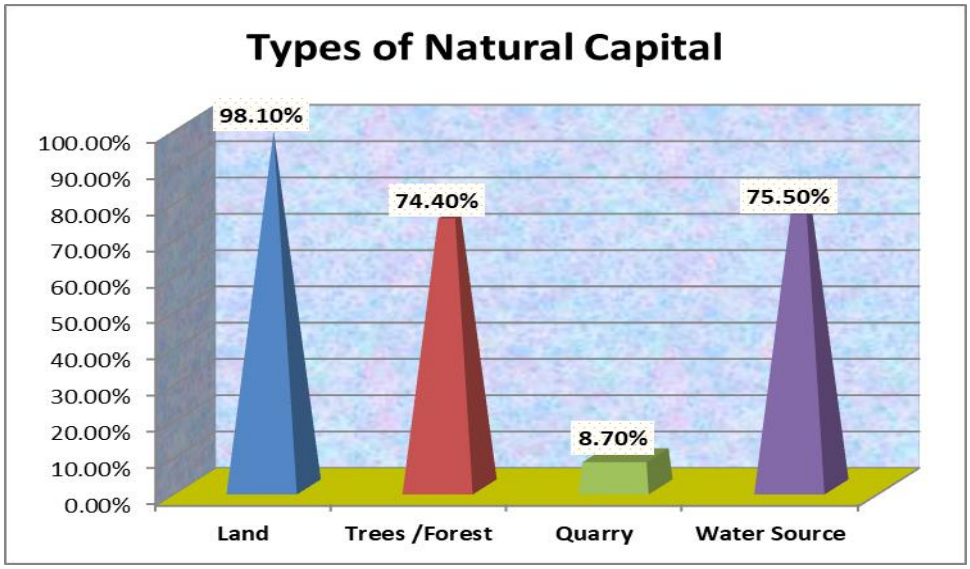

Figure 4:7 Types of Natural Capital

Source: Researcher, 2020

As shown in the findings 360 (98.1%) agreed that they can access land, 273(74.4%) trees/forest, 32 (8.7%) quarry and 277(75.5%) water source. This implies that land, water and tree/forestry are the main natural resources available to the household use. Most households have access to land which implies they can grow crops though the critical concern is the size of land, ownership and decision-making ability on land use. Most of the land is communally owned and fragmented into small parcels for inheritance purpose. The fragmented parcels contribute to diseconomies of scale as the returns are low and input costs higher. Communal land ownership acts as a disincentive to investments on the farm as a result of the conflicting interests that downplay the profit motive. In most households women are excluded from decision making especially on communal land yet they are the main players on the farm and interact most with the agribusiness market. The minimal exclusive ownership of land acts as a drawback to competitive and productive agribusiness.

In Bungoma County forests are utilized as the main source of fuel. For instance, the Buteyo Miti Park in Kanduyi Sub County is a tourist attraction place, a source for herbal medicine and fuel to the community. The area acts as a water catchment zone with protected swamps that are used as fish parks.

Plate 4.1: Indigenous Forest Park conserved in Sang'alo

Source: Field Data, April 2020

The forests are conserved for their aesthetic value, beekeeping and a source of a variety of timber products. Most households have resorted to tree planting in the County due to the minimum cost of production and the sustainable demand for timber. Unlike maize planting, tree farming is not so demanding in terms of input needs and management.

Forest ecosystems supply products to humans, to animals and ecosystem services like pollination, carbon dioxide uptake and nutrient growth, such as fruit, edible roots, tubers, berries and the medicinal herbs / leaves as well as wood, fires and fodder. Forests are recipients and partial recyclers of environmentally generated waste, besides providing leisure, beauty, spiritual values and other cultural facilities.

Plate: 4. 2 Tree Farming Integrated with Bee Keeping in Bumula

Source: Field Data, April 2020

The county has one gazetted forest reserve covering an area of 618.2 Km2 in Mt Elgon. Webuye Pan Paper Mills owns small-scale forests and woodlands. The County's primary forest resources include logs, firewood, grass, fruits, and herbs. Hunting and harvesting of wild berries, medicinal herbs and game meat are consumed by communities living around the forests.

The study rated water as third on the list of natural resources. The County is surrounded by several rivers, streams and wells. FAO (2017) noted that water is essential for all living things and is a basis for agribusiness activities like cooling, food processing, chemical synthesis and irrigation. Water conservation is an essential requirement for farmers to increase global food supplies on a sustainable basis. Agriculture is the largest water user worldwide accounting for 70% of the total freshwater withdrawals on average. A key informant explained that farming is intercepted when the County experiences dry spells. Farmers do not practice irrigation and water harvesting practice has lagged due to the associated installation costs. The practice of rain-fed agriculture has reinforced the practice of subsistence farming with relatively low productivity unable to transform the household's livelihood status. Generally, natural resource access is crucial for food provisioning and an overall improvement in human wellbeing.

4.5.2 Nature of Access to Natural Resources

The study sought to find out the nature of access to natural resources. Nature of access to natural resources is a precondition for better management and maximization of agribusiness resources.

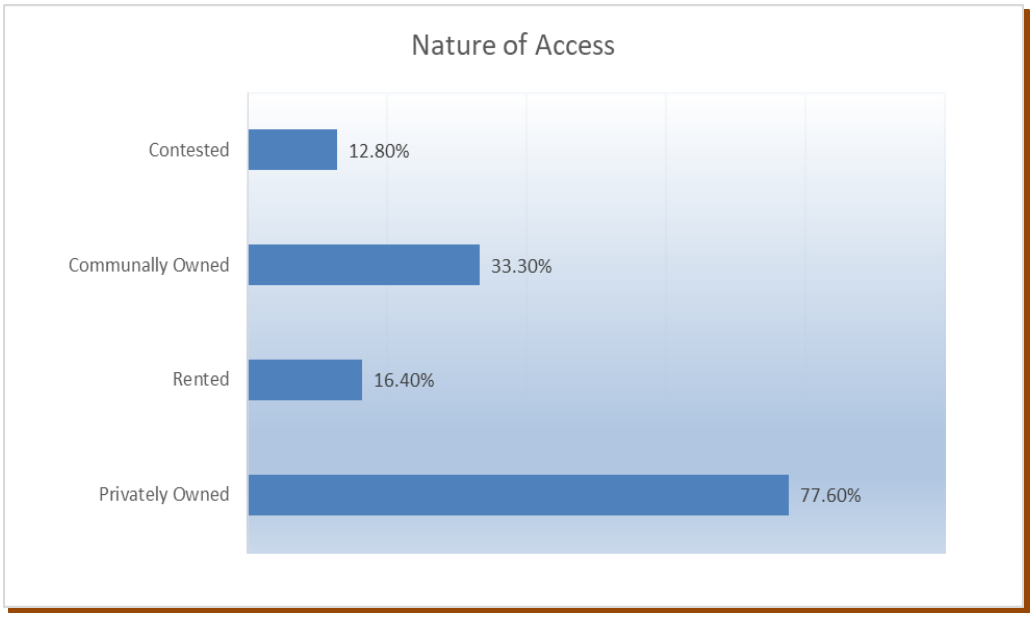

Figure 4.8: Nature of Access to Natural Resources

Source: Researcher 2020

The findings indicate that 77.6% agreed that the nature of access to natural resources was privately owned, 16.4% rented, 33.3% communally owned and 12.8% contested. This implies that most of the resources are privately owned a potential to positively enhance investments and better management of resources. Private ownership of natural resources facilitates more investment in agribusiness-oriented undertakings that are vital to the sustainable reduction of poverty. The livelihoods of people with limited access to natural resources are vulnerable because they are unable to acquire food, accumulate other assets and withstand shocks. Addressing the natural resource access and tenure security needs is crucial for creating conditions for household investments.

4.5.3 Knowledge for Increased Resource Productivity

The households' awareness of existent methods of enhancing resource productivity is critical in determining choices and the level of adoption of competitive agribusiness practices.

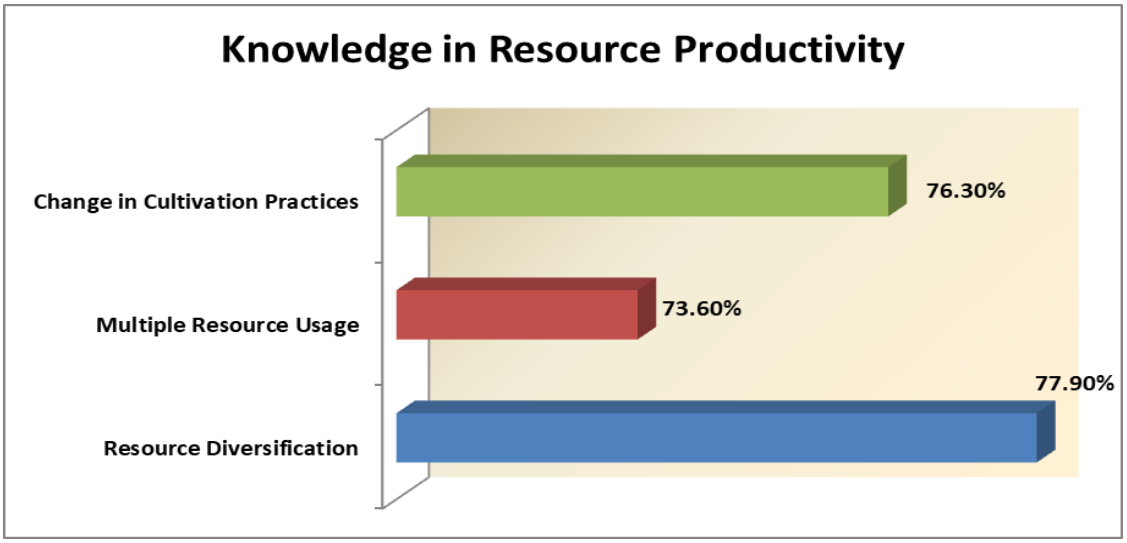

Figure 4.9: Knowledge for Increased Resource Productivity

Source: Researcher, 2020

The findings indicate that 77.9% agreed that resource diversification was key factor for increasing resource productivity. 73.6% agreed on multiple resource usage and 76.3% agreed on change in cultivation practices. The findings imply that the knowledge of resource productivity, that is, households' resource diversification, multiple resource usage and change in cultivation practices are crucial for enhancing resource productivity. A similar argument was advanced by Eteri (2018), who asserted that diversification of agribusiness plays, a key role in overcoming the poverty and reduction of economic inequality. Farm diversification enables farmers to increase the supply of local agro-

products both to the domestic and international market. Managing natural resources through multiple uses is a potential way of increasing the monetary value that households obtain from the resources. But knowledge of the techniques for managing the various products and services, and the availability of market opportunities differs greatly including the capacity to implement which is often low in the County.

Plate 4.3: Tomato Irrigation from a Stream in Cheptais

Source: Field Data, April 2020

Additionally, changes in cultivation practices through the adoption of the new technologies and the use of relevant information at the farm level are the key components in agriculture production, income and building resilience among households. Ahmad *et al*. (2017)); Parihar *et al*. (2016); and Quedraogo *et al*. (2016), note that farmers adopt various practices in response to the market and climate change challenges.

Farming households in Bungoma have resorted to organic farming through the practice of vermiculture, that is, the use of earthworms to decompose waste and make nutrient-rich worm manure that is more cost-saving and perceived as a healthy practice of food production. These farmers target a specific clientele that demands their crop products, the fertilizer and also earn from the field demonstrations.

Households are using mineral fertilization and manure, planting new crop varieties, crop rotation, expanding farmed area and using pesticides which are changes positively associated with new market opportunities that would ultimately translate into high returns from agribusiness.

Plate 4.4: Farmer Practicing Vermiculture in Kanduyi

Source: Field Data, April 2020

Participants in a focus group in Bungoma North alluded to the fact that the extent of application of knowledge on resource productivity is very low even though the

households are aware of its benefits. This was attributed to the cost of adoption, the diminishing extension support in the implementation process and the existent biases introduced through donor preferences. One of the discussants narrated that:

> '……very few rich farmers explore new knowledge for enhancing resource productivity…..majority of the local farmers are locked out from trying the new knowledge by their low income levels…….some farmers fear the risks that come with the introduction of new technology…..the uncertainty that surrounds agriculture practice makes most farmers to wait and see…….they cannot afford new technology…extension services are not enough…" (FGD in Bungoma North on 25th March, 2020.)

The study observed that the main challenge is the adoption of the knowledge on resource productivity which is highly linked to the inadequate extension services and funding. Most donors approach farmers with a preconceived mind on the value chains they are interested in supporting. For example, NARGP supports the dairy, banana, beans and poultry value chains with high yielding varieties and value addition. Agrochemicals and seed manufacturing companies invest strategically in capacity building and provide the goods on credit to reliable farmers based on the ascertained capability to buy their products and pay credit. KARI plays a crucial role in supplying high yielding crop varieties and carrying out demonstrations on the field days. Most farmers are shifting to fodder feed formulation which is cost-effective to produce and has a growing all year round market with immediate returns in comparison to the traditional cash crops, that is, maize and sugarcane. Farmers are shifting to the growing of orphan crops which include sunflower, sorghum, millet, that take short time to grow and have relatively minimal input requirements, more demand in the fodder market with high returns.

4.5.4 Size of Land Uunder Household Cultivation

Land is a key factor of production, in addition to capital and labour. Land is a natural resource that is supply-fixed and yet demand is continuously rising. The County has 2,880.78 Km2 of arable land, primarily for crop farming and livestock production (Bungoma CIDP, 2018). County land uses include farming, forestry, mining, human settlement buildings, industry, social, and public amenities. The land is used as collateral for loans as well as for aesthetic purposes.

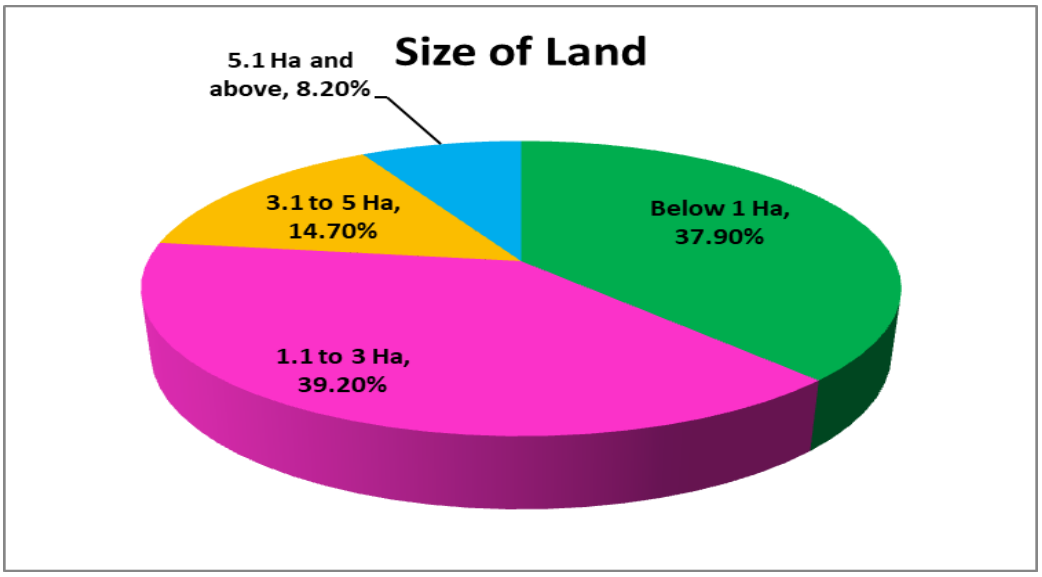

Figure 4.10 Size of Land

Source: Researcher, 2020

The findings indicate that majority of the respondents utilize below 3 hectares of land for crop cultivation. This implies that over ¾ of the households in the study area are smallholder farmers whose livelihoods are dependent on agriculture. Land plays a pivotal role in shaping and directing livelihoods (Brhanu, 2018; Hirut and Giovarelli, 2013).

A key informant pointed out that population growth and demand contributes to the excessive fragmentation of land into uneconomic units. This has affected the returns from traditional cash crops especially maize and sugarcane production whose cost of production becomes very high on small parcels of land making it difficult to break even. Kiplimo and Ngeno (2016), note that operations on smallholdings translate into low agricultural productivity, farm inefficiency and persistent food insecurity. Based on the responses from the focus group discussions it was suggested that for farmers to sell the small quantities produced from the fragmented land, they need to have well-organized collection points or cooperatives. This can aid to accumulate small quantities of the produce from various farmers and sell them in bulk and enhance the quantities supplied to meet market demand and accrue bargaining power in the markets. On the other hand, households own large tracts of land in Bungoma North which are not utilized optimally.

4.5.5 Relation Between Nature of Resource Access, Size of Land and Resource Productivity

Poverty is strongly associated with poor access to natural resources and in this case access to land, either in the form of landlessness or because of insecure and contested land rights. The study tested the relationship between land ownership, size of land and resource productivity as shown in Table 4.2

The results in table 4.2 indicate that there is a statistically significant relationship between privately owned land and resource diversification and between privately owned land and multiple resource use (χ^2 (367) = 11.492, $p<0.05$), χ^2 (367) = 13.390, $p<0.05$ respectively. However, there was no significant relationship between private land ownership and

Table 4.2 ***Correlation of Land Ownership, Size of Land and Resource Productivity***

Privately owned Land	N Valid cases	Pearson Chi Square Value	Df	Asymptotic Significance (2-sided)
Relationship between privately Owned land and Resource Productivity				
Resource diversification	367	11.492[a]	4	.022
Multiple Resource Usage	367	13.390[a]	4	.010
Change in Cultivation practices	367	3.894[a]	4	.421
Relationship between Rented land and Resource Productivity				
Resource diversification	367	10.399[a]	4	.034
Multiple Resource Usage	367	7.955[a]	4	.093
Change in Cultivation practices	367	5.377[a]	4	.251
Relationship between Communally owned and Resource Productivity				
Resource diversification	367	2.849[a]	4	.583
Multiple Resource Usage	367	3.613[a]	4	.461
Change in Cultivation practices	367	1.882[a]	4	.757
Relationship between Contested land ownership and Resource Productivity				
Resource diversification	367	3.702[a]	4	.448
Multiple Resource Usage	367	8.548[a]	4	.073
Change in Cultivation practices	367	6.512[a]	4	.164
Relationship between Size of Land and land ownership				
Privately Owned	367	3.300[a]	4	.509
Rented	367	9.610[a]	4	**.048**
Communally Owned	367	2.543[a]	4	.637
Contested	367	5.456[a]	4	.244
Relationship between Size of Land and Range of Income				
Range of Income	367	138.413[a]	16	.000

Source: Researcher, 2020

change in cultivation practices with a Chi Square value of $\chi 2$ (367) = 3.894, p>0.05. The study results indicate that private ownership does not influence the knowledge of resource productivity. This implies that there exists a significant relationship between private ownership of land and knowledge on resource productivity. The insignificant link between the essence of land ownership and changes in growing practices is contrary to Brussels' (2012) advances that land access and tenure security influences decisions on the nature crops cultivated subsistence and commercial purposes and the readiness of farmers to invest in improvements in production, sustainable management and adoption of new technologies.

Additionally, the results of the correlation analysis indicate that there was a significant relationship between rented land and resource diversification at ($\chi 2$ (367) = 10.399, p<0.05 but there was no significant relationship between rented land and multiple resource use and between rented land and change in cultivation practices at χ^2 (367) =7.955, p>0.05 and χ^2 (367) =5.377, p>0.05. These results are consistent with those of Dhungana *et al*. in 2004, which note that landowners are likely to be more efficient than tenants as they hold on the best quality of land while renting or leasing poor quality land. Since land control is strong, the owner-operator may perform all necessary agricultural operations promptly.

Further, there was no significant relationship between communally owned land and resource diversification, and between communally owned land and multiple resource usage and between communally owned land and change in cultivation practices at χ^2 (367) =2.849, p>0.05, χ^2 (367) =3.613, p>0.05 and χ^2 (367) =1.882, p>0.05 respectively.

These observations are contrary to Galiani and Schargrodsky (2016), who stated that property rights improve the allocation of resources and investment by limiting expropriation and facilitate market transactions. In addition, economic growth is accomplished if property rights make beneficial to undertake socially productive activities. Communal ownership of land is primarily dependent upon family labor and therefore inefficient production, that is, it undermine farmers' incentives to undertake land specific investments and cause substantial losses in productivity (Deininger and Ali,2008; Goldstein and Udry,2008).

The results further indicate that there was no significant relationship between contested owned land and resource diversification, and between contested owned land and multiple resource use and finally between contested owned land and change in cultivation practices at χ^2 (367) =3.702, p>0.05, χ^2 (367) =,8.548 p>0.05 and χ^2 (367) = 3.300 p>0.05 respectively. In contrast Galiani and Schargrodsky (2016) observed that the existence of fragile property rights is a major obstacle to economic development. Secure access to land has the potential to promote better resource management decisions, minimizing local conflict over land and increasing productivity.

The study further sought to establish the correlation between the size of land and land ownership. As indicated in Table 4.2, there was no significant relationship between the size of land and privately owned land, between the size of land and communally owned land and between the size of land and contested land. The Chi Square values were; χ^2 (367) =3.300[a], p>0.05, χ^2 (367) =, 2.543 p>0.05 and χ^2 (367) = 5.456 p >0.05

respectively. However there was a significant relationship between the size of land and rented land at ($\chi 2$ (367) =9.610, $p<0.05$.

In addition, the study sought to establish the size of land determines the range of income earned by farmers. The results showed a significant relationship between them; $\chi 2$ (367) = 138.413, $p<0.05$. These results are aligned to Kiplimo and Ngeno (2016) findings that land fragmentation results into a decline in agricultural productivity, farm efficiency and persistent food insecurity. The contemporary concerns in Sub-Saharan Africa are the declining farm sizes in ownership and use resulting in dis-economies of scale in production, uneven diffusion of modern technology and consequential negative effects on livelihood security.

4.6.1 Access to Productive Assets

Access to productive assets empowers the household to create a marketable surplus that minimizes poverty. In order to be competitive in agriculture, sufficient and well-functioning infrastructure is necessary and reduces the cost of providing inputs, marketing outputs, storage and energy supply. For the timely dissemination of technical knowledge to farmers, information infrastructure is important, while water infrastructure is a precondition for irrigation and water-based power generation.

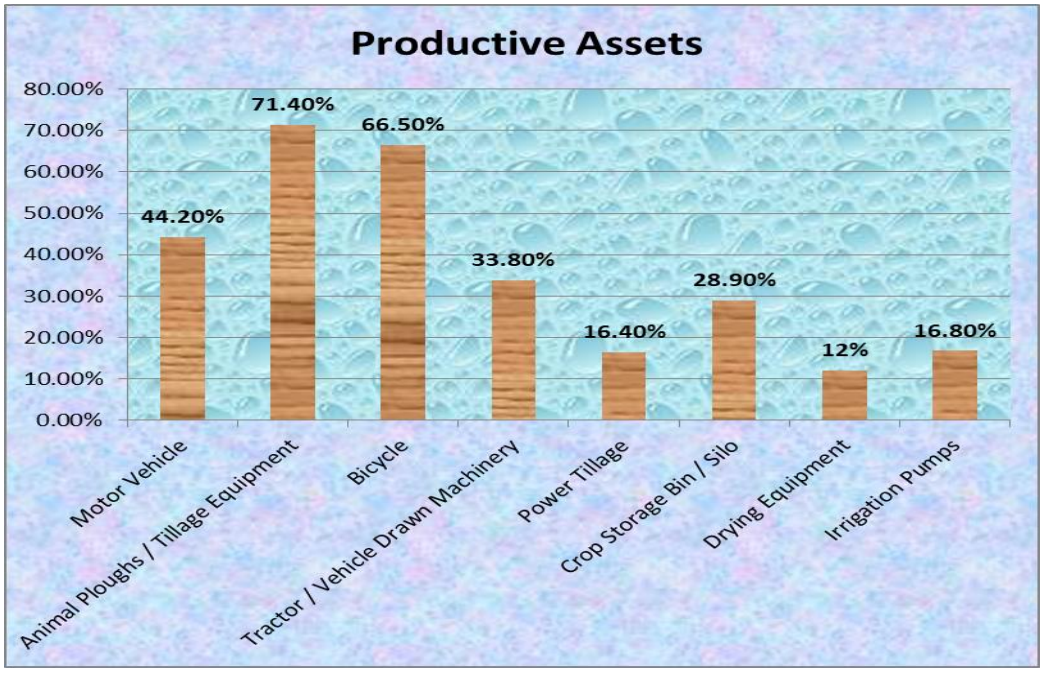

Figure 4.11: Household Productive Assets

Source: Researcher, 2020

Findings from the study show that the household access to productive assets was 44.2% on a motor vehicle, 71.4% on animal plough/tillage, 66.5% on the bicycle, 33.8% on tractor/vehicle drawn machinery, 16.4% power tiller/thresher, 28.9% crop storage bin/silo, drying equipment 12% and 16.8% Irrigation pumps. The results imply that households' access mostly traditional as opposed to the modern productive assets. For example, the households can access animal-drawn equipment 6 times more than they can access the drying equipment.

Plate 4.5: Farmer using a Tractor to plough Land in Tongaren

Source: Field Data, April 2020

In terms of area cultivated, crop diversity, yields, opportunities to redeploy family labor and household food security, households using traction technology, i.e. animals and tractors, instead of the hand-hoe, gain considerable advantages.

Mofya-Mukuka and Hichambua (2016), illustrate that the value of productive assets are positively associated with livelihood security. Better-off households' are non-liquid constrained and can therefore afford to purchase necessary assets needed for agricultural production. The poor are not only vulnerable because of poverty but they have fewer items and low-value assets to divest should they be forced to spend money on food and any emergencies.

The focus group discussions revealed that majority of the households cannot afford modern equipment resulting into low use of modern technology, high costs of production, slow cultivation, planting and harvesting periods with more labour demand.

The small parcels of land which is a common characteristic in the County accrue low returns to the farming households constraining them from stocking modern productive assets. Besides, the use of the modern equipment is not cost-effective on small pieces of land; farmers have to negotiate for the access in groups to hire tractors or maize shelling machines covering several households under one contract in a day for efficiency. Besides access to storage bins or silos is low resulting in the high levels of post-harvest losses especially in Cheptais and Bungoma North which are so cold and wet hindering the use of sun drying. Agro entrepreneurs are pushed by circumstances to hurriedly dispose of the produce to minimize the losses associated with rotting and molding. Consequently, the food markets are flooded with homogenous products creating an avenue for exploitation by the middlemen, stinking from the rotten fruits and vegetables create environmental hazards and in some cases, the produce is fed on animal around the markets. The lack of drying equipment is equally a big challenge worsening the post-harvest losses menace and product quality and yet investment in them is equally expensive. For instance, the County Government has acquired only three drying machines at the Mabanga Agricultural Training Institute which is not adequate to serve Kanduyi Sub County.

The level of irrigation within the County is low and yet irrigation is crucial in leveling the supply of food crops in the market. There is minimal water harvesting and the use of borehole water to irrigate the farms. This trend compromises productivity and competitiveness of agribusiness with low and unstable income to the households.

4.6.2 Means of Transport

Transport is a key factor in improving agricultural production and improving people's quality of life, building a demand for agricultural products, promoting connections between geographical and economic regions, and opening up new economic areas. In order for agriculture to be efficient, an adequate and well-functioning infrastructure is essential; it reduces costs of supplying inputs and marketing outputs.

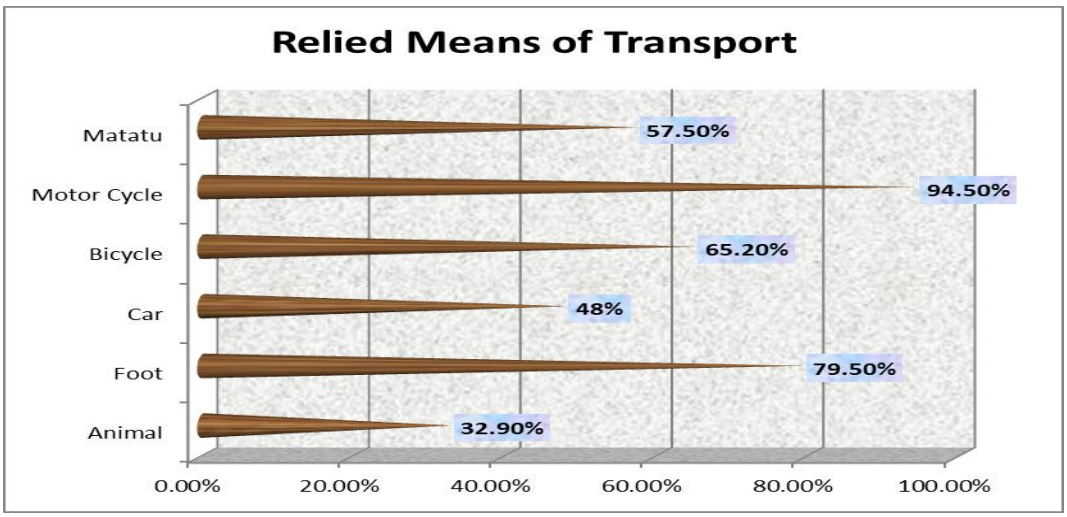

Figure 4.12: Means of Transport

Source Researcher (2020)

The findings indicate that households in the County have access to a variety of the means of transport. On the most relied upon means of transport, 57.5% agreed that they rely on a

matatu, 94.6% on a motor cycle, 65.2% on a bicycle, 48% on car, 79.5% on foot and 32.9% on animals.

Plate 4.6: Transportation of Crop Products Using a Motorcycle and Bicycle

Source: Field Data, April 2020

Motorcycles are the most relied upon means of transport due to their flexibility to reach the most remote areas; they are fast and easily available to the households. Most of the households rely on bicycle transport to transport inputs, output and the fodder and the means is cheaper and easily accessed by the households**.**

Plate 4.7: Onions Transported Using Donkeys to Cheptais

Source: Field Data, April 2020

Animal transport usually in the form of donkeys is commonly used to transport products from Mt. Elgon to temporal collection points downslopes or the local markets. Although animal transport is the least relied upon means of transport (32.9%), it is the most relied upon means of transport for sourcing agricultural inputs and distributing outputs in Cheptais.

Unreliable means of transport impedes access to markets and revenues which are much needed by smallholder farmers. Household tasks performed mainly by women, (transportation of household food, water collection and firewood) can be reduced substantially in time and energy to allow small farmers to devote these resources to other more productive activities.The lack of means of transport enhances farmers' reliance on middlemen to pick the produce from the farm gates at low prices. The middlemen charge very high prices for transportation and take advantage of the farmer's ignorance on the

product destination markets and prices in the non-local markets. One of the discussants in Bumula stated that:

> "… when our farm produce is ready, the Ugandans and businessmen from Vihiga County come with lorries to buy the maize from us at low prices,,…..we cannot reach these markets ourselves because of the high cost of hiring the lorries…….for the few community members who have tried to take their goods to outside markets themselves, they were not able to make any profit……" (FGD Bumula Sub County 19th March 2020).

In terms of time and energy inputs, transport systems based on human labor, for example, carrying produce to the market as a 'backload' are high, but offer little in terms of output. This input-output relationship can be strengthened by improving transport. For instance, a simple hand cart may bring more goods into the market and require less labor. Reliable transport enables access to markets for the sale of harvested goods and in less time enters a larger, more diverse range of markets. Transport may give smallholders the possibility of seizing more commercial opportunities, market networking/information and develop contacts with other producers and traders.

4.6.3 Time for Selling Crops

The time for selling the harvest is a function of the availability of storage facilities, the market information on demand and supply and the processing capability of the households, especially for the perishable goods.

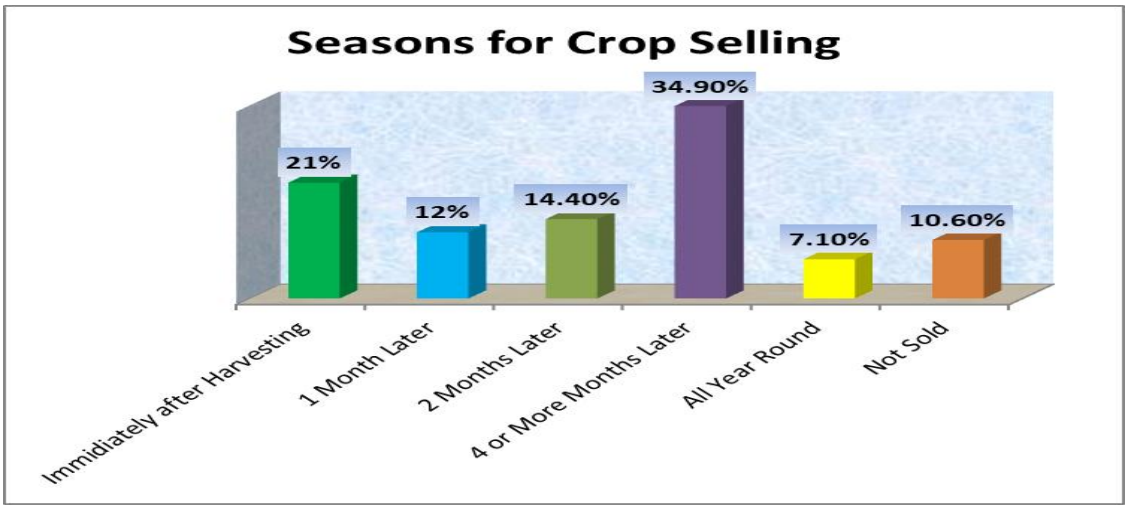

Figure 4.13: Time for Selling Crops after Harvesting

Source: Researcher, 2020

The finding indicate that the majority of the households sell their crop four or more months later after harvesting which was at 34.9%, followed by those who sell immediately after harvest and 1 month later at 21% and 12% respectively. The focus group discussions revealed that most perishables were sold immediately in a rush at throwaway prices to save them from rotting in the farmers' possession. Whereas the cereals, mostly maize, are sold to meet the immediate household needs like to pay school fees for the children**. A** participant in an FGD reiterated that:

> "…..at harvesting time, the produce is in excess and the buyers are few, yet the households are desperate to sell. Farmers sell for survival, to meet the immediate needs of their families……. The closest cereals board is in Bungoma town which is too far to be accessed and thus the middlemen are depended upon to buy the products from the farms…….When we harvest tomatoes and onions they just rot if you do not get the market hurriedly…." (FGD, Cheptais Sub County, 18th March, 2020).

Information from a crop officer revealed that due to the drying challenge, farmers are forced to dispose their produce at throwaway prices or if they do not dispose of then the

quality becomes bad leading to discoloration and buildup of aflatoxins which affects their returns. Poor storage also attracts weevils and grain borers (Osama) that further compromises the quality and consequently the bargaining power of the agro – entrepreneurs. The heavy reliance on rain seasons further leads to uniform seasons of planting, harvesting and supplying of the usually homogenous produce to the market, this results into high competition to sell products and low prices for the commodities negatively impacting agribusiness returns and losses from the goods that rot in the markets. The trend also results in the uneven supply of goods, that is, peak and off-peak seasons with unpredictable prices of crop products in the market.

The situation in Bungoma is worsened by the low returns from agribusiness emanating from the low quantities grown on the fragmented parcels and the cost of production. The farming households cannot afford modern storage facilities for the perishables or semi processing of the crop products to increase their lifespan to achieve sustainable supply, bargain for better prices or reach non-local markets. A key informant revealed the unfortunate turn of events whereby the households source the same goods from external markets through the middlemen during the off-peak seasons at higher values than the ones they sold their commodities distorting the balance of payment equation.

4.6.4 Source of Agribusiness Information

There exists a strong linkage between sources of information and the consequent agribusiness decisions and performance that cannot be underestimated. The study sought to examine a variety of sources of agribusiness information for the households.

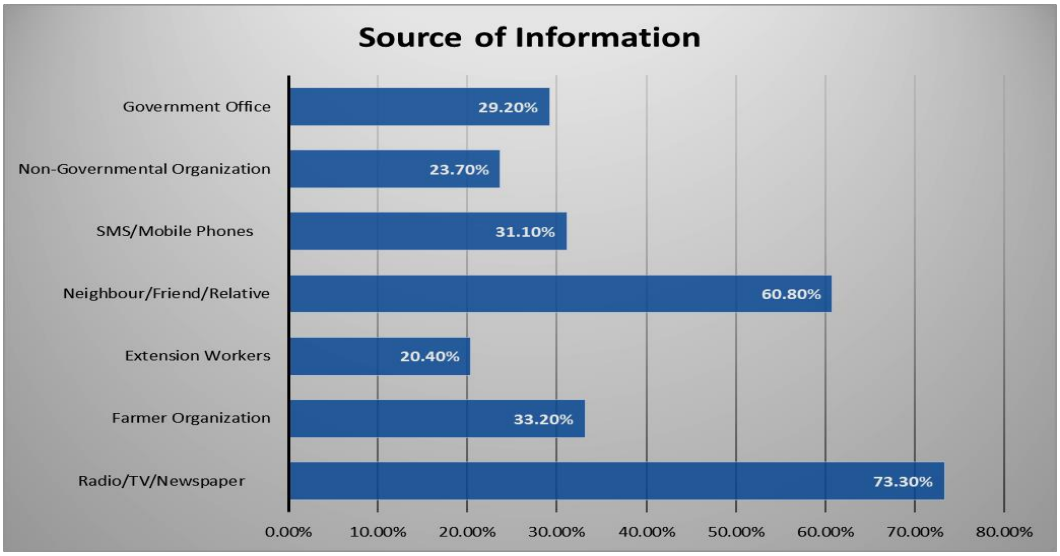

Figure 4.14: Source of Agribusiness Information

Source: Researcher, 2020

The study revealed that majority of the households receives agribusiness information from the radio/TV/newspaper and neighbor/friend/relative at 73.3% and 60.8%. It was also noted that the lowest-rated source of information was extension workers, government office and non-governmental organization. An interview with the sub-county agribusiness officers revealed that ability to provide information to the community is curtailed by the group model, that is, the use of the already existing groups to educate others, their services are demand-driven (depend on the farmer activities) and they lack mobility (have no vehicles or motorbikes for fieldwork). The non-governmental organizations use the government/agribusiness officers to reach the households leading the low coverage with those not in groups or already engaged in agriculture activities being excluded.

Since extension officers are no longer active on the ground, social media and mass media play a key role in the dissemination of information on agribusiness. The radio is playing a bigger role and more people are now embracing agriculture as the main boost for economic development.

Farmer groups are relevant in the dissemination of information and most donor support is targeted through them. Group members demand the services from the sub-county agribusiness officers and other agricultural officers who prefer using the group model and further link them to other stakeholders. The groups are used to disseminate new knowledge of increasing productivity and demonstrate new technology to other community members. A focus group discussant acknowledged that:

> ‘’…training is carried out regularly for our groups by different NGOs…we know how to increase yields and the new seeds……..we understand the technology to help us produce high quantities…we have learnt about the new methods of storing and drying the produce…the problem facing our group is getting the money…to plant new varieties....build modern stores….. mill flour from the potatoes…” FGD, Bungoma North, 25/3/2020.

The radio and television programs are relied upon by the locals for new technology and information on crop management and enhancing productivity. The programs include national TV and radio programs like the Shamba Shape up, Smart Farm, Farmers and Seeds of Gold which are aired regularly and are based on farmers’ visits enabling smallholders to identify with them in efforts to enhance productivity. Local radio stations, for example, Sulwe, Radio Mambo and Mulembe FM air agricultural programs to respond to farming challenges in the County. Generally, there are a variety of sources of information making information more accessible to agro entrepreneurs.

4.6.5 Factors Limiting Agribusiness Production

Agribusiness production relies mostly on agricultural efficiency which is impacted upon negatively by several factors in Bungoma County as considered in this section**.**

The study sought to establish the factors limiting agribusiness production which include hard infrastructural facilities and others non- physical but closely intertwined with the physical aspects.

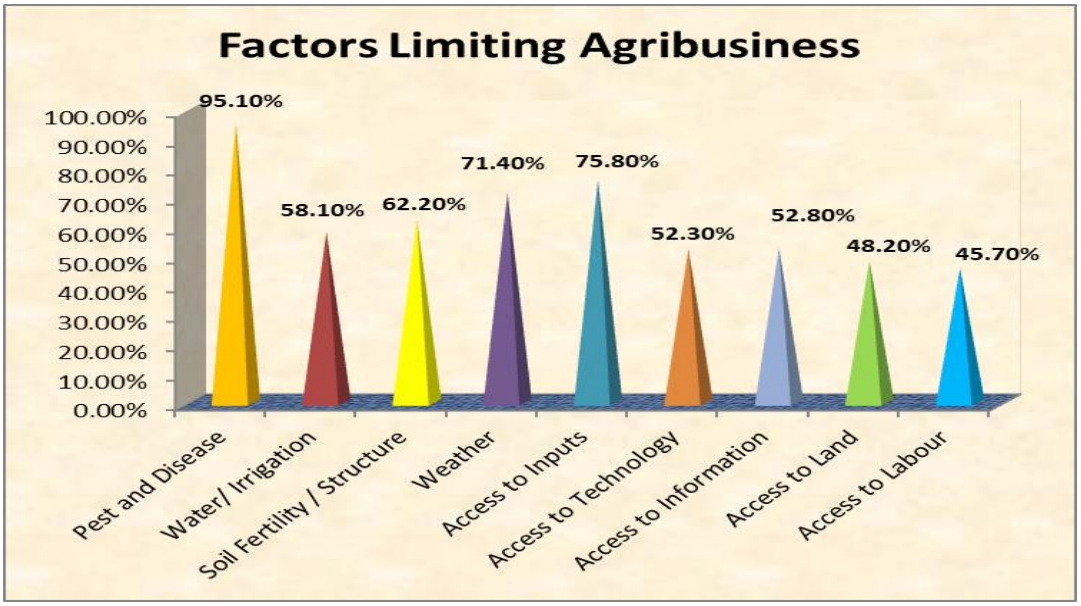

Figure 4.15 Factors Limiting Agribusiness

Source: Researcher, 2020

As presented in Figure 4.15, several factors limit agribusiness production. 95.1% agreed that Pests and diseases were a limiting factor, 58.1% Water/ irrigation facilities, 62.2% Soil fertility/ soil structure, 71.4 % Weather, 75.8% Access to inputs, 52.3% Access to technology, 52.8 % Access to information, 48.2% access to land and 45.7% access to labour. Generally, the results indicate that all the above factors limit agribusiness production to a great proportion with the least being access to labour. During the focus

group discussions, the following additional points outlined below were voiced out as hindering agribusiness production:

i. The fact that early planting and maintenance are not adhered to, households prioritize other issues over farming, which is, healthcare, education jeopardizing early preparation of the farm.

ii. Middlemen frustrate the farmers who plant without knowing where to sell products creating the urgency to dispose off especially the perishable commodities.

iii. The inadequacy of collection centres that can assist in the selling of products and enhance the bargaining prices for small scale farmers resulting in diseconomies of scale.

iv. Delayed input provisions by the government to the vulnerable households who rely on the rainy seasons make them plant and harvest late affecting their productivity and competitiveness.

v. The lack of adequate processing equipment that can make their products more competitive and increase the shelf life of the crop commodities.

vi. The absence of market survey ability among the households enhancing reliance on middlemen in turn increasing the vulnerability and exploitation of agro entrepreneurs.

vii. Lack of adequate training curtails the households from making informed decisions compromising the productivity and competitiveness of agribusiness.

viii. The fear of post-harvest losses affects the production of perishable goods and deters most households from agribusiness.

ix. Inadequate extension services due to a high farmer to staff ratio and lack of emerging knowledge on modern farming practices.

4.6.6 Rating the Quality of Agribusiness Products

The study sought to establish the rating of the quality of agribusiness products over the last five years. The findings are shown in Figure 4.16.

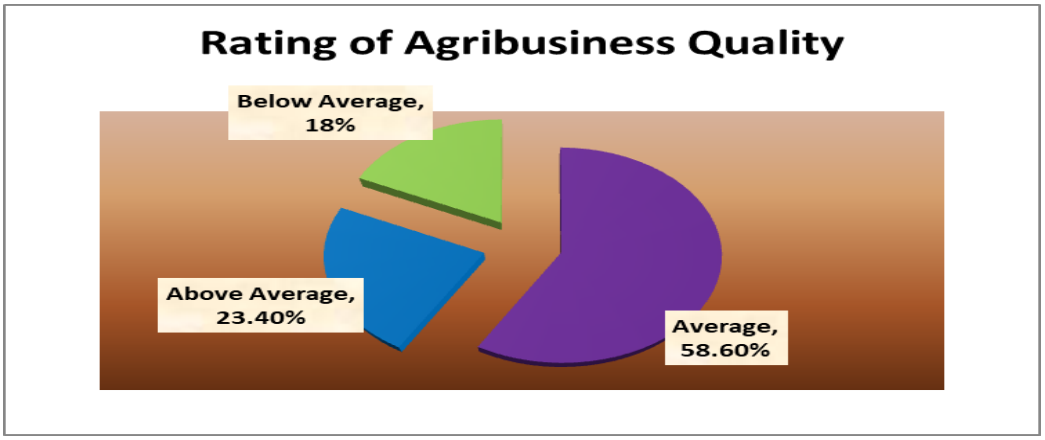

Figure 4.16: Rating the Quality of Agribusiness Products

Source: Researcher, 2020

On a rating of the quality of agribusiness products, the majority rated their products as average at 58.6%, followed by above average at 23.4% and below average at 18%. Based on an interview with the leader of a women group, the average ranking of products was associated with the lack of modern technology, pests and diseases, drought and the fact that the farmers are not business-minded. Storage technology contributes to the quality of the produce. Produce that is not stored well are discolored and disfigured making them unattractive in the market. Košičiarová *et al.* (2016) and Šugrová (2017), affirm that product quality is a decisive factor with an impact on consumers' purchase. Consumers easily distinguish high-quality products and make better decisions related to their

purchase and the low quality of agribusiness produce lowers the bargaining power of the sellers of the crop commodities.

The agribusiness markets in Bungoma County attract crop commodities from outside the County and if the local produce is not attractive then buyers opt for products from other counties. For example, oranges are outsourced from Machakos and Tanzania based on being juicy and sweet. Most ripe bananas are sourced from Uganda based on being sweeter and attractive.

4.6.7 Requisites for the Sustainability of the Yields

This study sought to examine the requisites for the sustainability of the yields. Increasing agribusiness productivity is a major concern but sustaining the yields is equally critical.

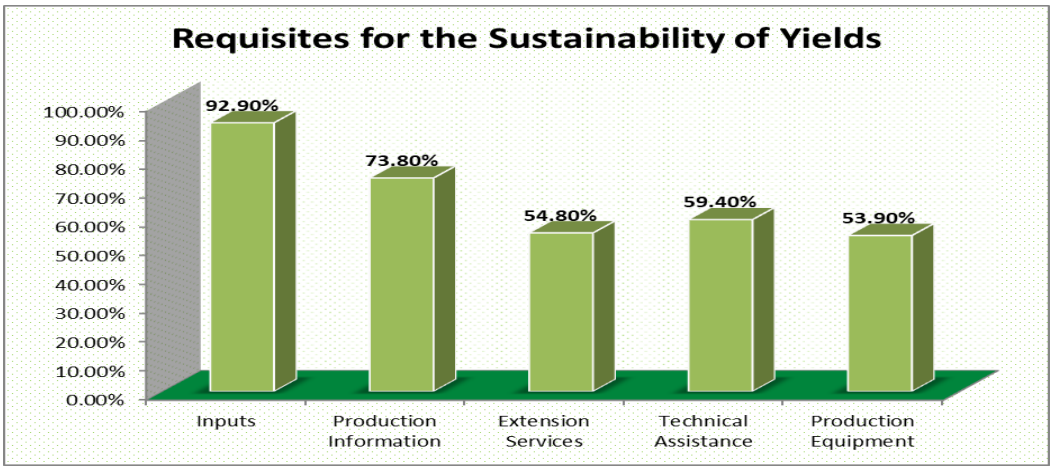

Figure 4.17 Requisites for the Sustainability of the Yields

Source: Researcher, 2020

Generally, there are several Requisites for Sustainability of yields and the findings indicate that farm input was agreed to be the highest at 92.9%, Production Information 73.8%, Extension services 54.8%, Technical assistance 59.4% and production equipment

53.9%. The findings indicate that the mentioned factors are crucial for the sustainability of yields with all the responses rated above 50% with inputs being the main factor. These results are aligned with the study findings by Uphoff (2003) who notes that an increase in external inputs is a key requisite for raising agricultural outputs. CAADP (2017) indicate that the yield potential of most crops grown in Africa continues to remain uneconomically low, averaging about a third of the global ones. This is on account of a multiplicity of factors, including the relatively low adoption of improved technologies such as improved seed cultivars and cuttings, non-mechanization in land preparation, the majority of smallholder farmers still depend on the hoe as a primary tool for land preparation. Additionally, the high proportion of smallholder farmers use labour-saving farming practices, such as the use of herbicides for weeding and the low adoption of irrigation on account of prohibitive costs, resulting in land productivity being confined to the rainy season. The relatively low utilization rates of these agricultural inputs by the majority of smallholder farmers below uneconomic threshold have negatively impacted on the growth of agribusinesses and viable value chains. Smallholder farmers have been deprived of participating in the production of improved seed varieties through the grower and contract farming arrangements. In general, low smallholder productivity has negatively impacted on the growth of agribusinesses on the continent. The positive role of the agricultural inputs that are required by agro-industry for achieving higher productivity, competitiveness, growth, and consumer quality has not been exploited to the desired level.

4.6.8 Problems Faced in Marketing of Agricultural Output

Understanding the problems faced in the marketing of agricultural output informs decisions relevant in the provision of the required physical facilities. Markets provide an opportunity for farm production to earn income from sales of farm produce and hence contribute to food security and poverty reduction (FAO, IFAD & WFP, 2013; USAID, 2012).

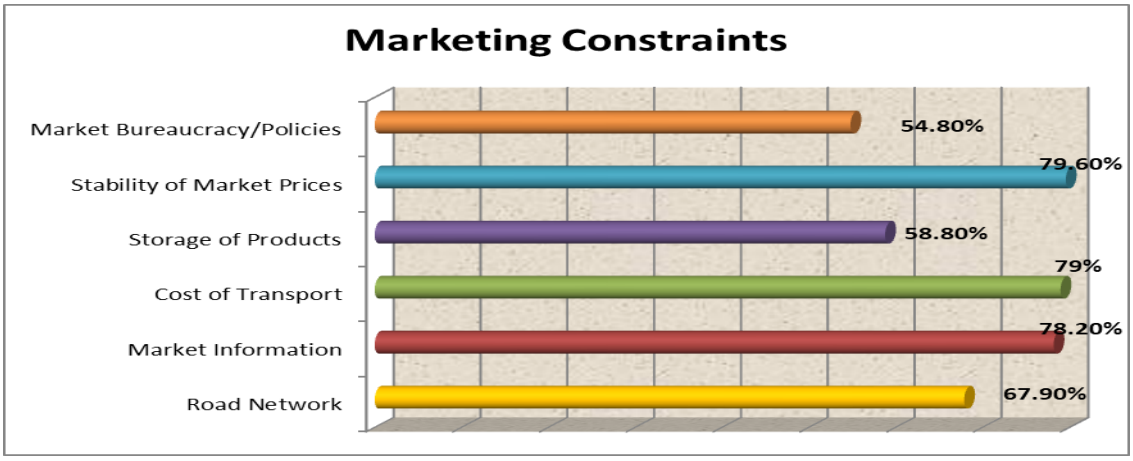

Figure 4:18 Problems Faced In Marketing of Agricultural Output

Source: Researcher, 2020

The study revealed that road network was at 67.6%, Market information at 78.2%, Cost of transport 79%, Storage of the products 58.8%, Stability of Market prices 79.3% and Market bureaucracy/ policies at 54.8%. Based on the focus group discussions, the main problem faced by the farmers is attributed to the lack of ownership of trucks (Lorries) for transporting farm products in bulk, information on the market destination of the products, and the market bureaucracy. This creates an avenue for their reliance on the middlemen who have an advantage over the local producers. The study established through the key informant interviews with women group leaders that market prices are unstable with

extremely low prices experienced at harvest time with differences in weighting measures (smaller *gorogoros*/tins of 2-kilogram used for weighting). Olwande & Mathenge (2011) point to a strong correlation between market participation and exiting poverty. Improved market access is a precondition for higher income for farmers. Smallholders confront uncertain production environment and immense restrictions in their physical access to distant markets. Additionally, the lack of market knowledge, lack of experience and negotiation experience and the lack of collective action disable poor farmers from engaging with the market.

Key informant information indicated that for small-scale farmers to sell their produce they have to penetrate the markets through established gatekeepers. Market prices keep changing especially during the harvest periods the prices fall drastically. The inability to provide storage and proper drying of the food crops makes the farmers dispose off the produce at throwaway prices to reduce losses from rotting and molding. The middlemen take advantage of the harvest time to demand the commodities at low prices and sell to other markets at higher prices. Besides, the high cost of transport hinders most of the agro entrepreneurs from reaching a variety of far off markets to fetch higher prices. The nature of the food crops bulkiness requires big and strong vehicles to transport the produce to markets. A focus group discussant stated further that:

> '…..the lack of information on the markets where the middlemen take the produce is a problem that makes the locals to depend on them…….we do not know where to sell the produce……farmers don't know the prices of the goods in other markets…..the roads are very bad and……..reaching the urban markets is a dream for most of the poor farmers…..the cost of hiring vehicles is extremely high……we use donkeys to transport down slope and wait for traders from Uganda and other towns to come and buy…..sometimes they delay and the produce rots…..' FGD held at Cheptais, 18th March 2020

4.6.9 Comparison of Marketing Constraints among Sub Counties

The study sought to establish whether there is a significant difference in means between market constraints within the five sub-counties as shown in Table 4.3.

Table 4. 3 ***ANOVA of the Marketing Constraints***

Road Network	Between	8.497	4	2.124	.877	.478
	Within	876.844	366	2.422		
	Total	885.341	366			
Market information	Between	12.769	4	3.192	2.052	.087
	Within	563.231	366	1.556		
	Total	576.000	366			
Cost of Transport	Between	29.097	4	7.274	4.882	.001
	Within	539.323	366	1.490		
	Total	568.420	366			
Storage of products	Between	44.834	4	11.209	4.835	.001
	Within	839.144	366	2.318		
	Total	883.978	366			
Stability of Market prices	Between	30.580	4	7.645	5.775	.000
	Within	479.224	366	1.324		
	Total	509.804	366			
Market bureaucracy	Between	34.925	4	8.731	3.425	.009
	Within	922.851	366	2.549		
	Total	957.777	366			

Source Researcher, 2020

The ANOVA table 4.3 shows that the F ratio for four variables out of six showed a statistically significant difference in the means by the five sub-counties. From the table, it can be deduced that there was a statistically significant difference in the mean for the cost of transport (F (4,366) = 4.882, P= 0.001 <0.05. Similarly, there was a statistically significant difference in the mean ratings for the five counties for 'Storage of products'; the results were (F (4,366) = 4.835, P = 0.001. Additionally, there were significant differences in the means for the stability of market prices at (F (4,366) = 5.775, P= 0.000. Similarly, There was a significant difference in rating on Market bureaucracy' at (F (4,366) = 3.425, P = 0.009 at the 0.05 alpha level.

Given the statistically significant differences for some of the items, as shown in the ANOVA table, a Scheffe post hoc analysis for multiple comparisons was conducted to determine which means differ from each other in the five sub-counties.

Table 4.4: ***Post-Hoc Scheffe Analysis for Multiple Comparisons***

Dependent Variable	(I) Sub-county you belong	(J) Sub-county you belong	Mean Difference (I-J)	Std. Error	Sig.
Cost of Transport	Webuye	Cheptais	.74323*	.23201	.038
		Kanduyi	.72630*	.18839	.006
Storage of products	Webuye	Bumula	-.88197*	.25428	.018
Stability of Market prices	Webuye	Cheptais	.73032*	.21870	.026
		Bumula	.86679*	.19216	.001
		Kanduyi	.65955*	.17758	.009
Market bureaucracy	Webuye	Kanduyi	-.74119	.24643	.062
		Cheptais	-1.00581*	.30349	.028

Source: Researcher, 2020

Post hoc analysis using the Scheffe post hoc criterion was conducted for selected multiple comparisons that showed significant differences in means. These were; the cost of transport, the stability of market prices, market bureaucracy and storage of products. The pairwise comparison for the five sub-counties revealed that; there was a statistically significant difference in mean rating between Cheptais and Webuye on one hand and between Kanduyi and Webuye on the other with a standard error of 0.23201 at P = 0.038< 0.05 and. 18839 at P = 0.006< 0.05 respectively for 'cost of transport'. This difference between the rating of Cheptais and Webuye on one hand and between Kanduyi and Webuye On storage of products, there was a statistically significant difference in the mean rating between Bumula and Webuye with a standard error of 0. 25428 at p= 0.000< 0.018. The Bungoma County CIDP (2018) states that the County has underutilized National Cereals and Production Board (NCPB) warehouses in Bungoma, Webuye, Kapsokwony and Bumula. Some rural communities still use traditional granaries and grips. To store crops, most households also use sacks and baskets. The lack of proper drying and chemical treatment results in massive losses from high humidity or attacks by weevils.

The results on the stability of market prices there was a statistically significant difference in mean rating between Cheptais and Webuye on one hand, between Bumula and Webuye on the other and between Kanduyi and Webuye with a standard error of 0. 21870at P = 0.26< 0.05, 0.19216 at P = 0.01< 0.05 and 0. 17758 at P = 0.009< 0.05. Market bureaucracy results indicate that there was a statistically significant difference in the mean rating between Cheptais and Webuye and Webuye and Kanduyi with a standard error of 0.30349 at P = 0.28< 0.05, 0.24643 at P = 0.62< 0.05 respectively. Webuye Sub

County stands out with a significant difference from Bumula, Kanduyi and Cheptais sub-counties in the factors constraining the marketing of agriculture products. This can be attributed to the strategic position of Sub County. Webuye West hosts a road network junction connecting Bungoma to Uganda, Kitale to Lodwar, Kakamega to Kisumu and Eldoret to Nairobi. The strategic location facilitates market access as well as ease of transportation.

4.7 Financial Capital and Livelihood Security

The second objective of the study was to assess the influence of financial capital for agribusiness incubation on livelihood security. Financial capital is a critical component to the success of any agribusiness venture.

4.7.1 Sources of Income

The study appreciates that households rely on various sources of income to support livelihoods as shown in figure 4.9. Income activities have the greatest potential to serve as motors of economic growth, reducing poverty while improving income distribution.

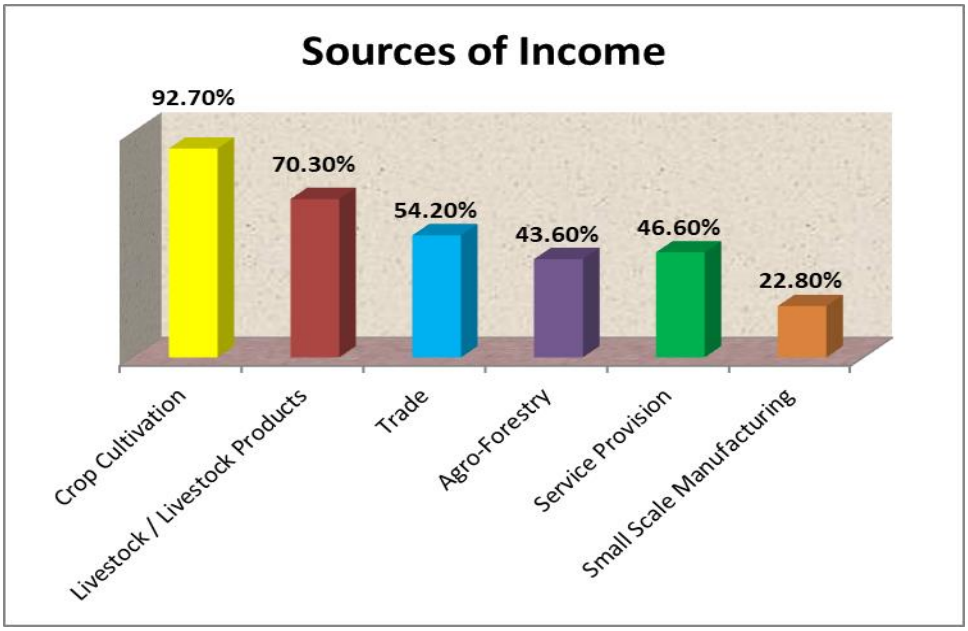

Figure 4.19 Sources of Income

Source: Researcher, 2020

The respondents indicated that crop cultivation as their main source of income at 92.7%, followed by livestock/livestock products at 70.3%, trade at 54.2%, agroforestry at 43.6%, service provision at 46.6% and finally small scale manufacturing at 22.8%. The results imply that the households diversify their income sources however more rely on agriculture than on non-agricultural sources of livelihoods. These results are in line with the Kenyan Census (KNBS, 2019), that agriculture is the backbone of the County of Bungoma, and most families rely on crop and animal husbandry. Crops are mainly grown for livelihood with surplus sold for other family requirements. Most families integrate crop farming and animal husbandry. The low levels of manufacturing have contributed to the low productivity and competitiveness of agribusiness.

4.7.1.1 Relations between the Sources of Income

The study sought to establish a correlation among the sources of income for the households as presented in table 4.5. The model assumption is that the size, direction and the intensity of these correlations among the income-earning activities imply more livelihood security.

Table 4.5 ***Correlation among Sources of Household Income***

Correlations

			Livestock	Crop cultivation	Trade	Agroforestry	Service provision	Small scale manufacturing
Spearman's rho	Livestock	Correlation Coefficient	1.000	.079	.115*	.193**	.175**	.004
		Sig. (2-tailed)	.	.131	.028	.000	.001	.933
		N	367	367	367	367	367	367
	Crop cultivation	Correlation Coefficient	.079	1.000	-.069	-.004	-.142**	-.111*
		Sig. (2-tailed)	.131	.	.185	.942	.006	.034
		N	367	367	367	367	367	367
	Trade	Correlation Coefficient	.115*	-.069	1.000	.154**	.107*	.095
		Sig. (2-tailed)	.028	.185	.	.003	.041	.068
		N	367	367	367	367	367	367
	Agroforestry	Correlation Coefficient	.193**	-.004	.154**	1.000	.235**	.139**
		Sig. (2-tailed)	.000	.942	.003	.	.000	.008
		N	367	367	367	367	367	367
	Service provision	Correlation Coefficient	.175**	-.142**	.107*	.235**	1.000	.284**
		Sig. (2-tailed)	.001	.006	.041	.000	.	.000
		N	367	367	367	367	367	367
	Small scale manufacturing	Correlation Coefficient	.004	-.111*	.095	.139**	.284**	1.000
		Sig. (2-tailed)	.933	.034	.068	.008	.000	.
		N	367	367	367	367	367	367

Source: Researcher 2020

4.7.1.1 Correlation between Income from Livestock and other Sources of Income

Income from livestock is classified as the value of sales and barter of livestock, plus the value of sales, trade and self-consumption of livestock products (such as milk, meat, eggs, honey, etc.) minus expenditure related to livestock production, which may include feed, labor and veterinary services, depending on the country (U Picca-Ciamarra *et al*., 2011)

From Table 4.5, the findings indicate a weak correlation between income from livestock/livestock products and income from crop cultivation (0.079) and small scale manufacturing (0.004) respectively. This means that any increase in income from livestock/livestock products does not increase income from crop cultivation and small scale manufacturing. This indicates that there exists minimum value addition on the livestock/livestock products. Further, there is a weak correlation between income from livestock/livestock products and income from trade, agroforestry and service provision respectively. This implies that an increase in income from livestock/livestock products does not necessarily bring about an increase in income from trade agroforestry and service provision. It can be deduced from these findings that most livestock farmers neither engage in trade, agroforestry and service provision activities. The weak link between livestock farming and the other three income-generating activities pose a serious threat to livelihood security. This is a clear manifestation of lack of diversification in farming practices thereby exposing farmers to catastrophic expenditures whenever there is an economic shock.

The results indicate that a majority of the households maintain livestock and those cattle make a small contribution to their incomes and that improvements in livestock production or profitability are unlikely to be a clear way out of poverty for most households. They would however be useful to many households and could provide a springboard for those sub-groups of the population that rely relatively more on livestock to support themselves (particularly in the context of rapidly growing demand for livestock products, which grows considerably faster than for staples). Increasing livestock returns may help some households resolve threshold obstacles to join more remunerative activities.

In conclusion, a report by Picca-Ciamarra *et al*. (2011) argues that livestock contributes livelihood security through a number of direct and indirect pathways. Firstly, they have cash incomes or income in kind by selling animals and/or selling and consuming milk, meat, eggs and other animal products. Secondly, animal sales provide immediate cash to meet substantial or unexpected expenditures as a source of investment (capital through herd growth) and insurance. Thirdly, they provide of manure, power supply and transport services that may be used on a household farm or exchanged on the market. Fourth, livestock not only contributes to social status as a source of income, but can also promote access to financial services in both formal and informal markets. For instance, studies by Alary *et al*. (2011) show that 60% of households in Niger rely on the selling of animals to cope with food shortages or unexpected medical expenses.

4.7.1.2 Correlation between Income from Crop Cultivation and other Sources of Income

From Table 4.5, the relationship between income from crop cultivation and income from trade (-.069) and agroforestry (-.004) is not significant. This implies that as income from crop cultivation increases/reduces, it does not increase/reduce income from trade and income from agroforestry respectively. This further confirms a missing link between the many farming activities and a clear indication of a lack of diversification. Further, there was a negatively low correlation between income from crop production and income from service provision and income from small scale manufacturers. This further shows that crop products do not undergo a value addition process thereby subjecting agro-entrepreneurs to minimal marginal returns from their harvest. Equally, these farmers are likely to suffer from post-harvest loses since small scale agro-processing units do not directly benefit them.

4.7.1.3 Correlation between Income from Trade and other Sources of Income

Table 4.5 further reveals a low positive correlation between income from trade and income from agroforestry (0.154) and income from service provision (0.107). It also shows that there is no significant relationship between income from trade and income from small manufacturers (0.095). It may suffice to argue that most households who engage in a trade do not engage in agroforestry and service provision activities.

4.7.1.4 Correlation between Income from Agroforestry and other Sources of Income

Agroforestry is defined as an economically viable land-use option on the environmental rehabilitation and sustainable agricultural development (Djalilov *et al*.2016). The relationship between income from agroforestry and income from service provision and income from small scale manufacturing is positively low. This implies that households' income from agroforestry does relate to income from other sources, a clear indication of absence or low diversification farming practices.

A study by Kassie (2018) observed that agroforestry has not only been practiced by farming families in Ethiopia, but also has a synergetic impact on non-farm revenue-generating activities and comparative economic return from customary food crops farming. In addition, after planting their farm parcels with trees, farmers spend their work time on non-farming activities, especially the transport of tree products and other commodities, which is relatively less labor intensive. The expansion of market and road networks, land rights and market expansion for agroforestry and non-farm activities jointly increase the adoption of agro-forestry and non-farm income generating activities. Furthermore, access to farm technology and farm household institutions can lead to a sustainable lifting of the rural economy.

In summary, the negative and low relationship between various sources of income-earning activities clearly shows a lack of diversification. Low or absence of diversification in farming activities reduces livelihood security since households cannot be cushioned against adverse crop failure for those who practice only one type of farming.

4.7.2 Range of Household Income from Crop Farming

The range of household income is a crucial indicator of the net worth, wealth or economic wellbeing and the consequent ability of households to transient into livelihood security. The study sought to examine the household range of income as portrayed in Figure 4.20.

Figure 4.20: Range of Household Income from Crop Farming

Source: Researcher, 2020

The study findings indicate that the majority of the households earn below KSh 20,000 income from crop production. This agreed with the assertions from one of the focus group discussants who explained that:

> "Most of the households farm on small parcels of land, the output is very low which has to be shared between the household for food provision and remains are sold out to earn income..... Sometimes households sell all the produce to middlemen to meet immediate needs and have to buy food for future use at a higher cost from the retailers or the same middlemen." (FGD held at Cheptais Sub County, 18th March 2020).

This low income from crop production in Bungoma County is explained by the ASDSP (2014) Baseline Survey Report as resulting from: the over-reliance on rainfall; the limited access to farm inputs; high costs of production emanating from poor infrastructure and distribution network; the inadequate extension services; inadequate access to emerging farming knowledge; poor cultivation practices; poor market access; low productivity and poor access to accurate or timely market information, factors reinforcing the low income. The low income from crop production can also be attributed to the low levels of agro-processing crucial for value addition.

4.7.3 Source of Financial Credit

The study sought to examine the sources of financial credit relied upon by the households in the study as shown in the Figure 4.21

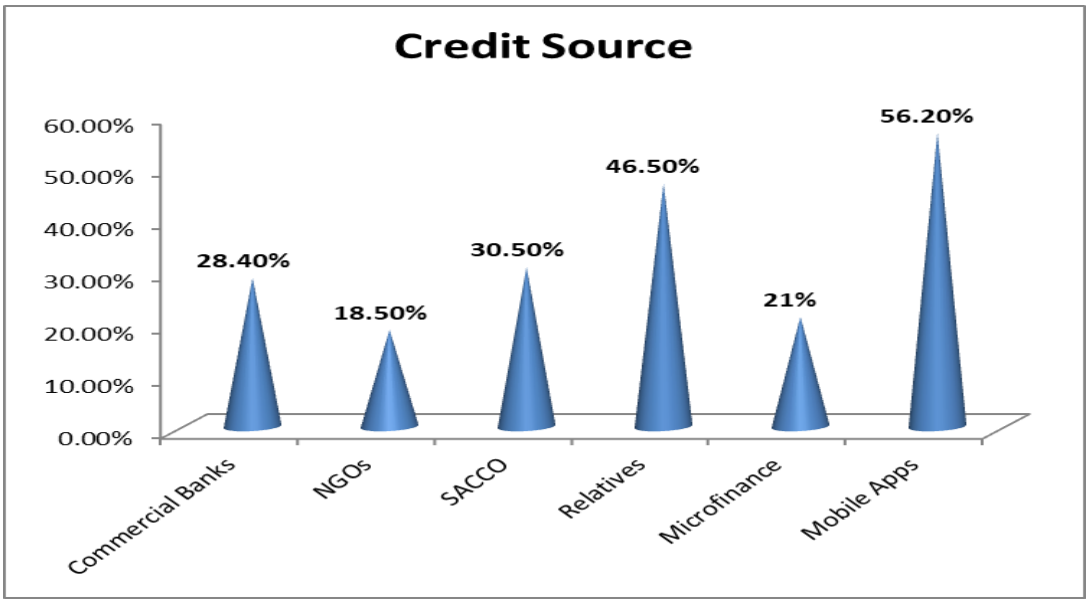

Figure 4.21: Source of Financial Credit

Source: Researcher, 2020

The findings indicate that the household's main source of financial credit were mobile apps and relatives. The same was pointed out in the focus group discussions that mobile loans especially Mshwari and Tala were easily accessed by the households. The commercial banks deny the majority of the households loans due to lack of collateral and inability to meet other requirements. An interview with an agribusiness officer revealed that most of the non-governmental organizations do not finance the agribusiness activities directly but instead they invest more in capacity building and input provision. The key informants further indicated that the active SACCOs that provide credit in the study area were the coffee and dairy cooperative societies.

The findings are aligned to the study by Muia *et al*. (2011) and Muriuki (2011) in that access to credit from financial institutions is curtailed by bureaucratic conditions and formalities as well as the high interest-rates. All these requirements go beyond the capacity of the non-formal crop manufacturers and enterprises to access finances for their product range diversification. McMichael (2013) observes that most creditors prefer to lend to resourceful farmers who afford the collateral to provide support. Wabwoba *et al*. (2015) note that, there is general concern that access to credits is limited by strict requirements including collateral and guarantors. The FGDs revealed that many household heads lack title deeds while others fear auctioneers due to failure to repay the loans. There is a low access for commercial and Agricultural Finance Corporation and the risks associated with agriculture discourage farmers from borrowing from the banks.

4.7.4 Additional Agribusiness Services Provided by Financial Institutions.

The study sought to examine the additional agribusiness services provided by financial institutions as shown in Figure 4.22

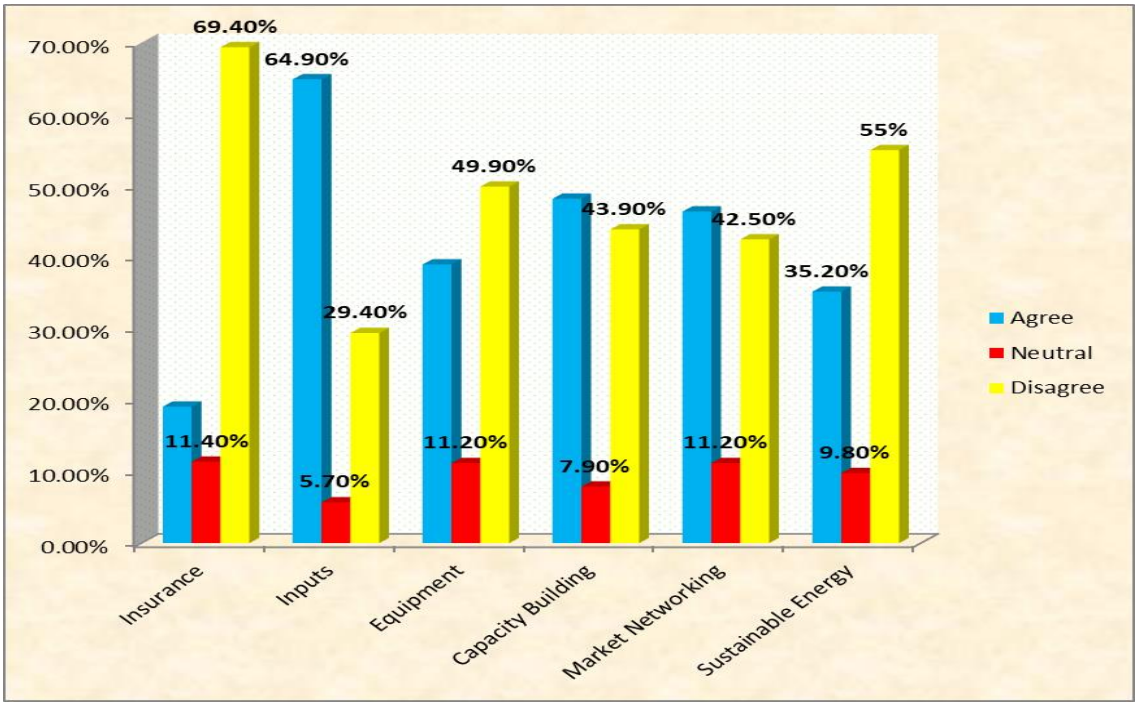

Figure 4.22 Additional Agribusiness Services Provided by Financial Institution

Source: Researcher 2020

The findings revealed that the additional services provided by financial institutions were mainly inputs at 64.9%, capacity building at 48.2% followed by market networking at 46.4%. The findings were in agreement with those from the FGDs whereby the common source of micro-financing was from the One Acre Fund which provides inputs, solar panels, iron sheets for building storage facilities and pest control equipment on credit to farmers. Most lending organizations prefer to provide inputs on credit to the agro-entrepreneurs to reduce the risks of mismanagement and the diversion of funds.

4.7.5 Barriers to the Household's Credit access

Multiple factors contribute to the exclusion of households from accessing credit services from financial institutions as indicated in Figure 4.23**.**

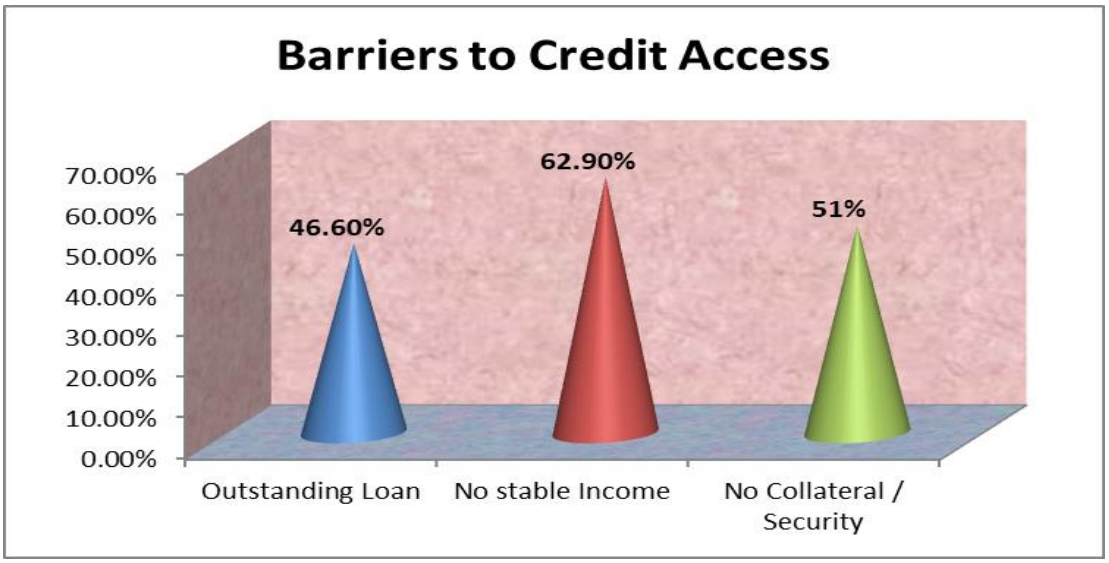

Figure 4.23: Barriers to household's Credit access

Source: Researcher, 2020

Majority of the households agreed that the lack of stable income (62.9%) denied them access to credit followed by the lack of collateral/security (51%). 46.6% of the respondents indicated that having outstanding loans acted as a barrier to access loans from financial institutions. The general implication is that most financial institutions give credit based on income, collateral and credit history. Klapper and Kunt (2012), argue that most people often do not believe they have enough income to transact with formal financial institutions and are concerned about requirements around collateral. Irregular and unreliable cash flows often discourage vulnerable people from using formal financial services. Wabwoba *et al*. (2015) pointed out that very high rates for loans provided to

farmers by financial institutions discourage farmers from applying for loans. Few households can access savings and credit cooperative societies.

Without access to credit, households are often unable to cope with risk and innovation-related costs in order to increase their productivity. Additional limits on access to financial services also include policy and legal obstacles and cultural norms, which prohibit women in particular from holding bank accounts or contracting without their husbands or other men's permission (FAO, 2011).

4.7.6 Forms of Current Savings

Forms of savings are an indicator of the state of capital accumulations which determines the investment and consumption potential, financial stability and the well-being of the household. The following figure shows a household's forms of current savings.

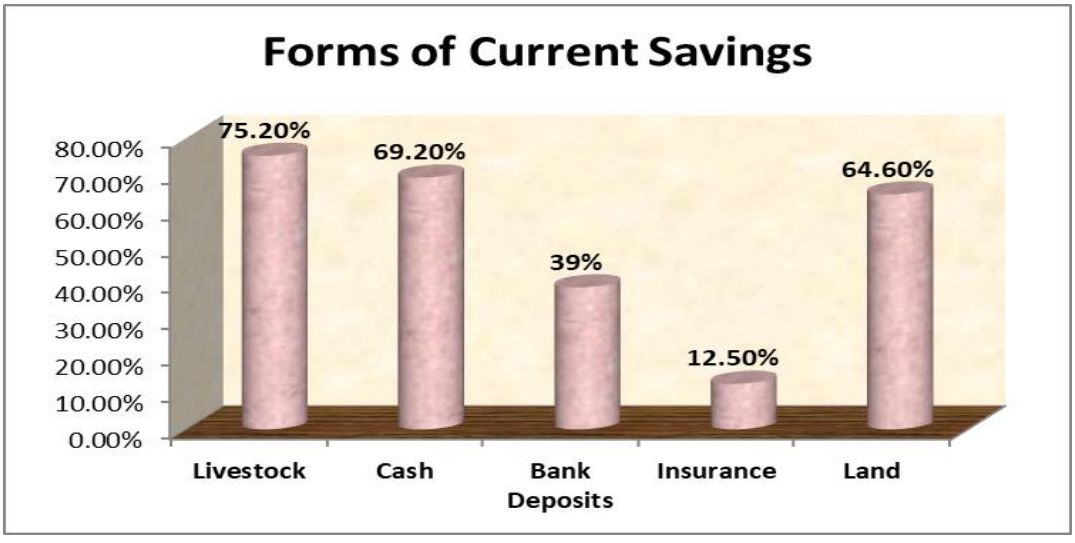

Figure 4.24: Forms of Current Savings

Source: Researcher 2020

The results portray livestock, cash and land as the major forms of savings at 75.2%, 69.2% and 64.6% respectively. Kozera *et al.* (2016) argue that the saving behaviour is the outcome of socio-economic conditions, such as sources and volume of income, the level of consumption, as well as the level of education. Households belonging to different socioeconomic groups vary in terms of the above-mentioned. One of the members in an FGD explained the factors that determined the forms of savings as follows:

> *'Most of the households spend their income on immediate needs and for survival, very few households can afford to save… and if they have to save then they buy property within the community…. Households do not understand how the insurance policies operate…some fear losing their money to insurance agencies……"* **(**FGD Bumula Sub County, 19th March 2020).

4.7.7 Farming Activities Practiced by the Household

The farming activities practised by the households vary among the households with some diversifying these activities. In the long run, these choices of activities have financial implications for the household.

Figure 4.25: Farming Activities

Source: Researcher, 2020

The findings indicate that crop farming activities were major at 92.5%, followed by poultry-keeping at 83.8%, livestock farming at 78.2% and tree planting at 62.1%. It implies that households diversify farming activities and that all the activities are important to the households. The households in Bungoma practise farming activities for subsistence and the respondents believed that they needed to be more self-reliant on food and income provision. The farming activities are rain-fed and thus the need to spread the risks and income sources. The ASDSP (2014) points out that result of this kind of diversification is small quantities (low volumes) of each commodity produced and therefore low competitiveness. The scale of the operations of the farming activities results in low incomes.

4.7.8 Importance of the Crop Farming Activities to the Livelihood of the Household

The study sought to understand the importance of crop farming activities to the livelihood of the household as presented in the figure below.

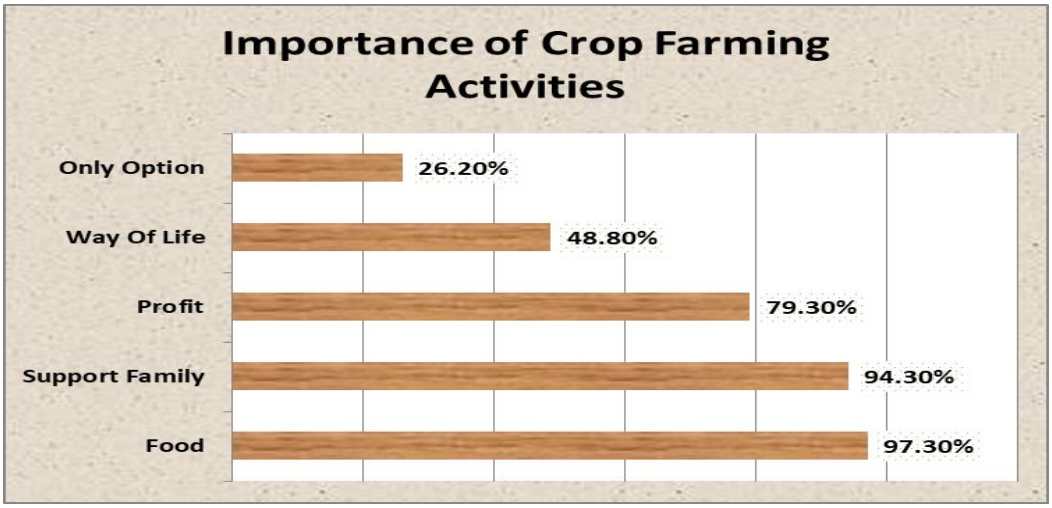

Figure 4.26: Importance of Crop Farming Activities

Source: Researcher 2020

The study findings show that crop farming activities are carried out for food at 97.3%, to support a family at 94.3%, for making a profit at 79.3%, as a way of life at 48.8% and as the only option at 26.2%. The farming for food surpasses the profit motive which has a negative implication on the agribusiness performance. Agriculture practice in Bungoma County is mainly for subsistence**.** Knowledge of the input factor productivity is very low within the County and farming is frequently done for subsistence needs with minimal surpluses.

4.7.9 Proportion of the Farm Crop Output Marketed by the Household

The proportion of farm crop output marketed by the household implies the household income. There exists a strong relationship between market participation and exiting poverty.

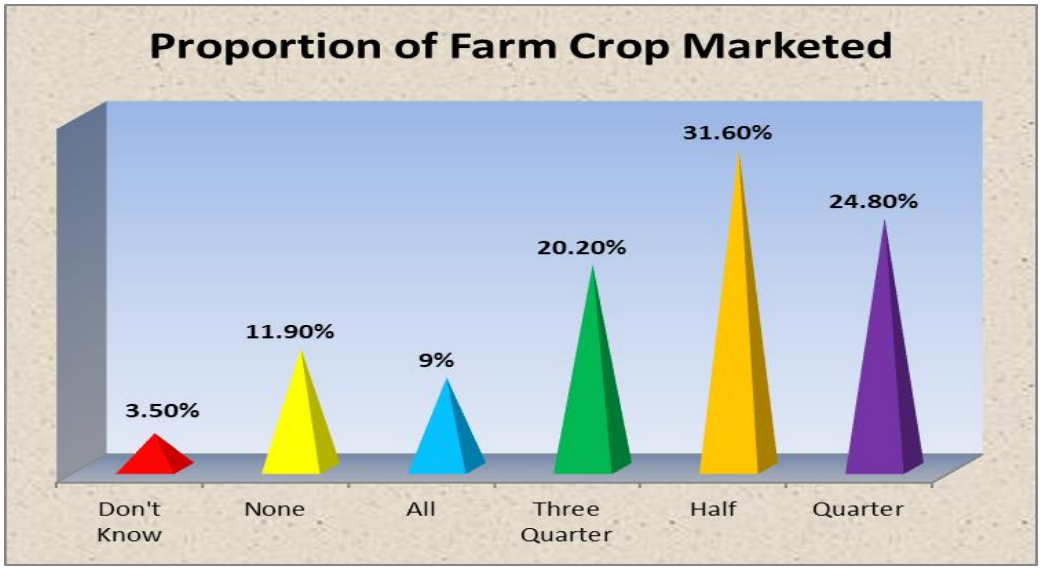

Figure 4.27 Proportion of the Farm Crop Output Marketed

Source: Researcher 2020

The figure presents the study findings on the proportion of crop output marketed by the household. Majority of the households (31.6%) market half of their total harvest, a clear indication that they consume a great proportion of what they produce. AGRA (2017) affirms that subsistence-oriented farms frequently sell small amounts of produce at harvest to obtain cash income, but are typically net buyers of staple food over the entire year. The proportion of products sold is mostly a function of the other subsistence needs of the family, that is, the need to buy other food and non-food products. The lack of proper storage and drying equipment is equally a push factor to dispose off the produce. In most cases, the households buy the same food crops later in the off-peak seasons at higher prices. Unfortunately, the proportion of the household produce marketed is smaller than the proportion acquired in the markets and consumed creating a balance of payment challenges for the households.

4.7.10 Market for Farm Crop Products

Market integration encourages the adoption of modern technologies and enhances the gains of producers with the potential to stimulate economic growth. Figure 4.28 presents a variety of markets for farm crop products.

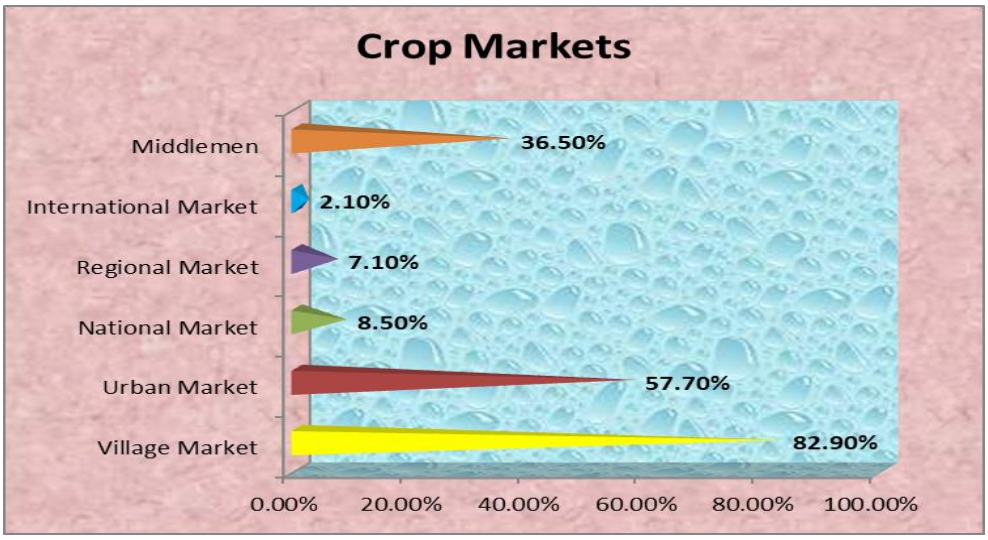

Figure 4.28: Market for Crop Products

Source: Researcher 2020

The findings indicate that farm products is mostly sold in the village market (82.9%), urban market (57.7%) and through middlemen at 36.5%. Through the focus group discussions in Cheptais, it was revealed that most of the produce is sold in local markets and retailers and middlemen are informed when the crops are ready so that they can come to buy. A focus group discussant explained that:

> "Farmers plant and wait for the brokers to come for the tomatoes and onions…buyers come with big lorries from Uganda and then give the farmers cash and harvest the products directly from the farm…..One farmer tried to take tomatoes to Chwele but was harassed in process… the cost of transporting and accessing Chwele market was not easy…" (FGD Cheptais Sub County, 18th March 2020).

The lack of information on the destination markets/ prices and the inability to afford the means of transport to access external markets push farmers to sell their commodities at the farm gate at low prices. Sometimes the prices of the products are negotiated before harvesting or weighing the goods.

The local markets in Bungoma are flooded with homogenous, unprocessed products in small quantities reducing their competitiveness and consequent returns. The farmers rely on the middlemen due to lack of connections to the urban, national and regional markets and the small quantities do not make economic sense to venture into external markets. These contextual hiccups are a barrier to the County's ability to benefit from the opportunities of agribusiness.

4.7.11 Trend of Change in Total Income from Crop Production

The study sought to examine the trend of change in income from crop production.

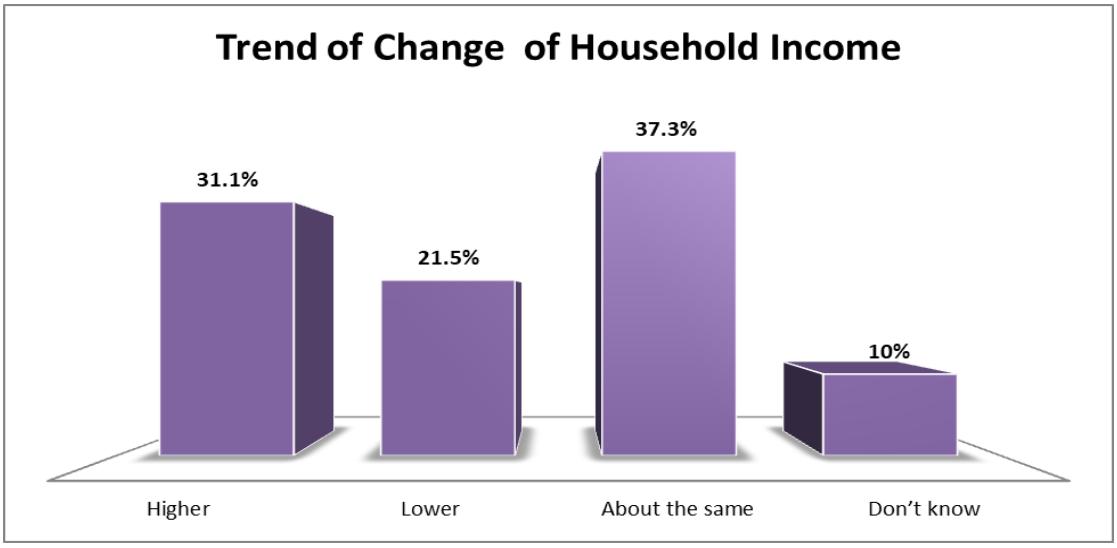

Figure 4.29: Trend of Change in Income from Crop Production

Source: Researcher 2020

The findings show that the majority income from crop production was about the same at 37.3%. This was affirmed by an agribusiness officer in Bungoma North through an interview that the problem of farmers is that they do not know how to carry out the costing or valuing of the crops from the point of planting resulting into great losses. The adoption of modern technologies and the exploitation of new markets translate into

income changes. In Bungoma County, the farmers are not entrepreneurial resulting in static returns from crop production. Despite the growing demand for agro products, the households have lagged in transforming the mode of production to respond to the changing global agribusiness needs. The situation is reinforced through the utility of obsolete technology, reliance on the weather patterns, the negative attitudes towards agribusiness and the lack of entrepreneurial skills to enhance productivity and competitiveness of agribusiness.

4.8 Social Capital for Agribusiness Incubation and Livelihood Security.

The third objective of the study was to assess the influence of social capital for agribusiness incubation on livelihood security. The existence of social ties facilitates access to key livelihood resources.

4.8.1 Social Group Belongingness

The study sought to establish a variety of social groups that households belong to as presented in figure 4.3**.** Group membership is a strong indicator of livelihood security.

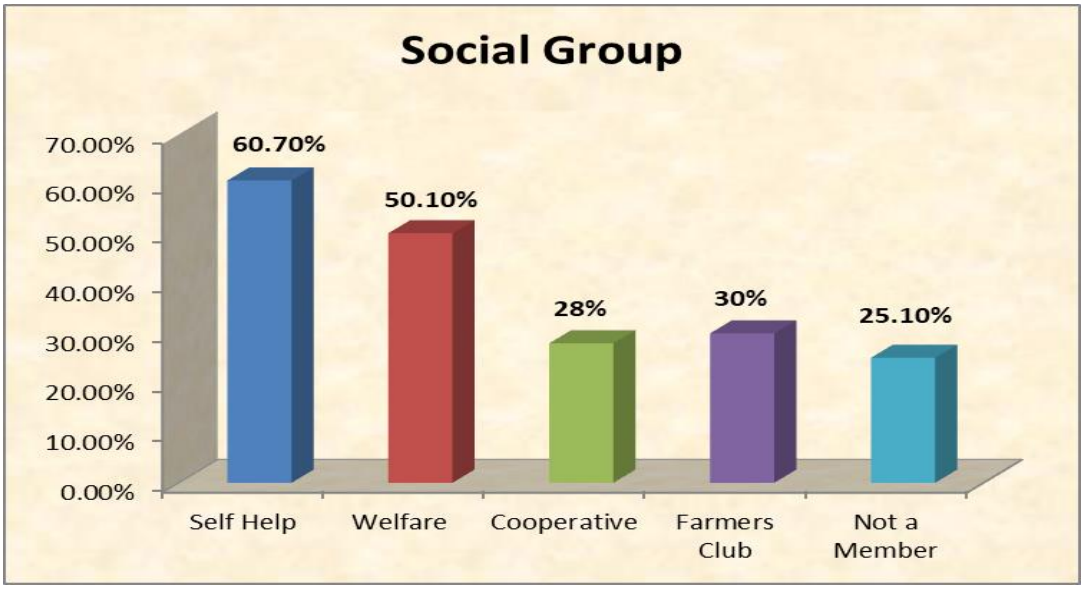

Figure 4.30: Social Group that Household Belongs

Source: Researcher, 2020

At 60.5%, the majority of household leaders belong to a self-help group and 50.1% to a welfare group. Through the FGD, it was revealed that participation in cooperatives was limited mainly to coffee and dairy farmers. Groups are formed by people to synchronize their activities and accomplish goals that cannot be done alone. Groups develop individual senses and increases self-awareness. Group membership controls the actions of individuals (Baber, 2017).

A study carried out by Olwande and Mathenge (2011) indicate that membership in farmer organizations or groups are linked positively to increased market participation. Collective action is important to promote access to relevant knowledge and credit that are relevant in accessing market opportunities.

Groups of smallholder farmers' work together to increase access to loans and improve credit terms. Small-scale farmers' associations have many benefits and are organized to

represent and manage the needs of the Members. Services are offered according to the needs of the members and the market. The group is also a forum in which all members express equal rights and voice their concerns, such as raising the issue of road maintenance and lobbying for better service. Associations enable donor sponsored projects and training to be delivered in a cost-effective way. The agri-business officers prefer using the group model to reach the community and other non-governmental stakeholders tend to channel their support into the same groups. Membership in a social community increases the chances of building capacity and accessing institutional support and act as collateral for credit institutions. Other benefits include: information sharing, risk sharing, cost reduction, veterinary facilities, repairs and maintenance, increased bargaining power and increased transport capacity. Associations boost rural mobility, create demands for services, create jobs, strengthen the democratic process and dialog in the local community.

4.8.2 Reasons for not Joining Group

Joining groups reinforce the accomplishments of households and there are a variety of groups in existence. The study findings on the reasons for not joining groups are presented in Figure 4.31.

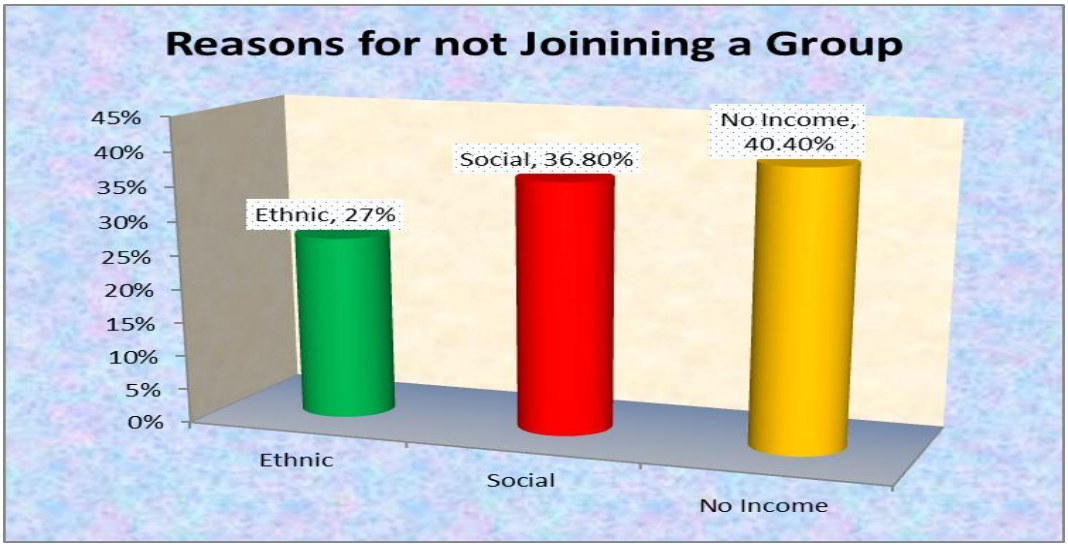

Figure 4.31 Reasons for Not Joining Groups

Source: Researcher, 2020

The reasons for the households not joining groups include the lack of income at 40.4%, social class at 36.8 and ethnicity at 27%. Though the households face barriers to the joining of social groups, these reasons do not entirely exclude them from joining social groups. The low-income levels act as a barrier to group inclusion because most groups charge membership fees and rotational funds to support members. The group projects in most cases require equal contributions from each member so that the benefits can be shared equally. The focus group discussions revealed that groups existing now as farmer or agribusiness groups were initially formed for the welfare mandate and converted to meet economic needs and donor requirements. In most cases, members evade the risk of incorporating strangers. From their experiences, default cases of members are high with strangers whose group loyalty levels are weak and cannot be easily traced when they relocate.

4.8.3 Benefits Derived from Membership in Social Groups

The study sought to establish the benefits derived from membership in social groups as portrayed in Figure 4.32**.**

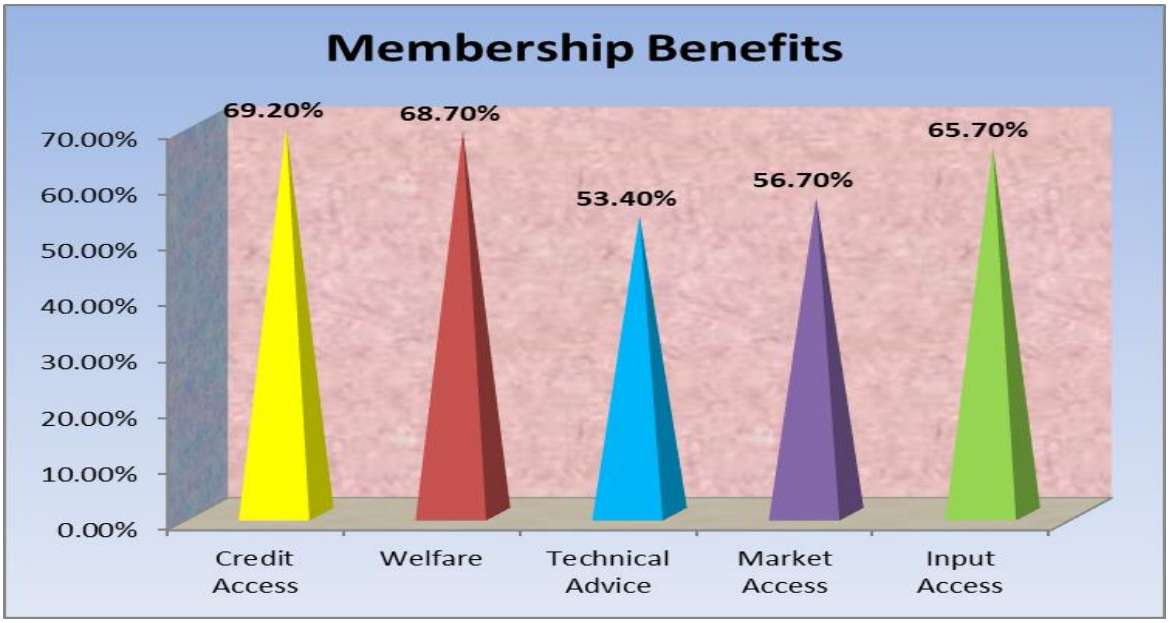

Figure 4.32 Benefits Derived from Membership in Social Groups

Source: Researcher, 2020

The response rate was in terms of credit access at 69.2%, welfare benefits at 68.7%, input access at 65.7%, market access at 56.7% and technical advice at 53.4%. The findings show that social groups are beneficial to the household's access to credit, technical advice, markets and inputs which are crucial in the agricultural transformation that feeds into agribusiness uptake translating into secure households. ASDSP (2014) support the perception that membership to groups is an important avenue for technological information and may facilitate access to services such as credit and extension. Adepoju (2011) asserts that households use social groups to develop coping strategies to deal with the risk of income fluctuations, access to credit, welfare aspects, dispute resolution and

enhanced economic achievement through increased trust and lower transaction cost. All of these mechanisms can potentially affect household welfare and alleviate poverty.

Gachemi (2018) points out that through membership in social groups, households can access credit and market their produce. These groups can help strengthen household links to markets and diversify their economic activities. Nugusse *et al.* (2013) and Kyazze (2010) note that cooperatives generate employment, increased income of the members, and provide social protection through educating members. Some savings and credit cooperatives provide development loans for housing, solar installation and water harvesting. One of the sub-county agribusiness officers reinforced that agriculture generally is a risky venture which calls for social cushioning of the households from the losses. The fact that most of the Bungoma dwellers practices are small scale farmers, collective action of the households helps them to borrow money in groups, share technology, attract institutional support services and pool supplies to meet the thresh hold demanded in the markets.

4.8.4 Social Groups and Demographic Vvariables

The study sought to establish whether gender, education and income play a significant role in determining social group belongingness. Many households are excluded from the groups they wish to belong to for a variety of reasons. This exclusion affects their performance in the agribusiness sector where networking is needed especially for the smallholders who face several coordinating challenges. Sometimes the member characteristics make them prefer to belong to one group category and not the other due to the perceived benefits and group requirements. Sometimes members cluster based on the institutional support providers requisites. For example, most stakeholders target the

women and the youth groups for support. A key informant explained that most educated people prefer to work with support institutions directly avoiding social groups and cited their meetings as energy draining, time-consuming and experiencing high turnover as a result of the group politics. The arguments raised in the focus group discussions informed the further analysis to verify the factors determining group belongingness as shown in Table 4.6.

Table 4.6 ***Social Groups and Demography (Gender, Education and Income)***

	N Valid cases	Pearson Chi Square	df	Ass.Sig (2-sided)
Social Groups and Gender				
Self –help group	367	3.045[a]	4	.550
Welfare group	367	8.239[a]	4	.083
Cooperative society	367	14.828[a]	4	.005
Farmers' Club	367	19.285[a]	4	.001
Not a member of any social group	367	3.422[a]	4	.490
Social Groups and Education				
Self –help group	367	23.675[a]	12	.023
Welfare group	367	19.281[a]	12	.082
Cooperative society	367	40.834[a]	12	.000
Farmers' Club	367	19.177[a]	12	.084
Not a member of any social group	367	23.377[a]	12	.025
Social Groups and Income				
Self –help group	367	27.312[a]	16	.038
Welfare group	367	27.883[a]	16	.033
Cooperative society	367	18.914[a]	16	.273
Farmers' Club	367	15.819[a]	16	.466
Not a member of any social group	367	21.747[a]	16	.152

Source: Researcher 2020

The study sought to establish whether gender plays a significant role in determining social group belongingness. From the table, it can be deduced that gender does not play a significant role in determining whether one belongs to; self –help group, Welfare group and not a member of any social group. The Pearson Chi Square value was .550, 0.083 and 0.490 respectively. The value were above p= 0.05 at 95% confidence level. However, gender played a significant role in determining belongingness to a cooperative society and a farmers club. The Pearson Chi Square values were statistically significant at p = 0.005 and 0.001 respectively < 0.05.

From FGD, most men preferred being members of a cooperative society and a farmers club. Gachemi (2018) asserts that women face collateral hiccups in acquiring loans from financial institutions. Group solidarity acts as collateral since the group members can guarantee each other loans.

The study further sought to establish whether education plays a significant role in determining social group belongingness. From the findings, education does not play a significant role in determining whether one belongs to a welfare group and farmers club. The Pearson Chi Square value was .082 and .084 respectively. The value were above p= 0.05 at 95% confidence level. However, education played a significant role in determining belongingness to self-help, cooperative society and not being a member. The Pearson Chi Square values were statistically significant at p = 0.023, 0.000 and 0.025 respectively < 0.05. Generally, education determines membership in social groups. From the FGDs the common perception was that the educated have alternative networks apart from the social networks that are entirely relied upon by the not well to do households.

Thus, they argued that their socio-economic status affects their ability to interact in self-help groups and prefer more formal cooperatives.

The study further sought to establish whether income plays a significant role in determining social group belongingness. From the findings, it can be deduced that income does not play a significant role in determining whether one belongs to; cooperative society, farmers club and not being a member. The Pearson Chi Square value was 0.273, 0.466 and 0.152 respectively. The value were above p= 0.05 at 95% confidence level. However, income played a significant role in determining belongingness to self-help and Welfare group. The Pearson Chi Square values were statistically significant at $p = 0.038$ and 0.033 respectively < 0.05.

A key informant interview revealed that the main cooperatives are the coffee cooperatives and only farmers growing these commodities are recruited as members thus excluding those who do not grow coffee. Nugusse *et al.* (2013) opine that financial shortcomings are the main reasons for the formation of cooperative societies and households join cooperatives to solve the shortage of financial resources. The likelihood to become a member of the cooperatives is less likely when the household has easy access to alternative credit sources, in this case, the self-help and welfare groups.

The study observed that most households have minimal knowledge or interactions with farmers clubs. From the FGDs it was revealed that most agribusiness stakeholders use the self-help and welfare groups as reference points as well as collateral for group members' access to credit. In most cases, men are excluded because most stakeholder support initiatives target women and youths groups. Women benefit more because they already

belong in welfare or self-help groups which are easily transformed to meet the donor requirements. The key informant interviews with the 5 sub-county agribusiness officers revealed that the utilization of the group model has forced agro-entrepreneurs to belong to a group to benefit or face exclusion from institutional support.

4.8.5 Social Capital and Membership Benefits: Logistic Model

Logistic regression, predicts dependent variable as a function of the probability that a particular subject will be in one of the categories (for example, in this study the probability that one is a member of a social group or not) Membership to a social group was coded = 1, non-membership to social group = 0. The regression model predicted the logit, that is, the natural log of the odds of being a member of a social group or otherwise against the benefits associated with this membership.

4.8.5.1 Diagnostic Assumptions for the Logistic Regression

The study conducted a correlational analysis for the predictor variables to rule out the problem of multi-collinearity - strong relationship between predictor variables.

Table 4.7 Correlation Matrix

	Constant	Credit access	Welfare	Technical advice	Market access	Input access
Constant	1.000					
Credit access	-.223	1.000				
Welfare	-.280	-.394	1.000			
Technical advice	-.143	-.011	-.257	1.000		
Market access	-.118	-.073	-.026	-.482	1.000	
Input access	-.016	-.159	-.018	-.276	-.391	1.000

Source: Researcher 2020

The results showed that there was a negative relationship between the predictor variables. The test, therefore, confirmed the fitness of the logit model for this analysis.

Further**,** goodness-of-fit statistics to assess the fit of the logistic model against actual outcomes was conducted. The results show that the Omnibus test for logit model was statistically significant implying that the model was fit. The Hosmer and Lemeshow Test yielded χ^2 (367) = 2.472, df =8, p=.963>0.05 was insignificant suggesting that the model was fit. The null hypothesis of a good model fit was therefore considered tenable.

4.8.5.2 Logistic Regression Analysis

A two-predictor logistic model was fitted to the data to test the research hypothesis regarding the relationship between the likelihood that social capital (belonging to a social group) is associated with membership benefits (livelihood security). The logistic regression analysis was carried out by the Logistic procedure in SPSS version 23. The

results of the overall model evaluation for logistic regression analysis of 367 respondents for the benefits of social capital on group membership are shown in Table 4.9.

Table 4.8 ***Logistic Regression Analysis of Benefits of Social Groups***

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Credit access	.220	.100	4.88	1	.027	1.247	1.025	1.516
Welfare	.563	.107	27.68	1	.000	1.756	1.424	2.165
Technical advice	-.212	.140	2.307	1	.129	.809	.615	1.063
Market access	-.084	.137	.374	1	.541	.920	.703	1.203
Input access	.075	.123	.374	1	.541	1.078	.847	1.374
Constant	-2.502	.311	64.78	1	.000	.082		

Source: Researcher 2020

The result in Table 4.8 shows that the predicted logit of (Membership to a social group) = -2.502+ .22(Credit Access) +.563(Welfare) - .212(Technical Advice)-.084(Market Access) +.075(Input Access). The binary logistic regression indicates that credit access and welfare are significant predictors of membership to a social group (social capital) – (χ^2 (1, N=367) =4.879, p=0.027 (<0.05) and (χ^2(1,367) =27.679, p=0.000 respectively. The other three predictors, that is, technical advice, market access and input access are not significant predictors of membership to a social group. All the five predictors

explained 77.9% of the variability of social capital for agribusiness livelihood security. The odds ratio (OR) for credit access is 1.247 at 95% Confidence Interval. This implies that a member of a social group is 1.2 times likely to get credit access as compared to a non-member Exp(B)= 1.24. Similarly, a member of a social group is 1.76 times likely to benefit from welfare as opposed to a nonmember (Exp (B) =1.76). However, social group membership was not dependent on the remaining three predictor variables. The model correctly predicted 88.7% of cases of non-membership to a social group and 45.7% of cases of membership to a social group, giving an overall percentage correct prediction rate of 77.9%.

4.9 Institutional Support and Agribusiness Incubation

Institutional support is critical for creating and building a competitive and a wide range of agribusiness capabilities for enhancing effectiveness through both upstream and downstream activities. An interview with the sub-county agribusiness officers indicated that indeed there was the need for agribusiness intervention in Bungoma County and they identified the following challenges: the level of agricultural production and the scale of marketing of agricultural products is very low resulting into low gross margins for the households; value addition is minimal with the presence of few small cottage industries; there is general lack of goodwill from the County Government which has been focusing on production and not linking it to agribusiness contributing to the lagging of the sector. The first challenge for intervention is to determine the constraints faced by the households in practicing agribusiness as noted by Kirimi *et al.* (2013) who observed that facilitating the expansion of market participation by smallholder farmers is critical in the transition out of poverty. This would involve enabling access to affordable production

inputs, suitable in ensuring farming households are not trapped in low productivity. The use of productivity-enhancing inputs improves the ability to produce a marketable surplus.

4.9.1 Agribusiness Support Services

A range of agribusiness support services is provided to the households by multiple stakeholders as presented in Figure 4.33**.**

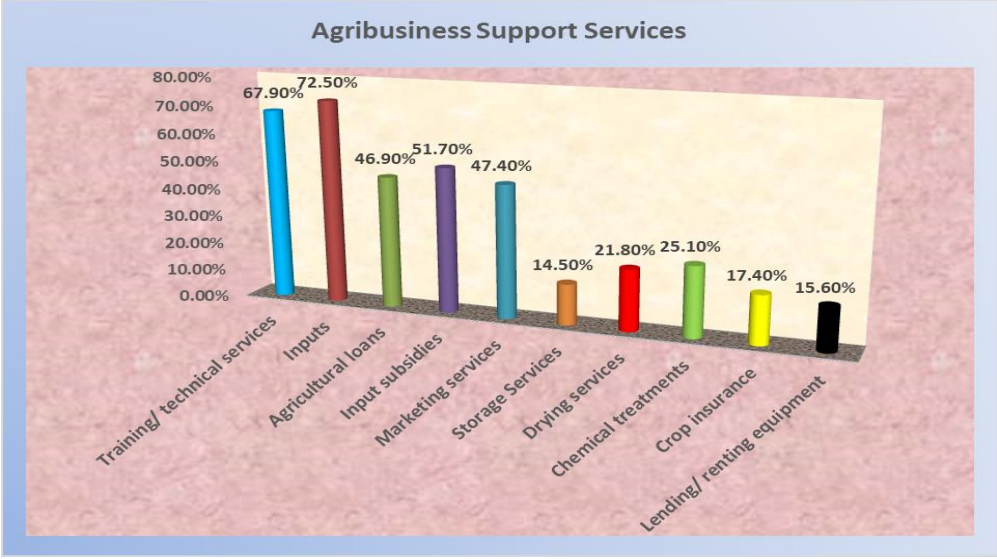

Figure 4.33 Agribusiness Support Services

Source: Researcher, 2020

The study findings show that a variety of agribusiness support services accessed by the households. The main institutional support services include inputs at 72.5%, training/technical services at 67.6%, and input subsidies at 51.7%, marketing services at 47.4% and Agricultural loans at 46.9%. This data is essential in prioritizing areas for external intervention and determines the entry point for support institutions. The FGDs supported these findings that the households receive training mostly from non-governmental organizations who reach the households through the agribusiness officers

and existing common interest groups. The farming households receive inputs on credit from non-governmental organizations like the One Acre Fund, GIZ, JICA and CREADIS. Input manufacturing companies also train the farmers on the new technologies and improved seed varieties and give inputs on credit. Cooperative societies especially the coffee societies provide seeds and inputs on credit to the members and as well as the marketing of the output. Private retailers provide storage and collection points for the onions, tomatoes and survey market for the farmers produce. For example, the Malakisi Leaf Centre collects the dried tobacco, sorts, and transports and markets the coffee sherries to the cigarette industries.

The Ministry of Agriculture provides inputs to the vulnerable households as well as subsidized inputs; they provide training and technical services to farmers' on-demand and utilize the group model to disseminate knowledge and skills. For example, the NARIGP (National Agriculture and Rural Inclusive Growth Project) is a 5year project financed by the National Government, World Bank and County Government, started in 2017, intending to increase agricultural productivity and profitability of targeted rural communities. The project supports community driven development, strengthens producer organizations and value chain development.

The other Government initiative is the NARIC programme which is funded by the World Bank through the County Government. The project aims to improve the quality of fast-growing varieties, disease resistant and high yielding crops in selected areas based on high poverty levels. The project targets the dairy, banana, beans and poultry value chains. Besides, the Agriculture Sector Development Support Programme (ASDSP) is also

crucial in transforming the agriculture sector into an innovative, commercially oriented, competitive and modern industry that contributes to poverty reduction, improved food security and equity. ASDSP aims to improve the production and productivity of rural smallholder farmers and off-farm sectors.

Institutions such as KARI, JKUAT and the Mabanga Agricultural Training Institute provide for the research, training and knowledge sharing, soil testing, high yielding varieties, drought-resistant varieties and value chain innovation.

AGRA (2017) opines that subsistence farmers require special help in acquiring necessary knowledge and skills, and becoming organized to link to modern value chains. Many households are either too poor or far-off from the markets, but assistance that helps them increase their farm productivity contributes greatly to the protection of their food and revenue. Subsistence farmers are usually the most vulnerable and most exposed to climate risk and need support to establish resilient farming systems in addition to safety nets. Babu *et al*. (2015) argue that effective distribution of inputs is necessary to increase productivity at farm level. Generally, the study observed low provision of storage, drying, chemical treatments, crop insurance and lending/renting equipment services which are crucial elements of the agribusiness incubation process by enhancing its productivity and competitiveness.

4.9.2 Satisfaction with Agribusiness Support Services Providers

The study sought to establish the extent at which the households are satisfied with the agribusiness support services providers as presented in Figure 4.34.

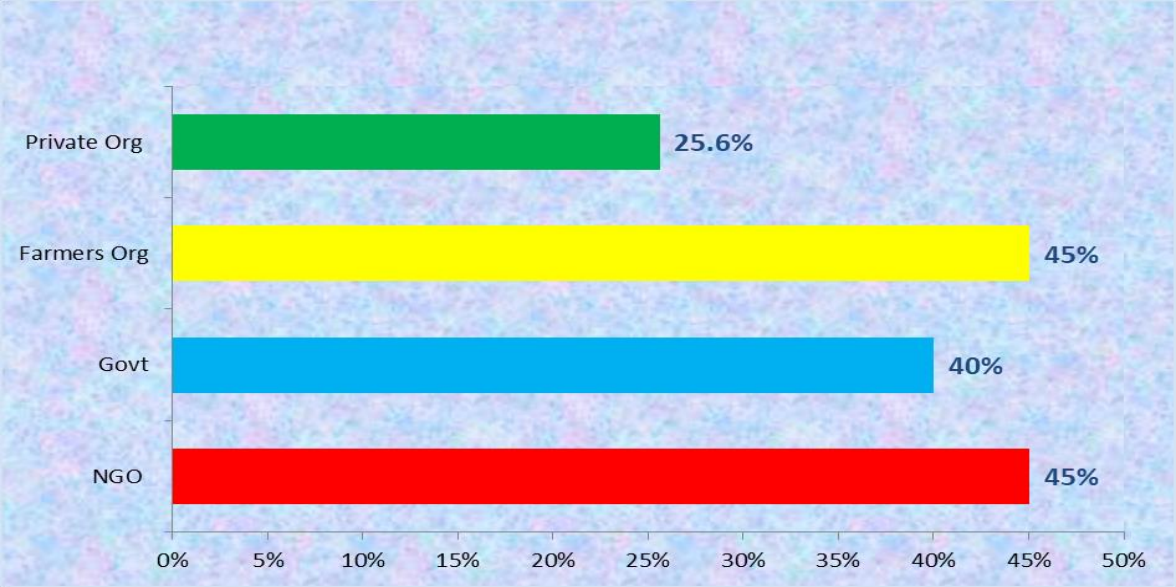

Figure 4.34 Level of Satisfaction with Agribusiness Support Services Providers

Source: Researcher, 2020

The general level of satisfaction with agribusiness support services from various institutions is below average, with NGOs at 45%, farmer organizations at 45%, and government agencies at 40% and private organizations at 25.6%. The FGD and key informants revealed that the low level of satisfaction was attributed to the exclusion of most of the households from benefiting from the services provided. The agribusiness officers engage with those already practising agribusiness and seek for their services (services are demand-driven). The sub-county agribusiness officers are derailed by the logistical challenges in that they do not receive adequate support in the form of funds and vehicles to facilitate them to reach the households. They mostly depend on other stakeholders especially the NGOs for the means of transport and funding for agribusiness projects. Further, agrochemical and seed companies target potential buyers of their products while the farmer organizations target the members engaged in the production of their commodities, resulting into the exclusion of those who do not produce crops.

The responses indicate a low level of satisfaction from the farmer organizations at 25.6%. In comparison, Adong *et al*. (2013) note that farmer organisations act as a means of reaching smallholder farmers by other stakeholders to improve agriculture productivity and food security. Overall, farmers' groups are vital avenues to access markets, improved technology and credit information. Farmer organisations provide are avenues for mobilizing farmers around a common goal for the delivery of services and formulation policies that promote agriculture.

In Bungoma County, the Nzoia Sugar Company is the major Government surviving agro-based industry that has been depended upon by the community as a source of livelihood. The Company has several outreach offices spread out in the County that monitor the germination of the cane, provide fertilizers, herbicides and seeds on credit. On the contrary, this Company is crumbling with management challenges resulting into the non-payment of the sugarcane farmers who complained of not being paid for over two years and are stuck with overgrown sugarcane.

Plate 4.8: Nzoia Sugar Company in Kanduyi Sub County

Source: Field Data, April 2020

The other concern is the lack of processing companies for the other agricultural commodities produced like sweet potatoes, bananas and fruits. A few maize millers exist in the Bungoma County, with the majority being privately owned. The government (CDF) millers exist but are dormant. Maize farmers from Cheptais and Bungoma North sub-counties complained of the long distance to access services in the National Cereals and Produce Boards (NCPD). Those situated in Bungoma North are forced to take their maize produce to the Lugari NCPD in Kakamega County or silos in Trans Nzoia County. Most farmers rely on the middlemen to buy and transport their maize to the NCPDs due to lack of the means of transport and the long queues together with the associated costs that discourage them.

One participant from the FGD clarified their experiences that:

> "Last year we harvested so many tomatoes, the government failed to protect us……lorries were coming from Uganda full of tomatoes……when you try to sell, you find the market flooded with cheaper tomatoes……sometimes middlemen knock you off with cheaper tomatoes from Nakuru….you are forced to sell at a lower price…price-cutting.." (FGD at Bumula Sub County, on 19th March 2020).

The government liaises with NGOs to implement their programs. NGOs take advantage of the skills and knowledge of the government officers and their community rapport to undertake their projects. It was evident that most of the fieldwork done by the sub-county agribusiness officers were initiated through the NGOs especially those targeting the youths in agribusiness and food security initiatives that dominate the NGO agenda. On the contrary, the NGOs enter the community with preconceived areas of support which might not be the real agribusiness needs of the households resulting into the misplacement of support and the consequent non-sustainability as articulated by one of the FGD discussants in Cheptais Sub County.

> "GIZ came through the agriculture office……they identified our existing group and supplied improved sweet potatoes seedlings which have to be processed into bread and biscuits…..they promised to buy from us the sweet potatoes and bring equipment for processing….we underwent training for growing and processing the sweet potatoes…..now the potatoes are overgrown, they were to be harvested after three months and they are now five months old…the NGO is not coming to assist us to market or process……." (FGD at Cheptais Sub County on 18th March 2020).

Plate 4.9: Dormant Sweet Potato and Banana Agroprocessing Centres

Source: Field Data, April 2020

Key informant interviews revealed that a variety of stakeholders are involved in the provision of agribusiness support. For example in Bumula, the Kimwanga Agro-processing Centre which is a nongovernmental organization initiative (CREADIS) supports groups in the distribution of high yielding seedlings and processing of sweet potatoes**.** At Cheptais, the banana Rippening project was an initiative of the County Government of Bungoma Special Programme to raise the livelihoods of the community. The raw materials (bananas) were to be sourced from the local community to produce banana flour, cakes and bread for the local market. The project stalled immediately due to the lack of adequate power to run the modern machines that require three-phase as opposed to the existent one phase power. The project has also suffered due to political interferences and the lack of political will.

Plate 4.10: Farm Inputs from the One Acre Fund in Cheptais

Source: Field Data, April 2020

The majority of farming households preferred the services offered by the One Acre Fund, that is, fertilizers, training, high yielding seeds and equipment. The services are spread in all the sub-counties with close contact with the farmers. Farming households receive the inputs on time and the crops are closely monitored to prevent the pre and post-harvest losses.

4.9.3 Nexus between Institutional Support, Agribusiness and Livelihood Security

The study sought to find out whether institutional support services significantly mediated the physical capital, financial capital and social capital for agribusiness incubation and livelihood security.

4.9.3.1 Diagnostic Assumptions

There were 10 items on agribusiness support services provided by various stakeholders. The Principal Component Analysis (PCA) was used to eliminate those items that had a low variance to sustain items that captured most of the variability among the services being provided.

The principal component analysis indicated the presence of two components with eigenvalues exceeding 1(training/technical services and input. An inspection of the scree plot revealed a clear break after the second component.

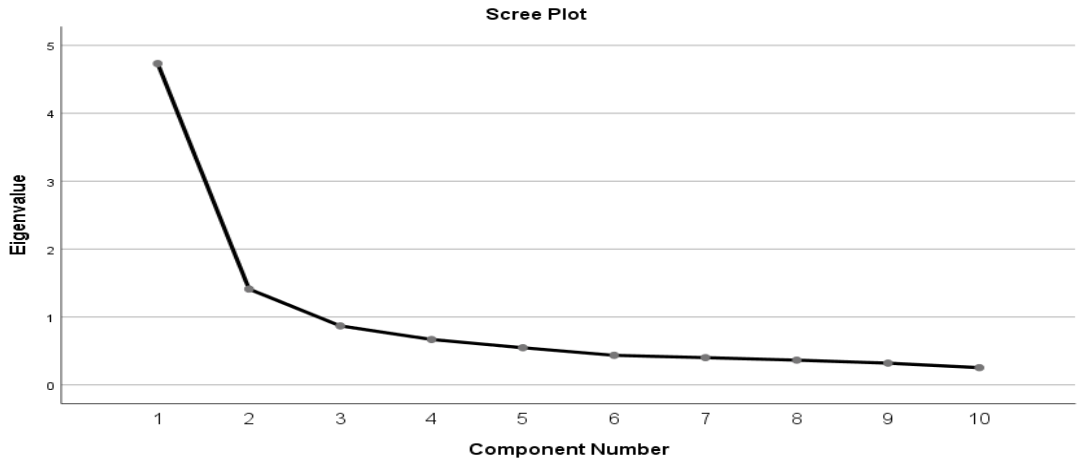

Figure 4.35 Scree Plot

Source : Researcher 2020

Figure 4.35 presents the eigenvalues of the correlation (covariance) matrix. The scree plot shows that the first two components have the highest variance. Then cumulatively, the first two components account for over 61% of the variation. This inspection confirms with the PCA and therefore forms a good basis for parametric statistical analyses. Based on the final solution for PCA, the two components that accounted for about 61% of the

variance were; training/technical services and inputs were used as the major factors that represent agribusiness support services. The two components were examined against physical capital, social capital, and financial capital for livelihood security.

The overall Cronbach's Alpha reliability test was .862. The Cronbach's alpha value for each factor was between .840 and .875. Thus, each value indicated that all items showed high reliability.The Cronbach's Alpha Values were high (above .840) and therefore passed the reliability test (Holland, Johnston, & Asama, 1993; Nunnally, 1978; Hair *et al.* 2010).

4.9.3.2 Institutional Support, Physical Capital and Livelihood Security

The study sought to establish the correlation between agribusiness institutional support (training/technical services and input) and resource productivity and size of land.

Table 4.9 ***Correlation of Institutional Support, Resource Productivity and Size of Land***

(Training/Technical Services)	N Valid cases	Pearson Chi Square Value	df	Asymptotic Significance (2-sided)
Resource diversification	367	62.615[a]	16	**.000**
Multiple Resource Usage	367	25.257[a]	16	.065
Change in Cultivation practices	367	33.589[a]	16	.006
Size of land	367	22.875[a]	16	.117
Input				
Resource diversification	367	54.580[a]	16	**.000**
Multiple Resource Usage	367	28.783[a]	16	**.025**
Change in Cultivation practices	367	20.066[a]	16	.217
Size of land	367	11.478[a]	16	.779

Source Researcher (2020)

As shown in Table 4.9, there is a statistically significant relationship between agribusiness Institutional Support (training/technical services) and resource diversification at (χ2 (367) = 62,615, $p<0.05$) and change in cultivation practices. χ^2 (367) =33.589, $p<0.05$.These results allude to the fact that training and provision of technical services have the potential to empower household to diversify. Diversification of agricultural production systems increases household incomes, improve and maintain food security and reduce vulnerability to poverty (Goshu *et al*., 2012; Gondwe *et al*., 2017;

Dey, 2018). However, there was no significant relationship between agribusiness institutional support (training/technical services) and, multiple resource usage and size of land. The Chi Square value was χ^2 (367) =25.257, p>0.05, and χ^2 (367) =, 22.875 p>0.05 respectively. This implies that the household endowments of land and other resources are constrained. So training can only inform resource intensification and not expansion.

The findings also show that there is a statistically significant relationship between agribusiness institutional support in the form of input and resource diversification at (χ2 (367) =54.580[a], p<0.05) and Multiple Resource Usage χ2 (367) =28.783[a], p<0.05. The lack of agricultural inputs is a critical concern in farm decision making and resource productivity that warrants institutional support. The same is echoed by Quedraogo *et a*l. (2016) that farm practices that require relatively high financial investment such as the use of pesticides, drought-tolerant varieties and improved seeds are positively associated with the provision of technical and financial support.

However, there was no significant relationship between agribusiness institutional support (input) and size of land and the change in cultivation practices, Chi Square value was χ^2 (367) =25.257, p>0.05, and χ^2 (367) =,22.875 p>0.05 respectively. The input support potentially translates into higher yields without directly transforming land size and cultivation practices. A combination of the training/technical support and input services would inform optimization of land through the change in cultivation practices and adoption of other modern technologies.

The study sought to further establish whether agribusiness institutional support (input and training/technical services) had an impact on factors limiting agribusiness production (physical capital).

Table 4.*10 Institutional Support and Factor Limiting Agribusiness Production*

(Training/Technical Services)	N Valid cases	Pearson Chi Square Value	Df	Asymptotic Significance (2-sided)
Pests and diseases	367	43.439[a]	16	.000
Water/ irrigation facilities	367	48.914[a]	16	.000
Soil fertility/ soil structure	367	54.020[a]	16	.000
Weather	367	66.221[a]	16	.000
Access to inputs	367	35.093[a]	16	.004
Access to technology	367	68.788[a]	16	.000
Access to information	367	103.966[a]	16	.000
Access to land	367	95.330[a]	16	.000
Access to labour	367	83.841[a]	16	.000
Inputs				
Pests and diseases	367	57.734[a]	16	.000
Water/ irrigation facilities	367	47.849[a]	16	.000
Soil fertility/ soil structure	367	56.878[a]	16	.000
Weather	367	46.119[a]	16	.000
Access to inputs	367	52.835[a]	16	.000
Access to technology	367	69.763[a]	16	.000
Access to information	367	51.710[a]	16	.000
Access to land	367	71.979[a]	16	.000
Access to labour	367	69.669[a]	16	.000

Source: Researcher, 202

The findings show that the Chi Square values were statistically significant for all the items tested at P=0.000 <0.05. This implies that the variables of agribusiness institutional support services (training/ technical services and input) had an impact on all the factors limiting agribusiness production.

Table 4.10 indicates a statistically significant relationship between agribusiness institutional support(training/technical services) and factors limiting agribusiness, that is: pests and diseases at (χ2 (367) =, 43.439 p<0.000), water/ irrigation facilities at (χ2 (367) =, 48.914 p<0.000, soil fertility/ soil structure at (χ2 (367) =, 54.020 p<0.000 , weather at (χ2 (367) = 66.221 p<0.000 , access to inputs at (χ2 (367) =35.093 p<0.004, access to technology at (χ2 (367) =68.788 p<0.000, access to information at (χ2 (367) =103.966 p<0.000, access to land at (χ2 (367) =95.330 p<0.000 and access to labour at (χ2 (367) =83.841 p <0.000.This is supported by FAO (2014) that research and education institutions generate new and improved technologies, planting materials, improved crop varieties, aquaculture techniques and produce several agricultural technologies for extension to farmers. Wabwoba *et al*. (2015), notes that, training empowers people with knowledge and skills in relevant field and therefore they are able to plan their activities logically. Most farmers fear adopting new technologies due to limitations in knowledge and exposure to the outside world.

The study further revealed that there is a significant relationship between agribusiness institutional support (inputs) and the factors limiting agribusiness production, that is : pests and diseases at (χ2 (367) =,57.734 p<0.000), water/ irrigation facilities at (χ2 (367) =,47.849 p<0.000, soil fertility/ soil structure at (χ2 (367) =, 56.878p<0.000 , weather at

($\chi 2$ (367) =46.119 p<0.000 , access to inputs at ($\chi 2$ (367) =52.835p<0.004, access to technology at ($\chi 2$ (367) =69.763 p<0.000, access to information at ($\chi 2$ (367) =51.710 p<0.000, access to land at ($\chi 2$ (367) =71.979p<0.000 and access to labour at ($\chi 2$ (367) =69.669p <0.000. For agriculture to prosper, farm inputs need to be available, affordable, accessible, and good quality. Seeds, fertilizers, and agrochemicals are essential for improving the productivity and incomes of smallholder farmers in developing countries (World Bank, 2007, 2013; Rosegrant *et al*., 2001; AGRA 2013; FAO, 2013). In Kenya, agro-dealers have set prices high, maximizing profit per sale but resulting in lower sales. Farmers equally lack the knowledge to apply products properly making them not to realize the expected return on their investments. The high prices combined with farmers' low incomes and lack of knowledge about potential benefits mean farmers are already purchasing and applying fewer inputs than needed to maximize productivity while seeking cheaper but poorer quality (i.e., out-of-date, counterfeit, uncertified) products. This further lowers their productivity and therefore lowers the returns they have to reinvest in inputs. The decreasing profitability of this segment of the market further discourages input suppliers from engaging with actors to build the long-term relationships needed to reverse this cycle (Ali-Olubandwa *et al.*, 2011).

4.9.3.3 Institutional Support, Financial Capital and Livelihood Security

The study sought to establish whether institutional support (input and training/technical services) had an impact on additional agribusiness services provided by financial institutions (Financial Capital).

Table 4.11 ***Institutional Support and Financial Capital***

Training/Technical Services)	N Valid cases	Pearson Chi Square Value	Df	Asymptotic Significance (2-sided)
Insurance	367	43.439[a]	16	.000
Inputs	367	180.453[a]	16	.000
Equipment	367	168.282[a]	16	.000
Capacity building	367	144.256[a]	16	.000
Market networking	367	159.199[a]	16	.000
Sustainable Energy	367	153.025[a]	16	.000
Agribusiness Institutional Support (Inputs)				
Insurance	367	120.092[a]	16	.000
Inputs	367	233.763[a]	16	.000
Equipment	367	132.166[a]	16	.000
Capacity building	367	114.988[a]	16	.000
Market networking	367	120.527[a]	16	.000
Sustainable Energy	367	131.532[a]	16	.000

Source: Researcher, 2020

As presented in the table above, the chi square values were statistically significant for all the items tested at P=0.000 <0.05. As indicated in the table above there is a statistical significant relationship between agribusiness institutional support – training/technical services: insurance at $\chi 2$ (367) =, 43.439p<0.000, Inputs at $\chi 2$ (367) =, 180.453 p<0.000, Equipment at $\chi 2$ (367) =, 168.282 p<0.000, Capacity building at $\chi 2$ (367) =, 144.256 p<0.000, Market networking $\chi 2$ (367) =, 159.199 p<0.000, Sustainable Energy $\chi 2$ (367)

=, 153.025p<0.000. This implies that the variables of agribusiness institutional support services (training/technical services) had an impact on additional agribusiness services provided by financial institutions.

The results also show that there is a significant relationship between agribusiness institutional support (inputs): insurance at $\chi 2$ (367) =, 120.092 <0.000, Inputs at $\chi 2$ (367) =, 233.763p<0.000, Equipment at $\chi 2$ (367) =, 132.166 p<0.000, Capacity building at $\chi 2$ (367) =, 114.988 p<0.000, Market networking $\chi 2$ (367) =, 120.527 p<0.000, Sustainable Energy $\chi 2$ (367) =, 131.532 <0.000. Data from the focus groups indicated that financial institutions also supported the farmers with other non-monetary inputs. For example, most of the NGOs trained the group members on ways of enhancing agricultural productivity and value addition. They also provided information on markets and input use. For example, the One Acre Fund preferred to give the farmers inputs on credit.

4.9.3.4 Institutional Support, Social Capital and Livelihood Security

The study sought to establish whether institutional support (input and training/technical services) had an impact on social group membership benefits (Social Capital).

Table 4.12 ***Institutional Support and Social Capital***

Agribusiness Institutional Support (training/technical services)	N Valid cases	Pearson Chi Square Value	Df	Asymptotic Significance (2-sided)
Credit Access		269.831[a]	16	.000
Welfare		167.481[a]	16	.000
Technical Advice		238.606[a]	16	.000
Market Access		189.772[a]	16	.000
Input Access		265.157[a]	16	.000
Agribusiness Institutional Support (inputs)				
Credit access		254.318[a]	16	.000
Welfare		141.996[a]	16	.000
Technical Advice		156.027[a]	16	.000
Market Access		192.243[a]	16	.000
Input Access		297.576[a]	16	.000

Source: Researcher, 2020

The findings show that the Chi Square values were statistically significant for all the items tested at P=0.000 <0.05. The table indicates a statistical significant relationship between agribusiness institutional support training/technical services: and Credit Access at (χ2 (367) =, 269.831 p<0.000), Welfare at (χ2 (367) =, 167.481p<0.000), Technical Advice at (χ2 (367) =, 238.606 <0.000, Market Access χ2 (367) =, 189.772<0.000, Input Access χ2 (367) =, 265.157<0.000. This implies that the variables of agribusiness institutional support services (training/technical) had an impact on membership benefits The study further revealed that there is a significant relationship between agribusiness

institutional support (inputs): Credit Access at (χ2 (367) =, p254.318<0.000), Welfare at (χ2 (367) =, 141.996<0.000), Technical Advice at (χ2 (367) =, 156.027<0.000, Market Access χ2 (367) =, 192.243<0.000, Input Access χ2 (367) =, 297.576<0.000. The findings imply that group members benefit from training/technical services and input access. Institutional support is very crucial in enhancing the social group benefits translating into agribusiness transformation and consequent livelihood security.

4.9.4 Partial Least Squares Structural Equation Modelling (PLS-SEM).

PLS-SEM estimates partial model structures by combining principal component analysis with ordinary least square regressions. It accounts for the total variance and uses the total variance to estimate parameters (variance-based) (Hair *et al*., 2017b).

The study adopted the SMART PLS 3 software to establish the existing relationship between key latent variables that affect livelihood security using the partial least square structural equation (PLS-SEM) modelling method. The study of the path model consists of the structural model and the models of measurement. During the creation of the path model, the sequence of structures and the connections between them has been observed in order to guarantee their theories and the connection they reflect with the hypothesis that is being tested. In structural models (i.e. arrows that point to them), structures considered to be dependent also are referred to as endogenous latent variables on the right side of a structural model.

4.9.4.1 Structural model specification

The study adopted the DFID livelihood framework to obtain the effect of physical capital, financial capital and social capital on household livelihood security. The Cronbach alpha for exogenous constructs, that is, Physical capital, Financial capital and social capital were .876, .890 and .828, >08 respectively. For the exogenous construct, Livelihood security, the Cronbach alpha value was 0.836. Since the values were greater than .8, the data was considered to be reliable for further analysis. Further, the Average Variance Extraction (AVE) values were all greater than 0.5 for the constructs and therefore the data was considered to have met the requirement for PLS-SEM analysis.

The study further adopted the Fornell-Larcker criterion to conduct discriminant validity. As shown from Table 4.21, the values were greater than .5 and therefore the data qualified for PLS-SEM analysis.

The Heterotrain-Monotrait ration was < .9 for all constructs and therefore the model had passed all diagnostic tests for PLS-SEM analysis. Henseler *et al*. (2015) and Kline, 2011), argue that the heterotrait-monotrait (HTMT) ratio of correlations should not have a value exceeding .85.

Based on the results, all the constructs did not have a problem of multicollinearity since the values were less < 5.

Hair *et al*., (2013) opines that Composite Reliability (CR) values and average variance extracted (AVE) should exceed exceeded the recommended value of 0.7 and 0.5 respectively. The AVE reflects the overall amount of variance in the indicators accounted

for by the latent construct. Both values did not violate the minimum requirement and the discriminant validity values were lower than .9 and therefore deemed for analysis.

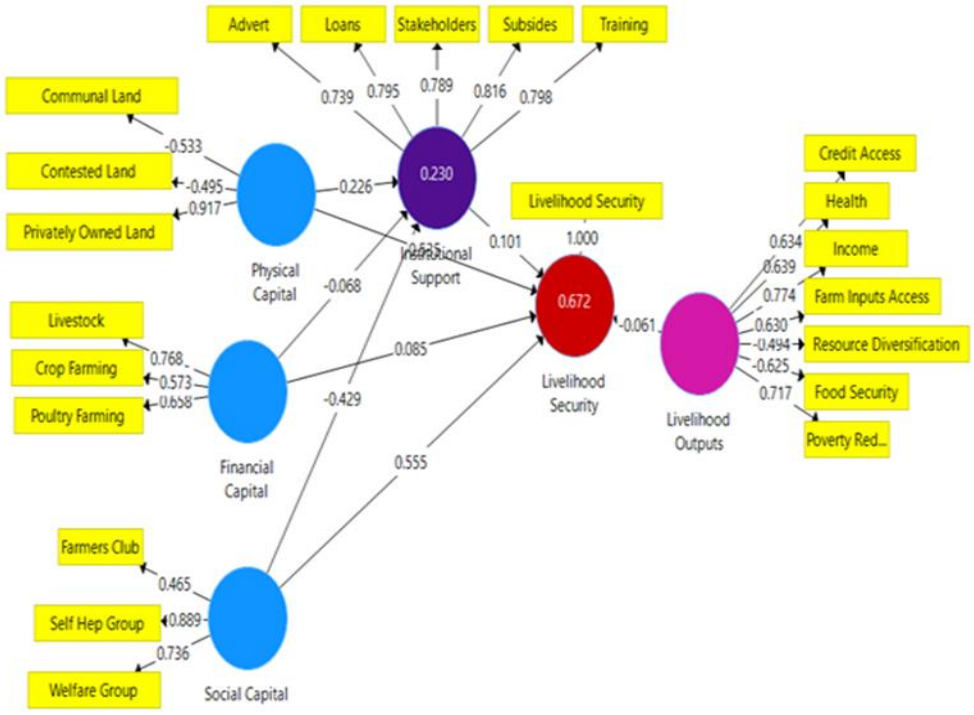

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Figure 4.36 Model of Agribusiness Capitals, Institutional Support and Livelihood Security

Source: Researcher 2020

To analyze the research model, Partial Least Squares (PLS) analysis with SmartPLS 3.0 software was used following the recommended two-stage analytical procedures. The study used SPSS Version 21 to establish descriptive data. The study opted for PLS-SEM which is non-parametric.

The R^2 value for the model was .672 implying that 67.2% of the variance in livelihood security is explained by physical capital, financial capital and social capital factors. Cohen (1988) says that a R^2 value greater than 0.26 indicates that the model is substantial. Hair *et al*. (2013) recommend using the R^2, beta, and corresponding t-values via bootstrapping procedure with a resample of 5000 while assessing the PSL-SEM equation.

Table 4.13 ***Relationship among Variables- Path Coefficients***

Path Coefficients	Original Sample	Sample Mean (M)	Standard Deviation	T Statistics	P Values
Financial Capital -> Institutional Support_	-0.068	-0.065	0.058	1.175	**0.240**
Financial Capital -> Livelihood Security_	0.085	0.088	0.030	2.790	**0.005**
Institutional Support_ -> Livelihood Security_	0.101	0.103	0.042	2.405	**0.016**
Livelihood Outputs -> Livelihood Security_	-0.061	-0.065	0.051	1.199	**0.231**
Physical Capital -> Institutional Support_	0.226	0.228	0.061	3.703	**0.000**
Physical Capital -> Livelihood Security_	0.535	0.532	0.065	8.250	**0.000**
Social Capital -> Institutional Support_	-0.429	-0.429	0.049	8.777	**0.000**
Social Capital -> Livelihood Security_	0.555	0.553	0.035	15.672	**0.000**

Source: Researcher, 2020

From the table, the results of the path coefficients show the following observations; Institutional support had a negative and an insignificant effect on financial capital, β=-0.068, p> .05, Financial capital had a positive and significant effect on livelihood security, β = Livelihood security positively.

There is no significant relationship between physical and social capital for agribusiness incubation on livelihood security.

4.9.4.2 Total Direct Effect of Variable

The direct effect refers to the direct causal relationship between agribusiness incubation capitals (independent variable) and livelihood security (dependent variable). It is that path that is not mediated by the institutional support (mediating variable).

Table 4.14 ***Total Direct Effects***

Total direct effect	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Physical Capital -> Livelihood Security	0.565	0.531	0.192	2.936	**0.003**
Financial Capital -> Livelihood Security	0.089	0.091	0.038	2.316	**0.021**
Social Capital -> Livelihood Security	0.418	0.413	0.056	7.409	**0.000**

Source: Researcher 2020

$H_0$1: There is no significant relationship between physical capital for agribusiness incubation and livelihood security.

The total direct effect of physical capital for agribusiness incubation on livelihood security is significant, p=.003 <.05. The null hypothesis is rejected, implying that physical capital has a positive impact on livelihood security.

$H_0$2: There is no significant relationship between financial capital for agribusiness incubation and livelihood security.

The total direct effect of financial capital for agribusiness on livelihood security is statistically significant p= .021<.05. The null hypothesis is rejected implying that financial capital for agribusiness incubation positively impacts on livelihood security.

$H_0$3: There is no significant relationship between social capital for agribusiness incubation and livelihood security.

The total direct effect of social capital for agribusiness incubation on livelihood security is significant, p= .000< .05. Its concluded that the null hypothesis is rejected, implying that social capital plays a significant role in strengthening livelihood security.

4.9.4.3 Total Indirect Effect

The total indirect effect presents the mediated path, that is, from the agribusiness incubation capitals (independent variable) through the institutional support (mediator) and feeds into livelihood security (dependent variable).

Table 4.15 ***Total indirect effect***

Total Indirect Effects	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
Physical Capital -> Institutional Support -> Livelihood Security	0.038	0.035	0.019	1.962	0.050
Financial Capital -> Institutional Support -> Livelihood Security	-0.007	-0.008	0.010	0.730	0.465
Social Capital -> Institutional Support -> Livelihood Security	-0.075	-0.077	0.026	2.842	0.005

Source: Researcher, 2020

Table 4.15 gives a summary of the effect of institutional support (mediating variable) on the constructs under study.

$H_0$4a: Institutional support does not significantly mediate the relationship between physical capital for agribusiness incubation and livelihood security.

From table 4.15, it can be deduced that institutional support had a statistically significant mediating role between physical capital for agribusiness incubation and livelihood security because the p-value, p= .050, implying the total indirect effect is significant. The null hypothesis was therefore rejected. It was therefore concluded that institutional support is key in ensuring physical capital gives the desired livelihood security.

$H_0$4b: Institutional support does not significantly mediate the relationship between financial capital for agribusiness incubation and livelihood security.

From table 4.15, institutional support did not mediate the relationship between financial capital and livelihood security, p- .465> .05. The Null hypothesis was not rejected. It was concluded that institutional support does not significantly mediate the relationship between financial support and livelihood security. The total indirect effect is not significant.

$H_0$4c: Institutional support does not significantly mediate the relationship between social capital for agribusiness incubation and livelihood security.

From table 4.15, it was observed that institutional support had a statistically significant mediating role between social capital and livelihood security, p= .005<.05. The null hypothesis was therefore rejected in favour of the alternative hypothesis.

4.9.5 Hypothesis Testing Summary

The study further sought to summarize the hypothesis conclusions as shown in Table 4.16.

Table 4.16 ***Hypothesis Testing Summary***

Hypothesis	Beta	P-value	Decision
$H_0$1: There is no significant relationship between physical capital for agribusiness incubation and livelihood security.	2.941	0.003	Reject Null
$H_0$2: There is no significant relationship between financial capital for agribusiness incubation and livelihood security.	2.662	0.021	Reject null
$H_0$3: There is no significant relationship between social capital for agribusiness incubation and livelihood security.	10.663	.000	Reject Null
$H_0$4a: Institutional support does not significantly mediate the relationship between physical capital for agribusiness incubation and livelihood security.	2.268	.050	Reject null
$H_0$4b: Institutional support does not significantly mediate the relationship between financial capital for agribusiness incubation and livelihood security.	.820	.465	Do not reject null
$H_0$4c: Institutional support does not significantly mediate the relationship between social capital for agribusiness incubation and livelihood security.	8.873	.005	Reject null

Source: Researcher, 2020

4.12 Chapter Summary

The study findings indicate that households in Bungoma County are averagely endowed with the physical, financial and social capitals crucial for agribusiness incubation but this has not adequately translated into secure livelihoods. Agribusiness uptake is negatively affected by the small land parcels, pests and diseases, rain reliance, high input costs and access deficits, low market access and returns, poor storage and post-harvest losses, use of non- modern technology, limited value addition, poor transport infrastructure, reliance

on middlemen and extension service gaps. The study revealed that several stakeholder mechanisms for support are available which include input provision, training and technical advice, value chain innovation, commercialization of orphan crops, provision of solar energy, and market networking. The study findings established that most of the institutional support targeted the physical capitals and to some extent the social capital especially with their reliance on group model for intervention. Apart from the mobile loan apps that were relied upon by households for credit, most institutional support was in non-monetary forms. The limited access to financial support which is a versatile resource limits the agribusiness choices that can be executed at the household level and sustains the low income levels in the County.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of the Findings

The findings were summarized as follows:Background information of the households; the effect of physical capital on livelihood security; the impact of financial capital on livelihood security, the influence of social capital on livelihood security, the mediating effect of institutional support on agribusiness capitals and livelihood security; conclusion of the study; recommendations and recommendations for further study.

5.1.1 Background Information of the Households

The data on the household demographics shows that the majority of the household heads belong to the productive age category between 20 to 50 years. This implies that the household can engage in longer labour hours resulting in more productive and competitive agribusiness. The findings show that there are more male-headed households than the number of female-headed households with the majority of the respondents' marital unions implying a high probability of influence from both genders in decision making in the value chain. On the education of household heads, the majority have secondary education which is a critical component in enhancing dynamism and ability to modernize agriculture. Most households have more than 5 household members and the majority of the households earn below KSh 20,000, the low-income impacts negatively on agribusiness decision-making ability and the viability of agribusiness

5.1.2 The Effect of Physical Capital on Livelihood Security

The study sought to examine the effect of physical capital for agribusiness incubation on livelihood security. Physical capital included the natural and built up assets required in up scaling the agribusiness productivity and competitiveness. The findings indicate that land, water and tree/forestry are the main natural resources available to the household use. Most of the land is communally owned and fragmented into small parcels for inheritance purpose resulting into diseconomies of scale as the returns are low and input costs higher. The findings further indicated that the extent of application of knowledge on resource productivity is very low. This could be attributed to the cost of adoption, the diminishing extension support and the biases introduced through donor preferences.The findings showed that most households access traditional productive assets translating high costs of production. Equally, the unreliable access to the means of transport for bulky crop products impedes access to markets and hence to revenues which are much needed by smallholder farmers. The study established that the farming households can neither afford modern storage facilities nor the semi processing of the crop products to increase their lifespan to achieve sustainable supply, bargain for better prices or reach non-local markets. In addition, extension services are inefficient paving way for the enhanced role of the social media and mass media in the dissemination of information on agribusiness with the radio playing the biggest role.The late planting of crops, frustrations from middlemen, inadequate collection centres, delays in input provisions, inadequate processing equipment, poor market surveillance, inadequate training, post-harvest losses, and inadequate extension services were cited as the factors limiting agribusiness production. Generally, the agribusiness products were rated averagely while the farm

inputs, production Information, extension services, technical assistance, and production equipment were identified as the requisites for the sustainability of yields. In conclusion, the marketing constraints are experienced in the bulk transportation of farm products, access to information on the market destination, and the market bureaucracy leading to excessive reliance on the middlemen. The inability to provide storage and proper drying of the harvest led to early disposal of produce and the post harvest losses. The study ascertained through an ANOVA marketing constraints differed among the sub counties in Bungoma.

5.1.3 The Impact of Financial Capital on Livelihood Security

The study sought to evaluate the influence of financial capital for agribusiness incubation on livelihood security. Financial capital is a critical component to the success of any agribusiness venture. The households have multiple income sources with crop cultivation being the main source of income and households diversify their income sources however more rely on agriculture than on non-agricultural sources of livelihoods at 92.7%. The majority of the households earn below KSh 20,000 income from crop production. In addition, the findings showed that the household's main source of financial credit were mobile apps (Mshwari and Tala) and relatives. The commercial banks deny the majority of the household's loans due to inability of households to meet other requirements. The findings further indicated that active SACCOs provide credit mostly to coffee and dairy farmers. The study ascertained that the additional services provided by financial institutions included inputs, capacity building and market networking. But, the majority of the households, the lack of stable income denied them access to credit followed by the lack of collateral/security and having outstanding loans. The household savings were in

the form of livestock, cash and land. The findings further revealed that households diversify farming activities and that all the activities were important to the households. Crop farming activities are carried out for food, to support family, and for making a profit. To the least, crop farming is practised as a way of life and as the only option. The farming for food surpasses the profit motive which has a negative implication on the agribusiness performance. The mmajority of the households market half of their total harvest with the lack of proper storage and drying equipment acting as a push factor to dispose off the products early. Farm products are mostly sold in the village market followed by the urban market and the remaining proportion is sold through the middlemen. The lack of information on the destination markets and the prices of the crop products in other markets, the inability to afford the means of transport to access external markets push farmers to sell their commodities to middlemen. The trend of change in total income from crop production was about the same for the last 5 years.

5.1.4 The Influence of Social Capital Livelihood Security

The study sought to assess the influence of social capital for agribusiness incubation on livelihood security. The existence of social ties facilitates access to key livelihood resources. The findings showed that the majority of the household heads belong to a self-help and welfare group. The inclusion into cooperatives was restricted mostly to farmers who were members and membership was determined by the crop activities practiced by the households. The reasons cited for the households not joining groups include the lack of income, social class, and ethnicity. Though the households face barriers to the joining of social groups, these reasons do not entirely exclude them from joining social groups.The findings show that social groups are beneficial to the household's access to

credit, technical advice, markets and inputs. Most of the small scale farmers benefit from collective action to borrow money, share technology, attract institutional support services and pool supplies to meet the thresh hold demanded in the markets. The binary logistic regression indicated that credit access and welfare are significant predictors of membership to a social group and that technical advice, market access and input access are not significant predictors of membership to a social group. A group member is 1.2 times likely to get credit access than a non member and 1.76 times likely to benefit from welfare than a non member.

5.1.5 Nexus Between Institutional Support, Agribusiness Capitals and Livelihood Security

The study observed low provision of storage, drying, chemical treatments, crop insurance and lending/renting equipment services which are crucial elements of the agribusiness incubation process by enhancing its productivity and competitiveness.The level of satisfaction with agribusiness support services from NGOs, farmer organizations, government agencies, and private organizations was below average. The low level of satisfaction was attributed to the exclusion of most of the households from benefiting from the services provided. The agribusiness officers' services are demand-driven and extension services are derailed by the logistical challenges. Further, agrochemical and seed companies target potential buyers of their products. The farmer organizations target the members who are also engaged in the production of their commodities, thus non-inclusion of households who do not produce commodities like coffee. Most of the crop producers are not organized in farmer groups to benefit.

The study concluded that institutional support had a statistically significant mediating role on the physical and social capital for agribusiness incubation translating into secure livelihoods. On the contrary, institutional support did not mediate the relationship between financial capital and livelihood security.

Financial institutions prefer providing non financial as opposed to monetary support. Non monetary support is in the form of insurance, inputs, equipment, capacity building, market networking and sustainable energy. The Chi Square values were significant for the relationship between institutional support and the benefits of social group belongingness with p=0.000 for all the items tested.

Based on the PLS-SEM, the R^2value was .672 implying that 67.2% of the variance in livelihood security is explained by the physical, financial and social factors. The total direct effect indicates a significant effect of all the agribusiness incubation capitals on livelihood security. Physical capital to livelihood security at p=.003, financial capital to livelihood security at p=.021 and social capital to livelihood security at p=0.000. The total indirect effect indicates that IS mediates positively the relationship between physical capital and livelihood security at p=.005; IS does not mediate the relationship between financial capital and livelihood security at p=0.465; that IS mediates positively the relationship between social capital and livelihood security at p=0.005. The non mediation of financial capital is attributed to the non monetary support to the agropreneurs.

In conclusion, hypothesis $H_0$1, $H_0$2, $H_0$3,$H_0$4a, $H_0$4c were all rejected in favour of the alternative hypothesis. Hypothesis $H_0$4b was not rejected implying that IS does not mediate the relationship between financial capitals and livelihood security.

5.2 Conclusion of the Study

Agribusiness is practiced by households in Bungoma County and crop production was the main source of income. Households are endowed with a variety of physical capitals crucial for agribusiness incubation but agricultural production in both quantitative and qualitative terms has been negatively affected by small parcels of land, pests and diseases and reliance on rain-fed agriculture, input deficits and marketing constraints. In addition, the higher access to traditional as opposed to modern productive assets, limited agro-processing and storage facilities resulting into post-harvest losses, the limited extension services, and the unreliable means of transport for bulk products are a menace. Compared to the other agribusiness capitals, financial capital has a weak influence agribusiness productivity and competitiveness in the County. Majority of the households engage in crop production but accrue low financial returns from the crop transactions. The households utilize a variety of credit sources and receive other additional services from the financial institutions. On the contrary, most households are excluded from accessing credit due to the unreliable income sources, the lack of collateral, credit history, the risks associated with crop production and the minimal savings. Generally, the farming motive for food surpasses the profit motive as households consume a great proportion of the farm produce and only sell small amounts. Farm gate marketing to retailers and middlemen is commonest with insignificant upward trends in income from crop production due to the poor costing and valuing of crops on the value chain. Most households belong to self-

help and welfare groups though entry barriers exist in the form of the lack of income, social class and ethnicity. Households take advantage of the trust and lowered transaction costs from group belongingness to deal with the risks of income fluctuation, access to credit and welfare aspects. The institutional support is mostly targeted through the common interest groups who are easily funded and monitored. The study ascertained that institutional support was critical to creating and building a wide variety of agribusiness capabilities. The satisfaction with institutional support was low as most institutions target common interest groups practicing agribusiness that act as entry points for their interventions excluding non-members. Input companies enterprises focus on potential buyers for their products reinforcing the exclusion of those not engaged in agribusiness. To enhance investment and achieve a sustained increase in production, integrated strategies and policies are essential in reducing risks and building resilience among agro entrepreneurs. Institutional support is essential to the optimal transformation and mobilization of the physical, financial and social capitals for agribusiness incubation. The interconnectedness of all the agribusiness capitals calls for a holistic approach in strengthening the physical, financial and social capitals concurrently.

5.3 Recommendations

Based on the findings and conclusions derived so far, the following are the recommendations;

a) County Governments to enhance mechanisms of stock taking and accountability to operationalize the already established facilities initiated by the previous regimes rendered dormant due to transition politics.

b) The agribusiness and extension officers to sensitize the agro-entrepreneurs to diversify crops to resolve the problem of over reliance on one cash crop and homogeneity of products in the market to enhance their bargaining power and over come the seasonality of income.

c) The cooperative officers to encourage formation of inclusive farmers' cooperatives in diverse crop value chains to empower farmers to collectively access external markets, share facilities for drying, storage, processing, information sharing and resolve the middlemen menace.

d) The County Government to facilitate for harmonized partnerships in the adoption a holistic approach of addressing the physical, financial and social agribusiness capital needs concurrently.

5.4 Recommendation for Further Study

a) A study to examine the extent of institutional support on livestock farming.

b) A comparative study to examine the effectiveness of the state and non-state actor's collaboration in supporting the agribusiness sector.

c) A study to examine the effectiveness of the agribusiness oriented programs in the Ministry of Agriculture.

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APPENDICES

APPENDIX I: LETTER OF INTRODUCTION

Jane Khasoa Lusenaka,

Moi University, School of Arts and Social Sciences,

Department of Sociology, Psychology & Anthropology,

P.O. Box 3900 -30100

ELDORET

DATE……

Dear Sir/Madam Respondent

RE: RESEARCH STUDY.

I am a post graduate student conducting an academic research on **"Agribusiness Incubation, Institutional Support, and Implication on Livelihood Security: A Case of Selected Sub -Counties in Bungoma County, Kenya".** The findings will be useful to all the stakeholders interested in improving livelihoods globally. The research seeks to intervene by providing a solution to the poverty situation experienced among the farming communities in Kenya. In this regard, you are requested to answer all the questions according to the instructions given to each, your answers will be treated as confidential. Please do not indicate your name. Thank you in advance for your co-operation.

N/B In this research, Livelihood security refers to the outcome of a range of agribusiness activities and choices made by households combined to improve the households' socio-economic conditions.

Thank you.

Yours faithfully,

Jane Khasoa Lusenaka

APPENDIX II: HOUSEHOLD QUESTIONNAIRE

HOUSEHOLD QUESTIONNAIRE AGRIBUSINESS INCUBATION, INSTITUTIONAL SUPPORT AND LIVELIHOOD SECURITY IN BUNGOMA COUNTY

BACKGROUND INFORMATION						
1.	Sub County that you belong	☐ Cheptais ☐ Bumula ☐ Kanduyi ☐ Webuye West ☐ Bungoma North				
	Ward that you belong					
3.	Age of the household head	☐ ≤ 20 years ☐ 21- 30 years ☐ 31-40 years ☐ 41- 50 years ☐ 50 and above				
4.	Gender of the household head	☐ Male ☐ Female				
5.	Marital Status	☐ Single ☐ Married ☐ Separated ☐ Widowed				
6.	Level of education	☐ No formal education ☐ Primary level ☐ Secondary level ☐ `Tertiary level				
7.	Number of people in the household	☐ 1- 4 ☐ 5-9 ☐ 10-12 ☐ Above 13				
(Section B) NATURAL CAPITAL						
8	**Please indicate your extent of agreement on the following types of natural resources that the household has access to.**					
	Types of Natural Resources	**Strongly Agree(5)**	**Somewhat Agree(4)**	**Neutral (3)**	**Somewhat Disagree(2)**	**Strongly Disagree(1)**
	B_{81} Land					
	B_{82} Trees/Forests					
	B_{83} Quarry					
	B_{84} Water Source					
9	**To what extent do you agree with the following as the**					

	nature of access to the natural resources					
	Nature of Access to Natural Resources	**Strongly Agree (5)**	**Somewhat Agree(4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
	B_{91} The natural resources relied upon by my household are privately owned					
	B_{92} The natural resources used by my household are rented					
	B_{93} The household natural resources are communally owned					
	B_{94} The household natural resources are contested					
10	**Please specify your level of agreement with the available knowledge to increase the resource productivity.**					
	Knowledge for Resource Productivity	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
	B_{101} Resource Diversification					
	B_{102} Multiple Resource usage					
	B_{103} Change in					

	cultivation practices					
11	**Please tick the category of the size of land under the household's crop cultivation** Below 1ha ( ) 1.1ha to 3ha ( ) 3.1 ha to 5ha ( ) 5.1ha and Above ( )					
	Section C PHYSICAL CAPITAL					
12	**Specify your level of agreement on the extent of the household's access to the following productive assets**					
	Productive Assets	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
	C_{121} Motor vehicle					
	C_{122} Animal ploughs/ tillage equipment/ carts					
	C_{123} Bicycle					
	C_{124} Tractor/ vehicle drawn machinery					
	C_{125} Power tiller/thresher					
	C_{126} Crop storage bin/silo					
	C_{127} Drying equipment					
	C_{128} Irrigation pumps					
13.	**Specify your level of agreement on the household's most relied upon means of transport**.					
	Means of Transport	**Strongly Agree**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree**	**Strongly Disagree**

		(5)			**(2)**	**(1)**
	C_{131} Matatu/Bus/Minibus					
	C_{132} Motorcycle					
	C_{133} Bicycle					
	C_{134} Car					
	C_{135} Foot					
	C_{136} Animal					
14	**Please tick the time the households' crops are sold after harvesting** Immediately after harvest ( ) 1 month later ( ) 2 months later ( ) 4 or more months later ( ) All year round ( ) Not Sold ( )					
15	**Please indicate the sources of agribusiness information for the household during the last 12 months (Multiple responses allowed)** **Radio/TV/Newspaper ( ) Farmer Organization ( )** **Extension Workers ( ) Neighbour/Friend/Relative ( )** **SMS/Mobile Phones ( ) NGO ( )** **Government Office ( )**					
16	**Please specify your level of agreement on the following as being the major factors limiting agribusiness production.**					
	Factor limiting Agribusiness	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
	C_{161} Pests and diseases					
	C_{162} water/ irrigation facilities					
	C_{163} Soil fertility/ soil structure					
	C_{164} weather					
	C_{165} Access to inputs					

	C_{166} Access to technology					
	C_{167} Access to information					
	C_{168} Access to land					
	C_{169} Access to labour					
17	Do you agree with the following rating of the quality of your agribusiness products over the last 5 years Above average ( ) Average ( ) Below average ( )					
18	**Specify your level of agreement on the following as requisites for the sustainability of the yields**					
	Requisites for the sustainability of yields	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
	C_{181} Inputs					
	C_{182} Production Information					
	C_{183} Extension services					
	C_{184} Technical assistance					
	C_{185} Production equipment					
19	Specify your level of agreement on the following problems faced in the marketing of agricultural output					
	Marketing Constraints	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
	C_{191} Road network					
	C_{192} Market					

	information					
	C_{193} Cost of transport					
	C_{194} Storage of the products					
	C_{195} Stability of Market prices					
	C_{196}Market bureaucracy/ policies					
	SECTION D FINANCIAL CAPITAL					
20.	**Please indicate your level of agreement on the following as the household's sources of income between January and December 2018.**					
	Sources of Income	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
	D_{201} Livestock/live stock products					
	D_{202} Crop cultivation					
	D_{203} Trade					
	D_{204} Agro forestry					
	D_{205} Service provision					
	D_{206} Small scale manufacturing					
21.	**Specify your level of agreement with the following as the range of income per month from crop Farming** **Below 5,000 ( ) 5,001- 20,000 ( ) 20,001-35,000 ( ) 35,001-50,000 ( ) above 50,001 ( )**					
23.	**Please indicate the level of agreement of the following as the sources of financial credit to the household.**					
	Credit Source	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**

	D_{231} Commercial Bank					
	D_{232} Non-Governmental Organization					
	D_{233} SACCO					
	D_{234} Relatives					
	D_{235} Microfinance					
	D_{236} Mobile Apps					

24	**Please indicate your level of agreement on the following as the additional agribusiness services provided by financial institutions.**					
	Additional Services by Financial Institutions	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
	D_{241} Insurance					
	D_{242} Inputs					
	D_{243} Equipment					
	D_{244} Capacity building					
	D_{245} Market networking					
	D_{246} Sustainable Energy					

25.	**Please Indicate your extent of agreement on the following as barriers to the household's access to credit services**					
	Barriers to Credit Access	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
	D_{251} Had outstanding loan					

	D_{252} No stable income					
	D_{253} No other security					

26	**To what extent do you agree to the following as forms of your current savings**					
	Forms of Current Savings	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
	D_{261} Livestock					
	D_{262} Cash					
	D_{263} Bank Deposits					
	D_{264} Insurance					
	D_{265} Land					

27	**To what extent do you agree to the following list of farming activities practiced by the household**					
	Farming Activities	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
	D_{271} Livestock farming					
	D_{272} Poultry keeping					
	D_{273} Tree Planting					
	D_{274} Crop farming					

28	**Please indicate your level of agreement with the following as the importance of the crop farming activities to the livelihood of the household**					
	Importance of Farming Activities	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
	D_{281} Making profit					
	D_{282} Support the family					
	D_{283} Food					
	D_{284} As a way of life					

	D_{285} Only option					
29	**Please indicate the proportion of the farm crop output marketed by the household.** **Quarter ( ) Half ( ) Three quarter ( ) All ( ) None ( ) Don't know ( )**					
30	Specify your level of agreement with the following as the market for farm crop products					
	Market for Crop Products	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
	D_{301} My farm products are mostly sold in the village market					
	D_{302} My farm products are sold in the urban market					
	D_{303} My farm products are sold in the national market					
	D_{304} My farm products are sold in the regional market					
	D_{305} My farm products are sold in the international market					
	D_{306} Middlemen are involved in the selling of my farm products					

31	**Do you agree with the following as the trend of change in the household total income from crop production** **Higher ( ) Lower ( ) About the same ( ) Don't know ( )**					
	SECTION E SOCIAL CAPITAL					
32	**Indicate your level of agreement on the organization or social group that you belong**					
	Social Group that you Belong	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
	E_{321} I belong of a Self –help group					
	E_{322} am a member of a Welfare group					
	E_{323} am a member of a Cooperative society					
	E_{324} am a member of a farmers' Club					
	E_{325} am not a member of any social group in my community					
33.	The following factors are reasons for not joining an organization or social group					
	Reasons for Not joining group	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
	E_{331} Ethnic					
	E_{332} Social Class					
	E_{333} No income					
34.	The following are the benefits derived from membership in the groups					
	Membership Benefits	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
	Credit access					

	Welfare					
	Technical advice					
	Market access					
	Input access					
	INSTITUTIONAL SUPPORT					
36	**The following is a list of agribusiness support services provided to the households by various stakeholders**					
	Services provided	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
	Training/ technical services					
	Inputs					
	Agricultural loans					
	Input subsidies					
	Marketing services					
	Storage Services					
	Drying services					
	Chemical treatments					
	Crop insurance					
	Lending/renting equipment					

37	**To what extent are you satisfied with the agribusiness support services provided through the institutions**						
	Service Providers	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree**	**Strongly Disagree (1)**
	I am satisfied with the agribusiness support services from						

non-governmental organizations						
I am satisfied with the agribusiness support services from government agencies						
I am satisfied with the agribusiness support services from farmer organizations						
I am satisfied with the agribusiness support services from private organizations						

To what extent are you satisfied with the support services provided by the following agribusiness oriented institutions.

Institutional Success	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neutral (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
I am satisfied with the					

	agricultural services provided by government agencies					
	I am satisfied with the agricultural services provided by private organizations					
	I am satisfied with agricultural services provided by NGOs/INGOs					
	I am satisfied with the agricultural services provided by Cooperatives					

APPENDIX III: FOCUS GROUP DISCUSSION GUIDE

1. What is your opinion on the extent of agribusiness practice in this sub county?
2. What are the opportunities for agribusiness to flourish in this sub county?
3. What are the challenges experienced by the community in practicing agribusiness?
4. How effective are infrastructure in meeting the agribusiness needs?
5. Comment on the presence of knowledge to manage natural resources.
6. How effective are the sources of income and credit to the households?
7. Explain the extent to which community members rely on social groups or resources to enhance agribusiness.
8. What are the constraints in the marketing of the agricultural products?
9. How effective are the agribusiness support organizations?
10. What should be done to upscale agribusiness support initiatives?

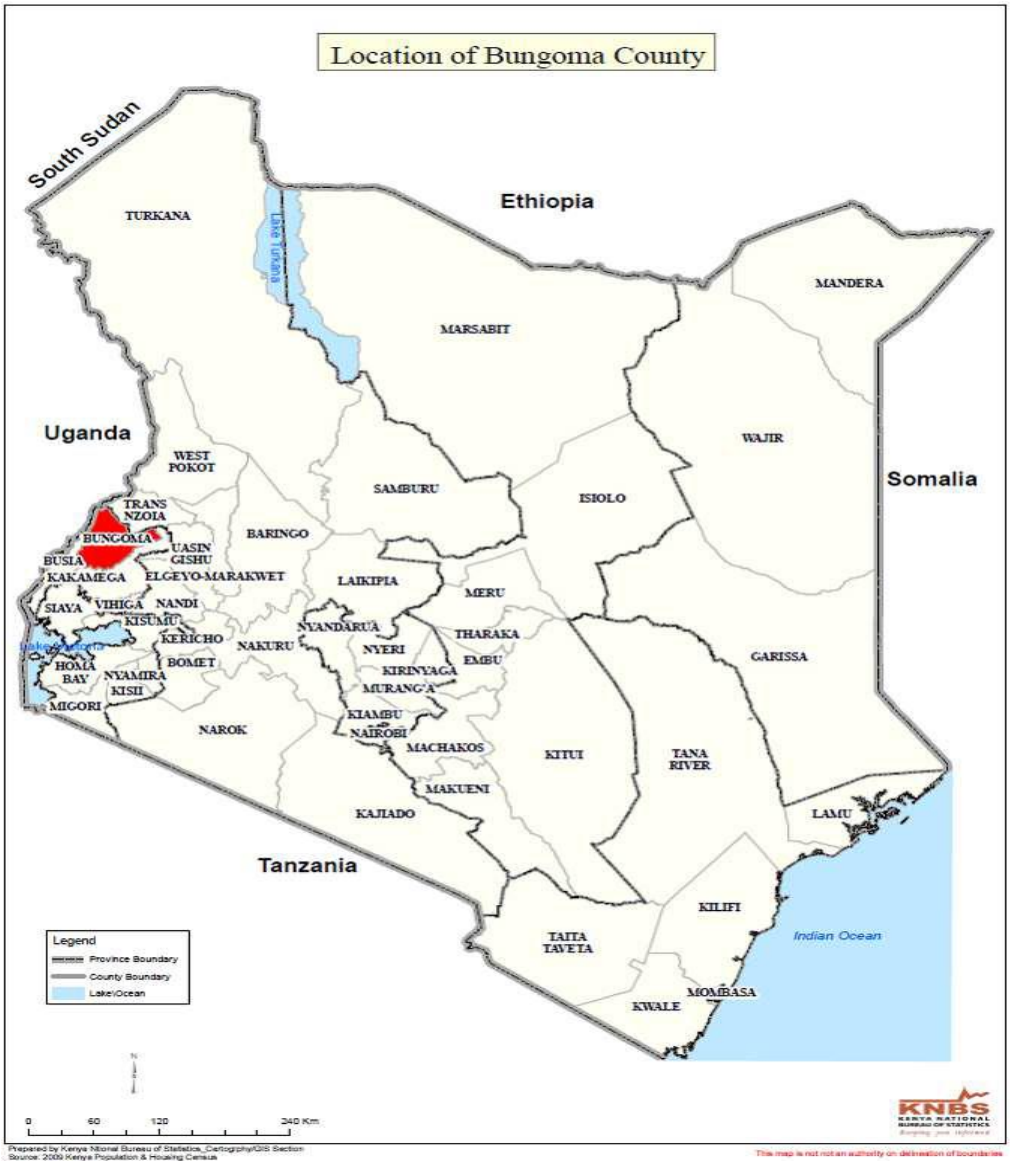
APPENDIX IV: INTERVIEW GUIDE FOR THE KEY INFORMANTS

1. What is the level of agribusiness uptake? (Performance, trend of productivity and returns)
2. What are the opportunities and challenges in agribusiness practice for the community?
3. What are your agribusiness institutional priorities for support?
4. Explain the changes required for sustainability.
5. What are your agribusiness institutional support activities? (Stakeholder's activities/strategy to support agribusiness)
6. Do you have any partnerships arrangements with other stakeholders? Explain.
7. What are the community support/perceptions towards agribusiness support?
8. Suggest most effective reform measures for agribusiness to transform livelihoods optimally

APPENDIX V: OBSERVATION CHECKLIST

1. Living conditions of the respondents and the local community in general.
2. Activities carried out at the household level to earn income.
3. The farming practices and crop management.
4. Available natural resources and how they are utilized.
5. Market conditions, goods sold (quality and quantity), the market participants, engagement in the value chain.
6. State of technology in farming, transportation, storage and general handling of the output.
7. Access to water, schools, health facilities and industries
8. Agro processing activities or industries.

APPENDIX VI: MAP SHOWING LOCATION BUNGOMA COUNTY



Source: Bungoma County Integrated Development Plan 2018 – 2022

APPENDIX VII: RESEARCH AUTHORISATION LETTER FROM MOI UNIVERSITY

MOI UNIVERSITY
(ISO 9001:2015 CERTIFIED INSTITUTION)
SCHOOL OF ARTS & SOCIAL SCIENCES

Tel: (053) 43093
(053) 43620 Ext 2515
Fax: (053) 43047
E-mail: deanarts@mu.ac.ke

P.O Box 3900
ELDORET
KENYA

3rd December, 2019

NACOSTI (National Commission for Science, Technology and Innovation),
P.O. Box 30623,
Utalii Hse,
NAIROBI.

Dear Sir/Madam,

RE: LUSENAKA JANE KHASOA –SHRD/PHDD/04/14

This is to certify that the above named is a bonafide student at Moi University, School of Arts and Social Sciences. She is a Doctor of Philosophy (PhD) student in Development Studies.

She has completed her coursework component and proposal and has now embarked on Thesis writing.

Her Thesis is entitled: **"Agribusiness Incubation, Institutional Support, and Implication on Rural Livelihood Security in Selected Sub Counties in Bungoma County, Kenya".**

Any assistance accorded to her will be appreciated.

DEAN
SCHOOL OF ARTS &
SOCIAL SCIENCES

PROF. MARY WAHOME
ASSOCIATE DEAN, SCHOOL OF ARTS AND SOCIAL SCIENCES

APPENDIX VIII: RESEARCH PERMIT FROM NACOSTI

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 926231

Date of Issue: 16/March/2020

RESEARCH LICENSE

This is to Certify that Ms., JANE KHASOA LUSENAKA of Moi University, has been licensed to conduct research in Bungoma on the topic: AGRIBUSINESS INCUBATION, INSTITUTIONAL SUPPORT AND IMPLICATION ON RURAL LIVELIHOOD SECURITY IN SELECTED SUB COUNTIES IN BUNGOMA COUNTY, KENYA for the period ending : 16/March/2021.

License No: NACOSTI/P/20/4032

926231

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY &
INNOVATION

Verification QR Code

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

APPENDIX IX: RESEARCH AUTHORISATION FROM BUNGOMA COUNTY

REPUBLIC OF KENYA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
State Department of Basic Education and Early Learning– Bungoma County

When Replying please quote
e-mail: bungomacde@gmail.com

Ref No: BCE/DE/19/VOL.III/183

County Director of Education
P.O. Box 1620-50200
BUNGOMA

Date: 17th March, 2020

TO WHOM IT MAY CONCERN

RE: AUTHORITY TO CARRY OUT RESEARCH – JANE KHASOA LUSENAKA – NACOSTI/P/20/4032

The bearer of this letter Jane Khasoa Lusenaka of Moi University has been authorized to carry out research on ***"Agribusiness incubation, institutional support and implication on rural livelihood security in selected sub-counties in Bungoma county, Kenya'*** for a period ending ***16th March, 2021.***

Kindly accord her the necessary assistance

For: COUNTY DIRECTOR OF EDUCATION
BUNGOMA
P.O. Box 1620,
BUNGOMA - 50200

CHRISTINE OWINO
For: COUNTY DIRECTOR OF EDUCATION
BUNGOMA COUNTY

APPENDIX X: LOGISTIC REGRESSION MODEL SPECIFICATION TESTS

Specification Tests	Chi-square	Df	Sig.
Omnibus Tests of Model Coefficients	67.778	5	.000
Goodness-of-fit Hosmer and Lemeshow Test	2.472	8	.963
Model Summary	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
	345.525[a]	.169	.250

Source: Researcher 2020

APPENDIX XI: CRONBACH'S ALPHA RELIABILITY ANALYSIS

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.862	**.857**	**10**

Source: Researcher, 2020

Item by Item Cronbach's Alpha

Construct	Element	Cronbach's Alpha
Software 'related agribusiness support	Training	.852
	Inputs	.851
	Agricultural loans	.842
	Input subsides	.844
	Marketing services	.840
Hardware' related agribusiness support	Storage services	.843
	Drying	.851
	Chemical treatments	.849
	Crop Insurance	.849
	Lending/ Renting Equipment	.853

Source: Researcher, 2020

APPENDIX XII: CONSTRUCT RELIABILITY AND VALIDITY TEST

Construct	Items-	Outer loadings	Cronbach's Alpha	**rho_A**	**(CR)**	**AVE)**
Financial Capital			0.890	**0.390**	**0.766**	**0.621**
	Livestock farming	0.768				
	Crop farming	0.573				
	Poultry farming					
Physical Capital			0.876	**0.932**	**0.736**	**0.583**
	Communally	0.533				
	Contested land	0.495				
	Privately owned	0.917				
Social Capital			0.828	**0.795**	**0.831**	**0.714**
	Farmers club	0.465				
	Self-help group	.0885				
	Welfare group	0.736				
Livelihood Outputs			0.825	**0.827**	**0.884**	**0.656**
	Credit access	0.634				
	Health Benefit	0.639				
	Income	0.774				
	Farm Inputs	0.630				
	Resource	0.494				
	Food security	0.625				
	Poverty reduction	0.717				

Source: Researcher, 2020

APPENDIX XIII: DISCRIMINANT VALIDITY-FORNELL-LARCKER CRITERION

	1	**2**	**3**	**4**	**5**	**6**	**7**
Financial Capital	**0.671**						
Institutional Support	0.178	**0.728**					
Livelihood outputs	-0.312	-0.044	**0.650**				
Livelihood Security	0.283	0.229	-0.087	0.240	1.000		
Physical Capital	0.195	0.169	0.144	0.150	0.617	**0.681**	
Social Capital	0.229	0.110	-0.382	0.189	0.600	0.030	**0.653**

Source: Researcher, 2020

APPENDIX XIV: HETEROTRAIT-MONOTRAIT RATIO (HTMT)

	1	**2**	**3**	**4**	**5**
Financial Capital					
Institutional Support	**0.258**				
Livelihood outputs	0.243	**0.800**			
Livelihood Security	0.409	0.101	**0.323**		
Physical Capital	0.411	0.450	0.310	**0.603**	
Social Capital	0.423	0.767	0.931	0.547	**0.280**

Source: Researcher, 2020

APPENDIX XV:COLLINEARITY TEST-COLLINEARITY STATISTICS (VIF)

	VIP
Communally Owned Land	**1.068**
Credit Access	**2.713**
Crop Farming	**1.062**
Cultivation	**1.079**
Farm Inputs Access	**2.331**
Farming Profit	**1.023**
Food	**1.136**
Health	**1.670**
Knowledge	**1.186**
Loans	**1.727**
Multiple	**1.247**
Poultry Farming	**1.062**
Privately Owned Land	**1.068**
Self Help Group	**1.264**
Stakeholders	**1.699**
Subsides	**1.728**
Support to Family	**1.139**
Technical Advice	**2.594**
Training	**1.855**
Welfare	**1.603**
Welfare Group	**1.264**
YZ	**1.000**

Source: Researcher, 2020