

INFLUENCE OF FARM ENTERPRISE DIVERSIFICATION ON SOCIO-ECONOMIC STATUS AMONG SUGARCANE FARMERS IN BUMULA SUB-COUNTY BUNGOMA COUNTY KENYA

BY

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DECLARATION

This research project is my original work and has not been presented for examination in any university for any academic award.

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This research project proposal has been submitted for examination with my approval as the university supervisor.

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DEDICATION

I dedicate this project research proposal to my dear husband Joseph Obino and my dear son Nevine,

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My acknowledgement goes to my able supervisor Dr. Stephen Luketero for his mature criticism and guidance during the writing of this research project proposal. My gratitude also goes to the University of Nairobi for providing space and enabling environment for my studies. My recognition also goes to my 2013 fellow course mates who have been always there for me when I required their support.

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ABBREVIATIONS AND ACRONYMS

PRSP	-Poverty Reduction Strategy Paper
ERS	-Economic Recovery Strategy
SPSS	-Statistical Package for Social Sciences
SRA	-Strategy for Revitalizing Agriculture
MDGs	-Millennium Development Goals
CAADP	-Comprehensive Africa Agriculture Development Programme
NEPAD	-New Partnership for Africa's Development
UN	-United Nations
HIV	-Human Immuno-deficiency Virus
AIDS	-Acquired Immune Deficiency Syndrome
KFSSG	-Kenya Food Security Steering Group
ASDS	- Agriculture Sector Development Strategy
IFPRI	-International Food Policy Research Institute
ASDS	-Agricultural Sector Development Strategy
MOCO	-Mumias Outgrowers Company
KSA	-Kenya Sugar Authority ()
SASA	-South Africa Sugar Authority
LEISA	-Low External Input and Sustainable Agriculture
IEBC	-Independent Electoral and Boundaries Commission
AEOs	-Agricultural Extension Officers
MSC	-Mumias Sugar Company
HCDA	-Horticultural Crops Development Authority's
LME	- Liquid Milk Equivalent
FAO	-Food and Agriculture Organization
ILRI	- International Livestock Research Institute
GDP	-Gross Domestic Product
DFID	-Department for International Development
SLF	-Sustainable Livelihood Framework

ABSTRACT

The agricultural sector is the backbone of Kenya's economy and the means of livelihood for most of our rural population. Farm enterprise diversification is critical to uplifting the living standards of the people as well as generating rapid economic growth. The purpose of this study was to investigate the influence of farm enterprise diversification on socio-economic status among sugarcane farmers in Bumula Sub County, Bungoma County. The objectives of this study were; to determine the influence of horticulture farming, to establish the influence of dairy farming, to examine the influence of poultry keeping and to investigate the influence of crop farming on socio-economic status among sugarcane farmers in Bumula sub county, Bungoma County. Therefore the research questions for the study were; what is the influence of horticulture farming, what is the influence of dairy farming, what is the influence of poultry keeping and what is the influence of crop farming on socio-economic status among sugarcane farmers in Bumula sub county, Bungoma County? The study adopted the descriptive survey research design to assess the socio-economic status of farmers. The target population was 20,294 cane farmers and 19 AEOs hence a total of 20,303. The sample for this study was 377. The sampling technique used was simple random sampling where farmers were grouped into sub-locations and randomly selected. The research instrument that was used in this study for data collection was questionnaire for the farmers and AEOs. Data analysis used frequency tables and percentages to analyze both quantitative and qualitative data. The findings indicate that farm enterprise diversification increases income for farmers in that various options for income generation are available. Therefore overreliance on sugarcane alone for income is inadequate and does not alleviate poverty. Therefore cane farmers are advised to venture into other farming ventures to boost their income and hence raise their living standards.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Agriculture is the world's largest use of land, occupying about 38% of the Earth's terrestrial surface. The agricultural community has had tremendous successes in massively increasing world food production over the past five decades and making food more affordable for the majority of the world's population, despite a doubling in population. Global production of main grains has roughly tripled since 1960, with corresponding decreases in price in most markets.

The transformation of agriculture over the past 50 years to what we now know as "modern" agriculture took advantage of inexpensive fossil fuels to raise agricultural productivity in many world regions. Technological innovations, investments in infrastructure and supporting policies including subsidies were effective in some regions but others have been left behind, particularly Sub-Saharan Africa. Yield trends in the past 50 years and current yield gaps vary widely among and within countries (Nelson, 2013).

Contemporary food systems have also exerted undesirable pressure on terrestrial and aquatic ecosystems and they are failing to provide adequate nutrition to billions of people. An estimated 870 million people still lack sufficient caloric intake, while a billion or more suffer from micronutrient deficiencies. Another 1.4 billion suffer from overweight or obesity. Progress in reducing poverty and hunger has slowed down in recent years.

Food prices began to rise slowly around 2004 and have fluctuated much since 2007, highlighting the vulnerability of global food supplies and re-vitalizing interest in farming and related issues after a long period of neglect. Global food demand will continue to increase for at least another 50 years – against a backdrop of growing competition for land, water, labour and energy and under threat from climate change. FAO projects that feeding a world population of about 9 billion people in 2050 would require raising overall food production by at least 70 %. Depending on actual demographic trends, crop production may even have to double within that period to also keep pace with dietary changes and increasing bioenergy use of crops. A fast

rising middle class in transition countries will exacerbate the demand for energy-intensive food categories beyond levels not seen before (Nelson, 2013).

On the supply side, concerns include climate variability and change, rising energy prices, conflicts over land and water, soil degradation, and out-migration of labor from rural areas. Agriculture faces indeed an intimidating set of unprecedented challenges and risks. As we face these challenges for the world's current and future inhabitants, we must call for a new approach that ensures success and sustainability under this new set of constraints. We now need a "post-modern" agriculture that draws more effectively on production ecology principles to improve the productivity and efficiency of agriculture while reducing negative environmental impacts. While modern agriculture has used fossil fuel-based inputs to achieve an optimized uniformity in many areas, post-modern agriculture can benefit from cheap information to bring about agro-ecological intensification based on optimized complexity (Nelson, 2013).

The current transformation of the European agriculture and farming sector towards multi-functionality (Van Huylenbroeck and Durand, 2003), the growing importance of sustainable technologies that rely on a more efficient use of natural resources, and the reorientation of agricultural production towards non-food markets (such as energy crops) and service provision (Mahroumet al., 2007) involve 'vision creation' and strategic choices on the part of farmers and rural actors at large. These choices are made in the context of societal transformations that restructure rural areas. Socio-demographic changes, the counter-urbanization movement, the flowing off of certain knowledge-based industries from cities to rural areas (for example, increasing placement of creative industries and new technology companies in the country), the construction of new spaces between towns and country (e.g. city regions, metropolitan countryside) (Muench-hausen, 2008) and the increased demand for quality of life based on rural amenities are driving such transformations (Knickel et al., 2008; Van der Ploeg et al., 2008).

However, there are global trends as well that affect European farmers and rural communities at micro and meso levels. Examples are migration, climate change, and an increasing scarcity of fossil fuels, the instability of financial markets and the influence of distant regional conflicts. The complexity around strategic choices towards economic and social sustainability requires common vision creation. Innovation is a part of visioning and of the collective capacity to imagine and choose new development trajectories for rural areas – farms, businesses, communities and territories (see also Downey and Purvis, 2005).

The poverty alleviation rural India-strategy and programmes states that at the beginning of the new millennium, 260 million people in the country did not have incomes to access a consumption basket which defines the poverty line. Of these, 75 per cent were in the rural areas. India is home to 22 per cent of the world's poor. Such a high incidence of poverty is a matter of concern in view of the fact that poverty eradication has been one of the major objectives of the development planning process. Indeed, poverty is a global issue. Its eradication is considered integral to humanity's quest for sustainable development. Reduction of poverty in India, is, therefore, vital for the attainment of international goals (PARI-SP, 2009).

Agricultural wage earners, small and marginal farmers and casual workers engaged in non-agricultural activities, constitute the bulk of the rural poor. Small land holdings and their low productivity are the cause of poverty among households dependent on land-based activities for their livelihood. Poor educational base and lack of other vocational skills also perpetuate poverty. Due to the poor physical and social capital base, a large proportion of the people are forced to seek employment in vocations with extremely low levels of productivity and wages. The creation of employment opportunities for the unskilled workforce has been a major challenge for development planners and administrators (PARI-SP, 2009).

The agricultural sector is the backbone of Kenya's economy and the means of livelihood for most of our rural population. Sustained agricultural growth is critical to uplifting the living standards of our people as well as generating rapid economic growth. However, in spite of the importance of the agricultural sector, farming in our country has for many years been predominantly small scale, rainfed and poorly mechanized. In addition, institutional support and infrastructure have been inadequate (Agricultural Sector Development Strategy, GoK, 2010–2020).

In Kenya, growth of the national economy is highly correlated to growth and development in agriculture. In the first two decades after independence, the agricultural sector, and in turn the national economy, recorded the most impressive growth in sub-Saharan Africa at average rates of 6 per cent per annum for agriculture and 7 per cent for the national economy. During this period, small-scale agriculture grew rapidly as the population rallied around the call by the first president of the republic, *rudini mashambani* (return to the farms). This growth was spurred by expansion because there was ample land and better use of technology. Moreover, agricultural

extension and research were supported by the Government (Agricultural Sector Development Strategy, GoK, 2010–2020).

The Government developed and launched the SRA in March 2004 as a response to the ERS. The strategy set out the vision of the Government as: To transform Kenya’s agriculture into a profitable, commercially-oriented and internationally and regionally competitive economic activity that provides high-quality, gainful employment to Kenyans. This was to be achieved within the framework of improved agricultural productivity and farm incomes, while conserving the land resource base and the environment. The Government’s vision pointed to a paradigm shift from subsistence agriculture to agriculture as a business that is profitable and commercially oriented. The SRA also gave policy direction and actions that needed to be taken in each agricultural subsector to achieve the vision.

The ERS emphasized economic growth and creation of wealth and employment as means of eradicating poverty and achieving food security. This was a major shift from the previous focus on poverty reduction and food security. The strategy identified agriculture as the leading productive sector for economic recovery (Agricultural Sector Development Strategy, GoK, 2010–2020).

Among the crops grown for commercial and industrial purposes in Kenya is sugarcane. In particular, Mumias Sugar Company which was established in the early 1970’s, has been Kenya’s leading sugar producer. However the farmers who have contracted by the company for that long still live in poor conditions with low socioeconomic power due to a myriad of challenges bedevilling the sugar i. S Sugarcane growing was expected to provide a boost to the much elusive family income among the poor families in western Kenya. According to Wanyande, (2001), the current state of sugar industry is primarily as a result of destructive political economy that has seen corruption, mismanagement, lack of political goodwill, ruin the sector. Apart from Mumias Outgrowers Company (MOCO) which the Kenya Sugar Authority (KSA) acknowledged as the only outgrower organization to have succeeded in offering the farmers good services despite the insurmountable problems in the sub-sector, the other outgrower organizations have not performed to the expectations of farmers. The result has been a systematic increase in poverty amongst farmers and subsequent decline in the sustainability and efficient growth of the sub-sector. The situation has been exacerbated more by non-sequenced trade liberalization trade policies, leading to unchecked influx of imported (often dumped) sugar into the local market.

Kenya Sugar sector is expected to have undertaken key reforms in various areas to build competitiveness and introduce efficient management in the sugar supply chain. Consequently, the institutional and legislative framework governing the sugar sub-sector must be urgently overhauled in order to respond to imminent threat affecting the sector.

1.2 Statement of the problem

Sugarcane farming is a worldwide activity, practiced in most countries in the world. According to SASA (2009), an estimated 2% of the South African population depends on the sugar cane industry for a living. However, this activity has its own challenges as far as the whole process of sugar production from planting the canes to the processing, and finally the payment of farmers is concerned. Most of sugarcane farmers usually expect high returns especially when they have invested much in the activity and following the required procedures in sugarcane farming (SASA, 2009).

According to Odenya, (2007), despite the effort made to multiply and distribute the treated seed cane with agronomic packages, there is still low adoption of the technologies by the farmers which has led to reduced acreage of sugarcane leading to reduced household income and livelihood status in Nyando sugar zone. This is almost the same case in Bumula sub county, where the farmers experience the same challenges and many of them have been withdrawing from sugarcane farming and mainly getting involved in maize farming.

Despite growing sugarcane for such a long time, poverty rates are still high in this sub county; productivity growth is slow; as a result of natural resource degradation, including soil erosion, soil fertility depletion, overgrazing and deforestation. At the same time, productivity growth has slowed in many farms and favourable rainfed agricultural because of diminishing returns to conventional technologies in these areas and natural resource degradation problems.

Because of these problems, alternative technological approaches are being advocated, particularly for poor farmers in less-favoured areas. Among such approaches are low external input and sustainable agriculture (LEISA) approaches, organic agriculture and biotechnology.

The study according to Waswa, *et al.*, (2012), was about contract sugarcane farming whereby more land is put into agriculture than the rest. Their study shows that while it was hoped that sugarcane farming would raise farmers' incomes and somehow help reduce poverty, Western

and Nyanza provinces are still among the poorest regions in Kenya. Further, the additional labour demands for cash crop production may reduce the amount of time women have for subsistence farming and or alternative income generation options. Waswa, *et al.*, (2012) adds that an equitable approach to labour specialization at the farm between men and women could help address this dilemma. Whilst the revenues from high value cash crops like sugarcane should be more than sufficient to meet the household's basic needs and nutritional requirements, this does not always happen.

For over three decades, majority of farmers in Bumula Sub County grow sugarcane which is supplied to Mumias sugar as the main sugar industry within the region with the hope that the proceedings will be able to help them meet their family by having sufficient income. The purpose of this study is to assess the potential of farm enterprise diversification to help improve productivity and income flow and reduce poverty in the households and to provide recommendations concerning modern farming practices to reduce poverty among poor farmers in the sugarcane growing areas.

1.3 Purpose of the Study

The purpose of this study was to investigate the influence of farm enterprise diversification on socio-economic status among sugarcane farmers in Bumula Sub County, Bungoma County.

1.4 Objectives of the Study

The following objectives guided this study:-

- (i) To determine the influence of horticulture farming on socio-economic status among sugarcane farmers in Bumula sub county, Bungoma County.
- (ii) To establish the influence of dairy farming on socio-economic status among sugarcane farmers in Bumula sub county, Bungoma County.
- (iii) To examine the influence of poultry keeping on socio-economic status among sugarcane farmers in Bumula sub county, Bungoma County.
- (v) To investigate the influence of crop farming on socio-economic status among sugarcane farmers in Bumula sub county, Bungoma County.

1.5 Research Questions

From the objectives of the study, the following research questions were formulated:-

- i) What influence does horticulture farming have on socio-economic status among sugarcane farmers in Bumula sub county, Bungoma County?
- ii) What influence does dairy farming have on socio-economic status among sugarcane farmers in Bumula sub county, Bungoma County?
- iii) What influence does poultry keeping has on socio-economic status among sugarcane farmers in Bumula sub county, Bungoma County?
- iv) What influence does crop farming has on socio-economic status among sugarcane farmers in Bumula sub county, Bungoma County?

1.6 Significance of the Study

It is hoped that the research findings on the effect of farm enterprise diversification on socio-economic status among sugarcane farmers in Bumula Sub County, Bungoma County, will provide useful information to the government on how to enhance the uptake of modern farming practices among the sugarcane farmers. This would in turn boost food security in the country while also helping the poor access disposable income. The information would also act as a feedback that will enable all the players to critically evaluate and design farming methods that will yield high returns for to the farmers. Finally, the information collected would add to the literature available on influence of modern farming practices on social economic status among sugarcane farmers and form a basis for further research.

1.7 Delimitation of the Study

The study was carried out in Bumula sub county, Bungoma County in Western province. The IEBC estimates the population in the district to be 178, 897 on an area covering 944 km² (Census report 2010). The 2009 Kenya population census statistics indicate that agriculture is the main economic activity practiced by the majority of the population. According to Mumias Sugar Company records, Bumula Sub County has 20,294 farmers contracted with the company to grow sugarcane and 19 AEOs employed by MSC and seconded to the sub-locations. The district was selected on the strength that it was convenient to the researcher as an Agricultural Extension Officer in the sub county. The study sought to determine the influence of farm enterprise diversification on socio-economic status among sugarcane farmers in Bumula Sub County.

1.8 Limitation of the Study

The study faced with a number of limitations. First was availability of the accurate records on the number of farmers contracted by MSC especially after the collapse of MOCO. This study could have been mistaken to be meant for undermining sugarcane growing in the area with the intention of substituting it with other crops. However the purpose of the study was explained to the research participants to allay any such fears that would arise out of their participation. Secondly, there was a financial constraint because of the vastness and the terrain of the area under study. The cheapest and convenient means of transport were used where respondents were clustered for easier visits to avoid daily traversing across the division. Appointments were made in advance to cut on incidences of bouncing or missing the respondents for questionnaire administration.

1.9 Assumptions of the Study

During the study, the following assumptions were considered; that all respondents would give honest responses. It was also assumed that the sample taken would represent the population adequately. The data collection instrument would have validity and would measure the desired outcomes for the study.

1.10 Definition of Significant Terms

Farm enterprise diversification – refer to a substitution of one crop or other agricultural product for another, or an increase in the number of enterprises, or activities, carried out by a particular farm,

Socio-economic status: -is an economic and sociological combined total measure of a person's work experience and of an individual's or family's economic and social position in relation to others, based on income, education, and occupation.

Horticulture farming -is technically the science, technology, and business involved in intensive plant cultivation for human use.

Dairy farming - is a business enterprise established for the harvesting of animal milk mostly from cows or goats.

- Poultry keeping - is the raising of domesticated birds such as chickens, turkeys, ducks, and geese, for the purpose of farming meat or eggs for food.
- Crop farming - Crop farming is the cultivation of plants for food, animal foodstuffs, or other commercial uses.

1.11 Organization of the study

The report is organized in five chapters: It has a cover page and preliminary pages containing declaration, dedication, acknowledgement, abstract, table of content, list of figures, list of tables, abbreviations and acronyms.

Chapter one (Introduction) contains; background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, delimitation of the study, limitations of the study, assumptions of the study, definition of significant terms and the organization of the study.

Chapter two (Literature review) contains; Introduction, horticulture farming and socio-economic status of farmers, dairy farming and socio-economic status of farmers, poultry keeping and socio-economic status of farmers, crop farming and socio-economic status of farmers, theoretical framework, conceptual framework and summary.

Chapter three (Research methodology) contains; Introduction, research design, target population, sampling procedures and sample size, data collection instruments and their validity and reliability, methods of data collection, data analysis techniques, operational definition of variables, ethical considerations and summary.

Chapter four (Data analysis, presentations and interpretations) contains; introduction, questionnaire return rate, demographic characteristics of the respondents, horticulture farming and socio-economic status of farmers, dairy farming and socio-economic status of farmers, poultry keeping and socio-economic status of farmers, crop farming and socio-economic status of farmers.

Chapter five (Summary, conclusion and recommendation) contains; introduction, summary of the study, conclusions, recommendations and suggestions for further studies

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides the reviewed literature of the studies that have been conducted on the effect of farm enterprise diversification on socio-economic status among sugarcane farmers. The literature under this chapter covers aspects such as; horticulture farming and socio-economic status of farmers, dairy farming and socio-economic status of farmers, poultry keeping and socio-economic status of farmers, crop farming and socio-economic status of farmers.

2.2 Horticultural farming and enterprise diversification on socio-economic status

Sargent [1973] highlighted that in primitive stages of agricultural development, agriculture remained the main occupation of the people. In the transitional stage of economic development, agriculture carried immense burden in the drive for economic growth. However, during maturing phase the main emphasis still remains on the maintenance of balance role for agriculture, but horticulture becomes more important. This is due to commercialization of crops around the world. Fruits and vegetables have become of greater importance in the past few years in the process of agricultural development. This is so because of the high increases in income derived by the cultivation of fruits and vegetables crop as compared to annual cereal crops. In addition; fruits and vegetables crop are being the sources of protective foods, brought awareness to the masses.

Mahatma Gautama Buddha very aptly said, “Speech and action go ill together, Nature is continuously in action, yet is mute”. One factor behind the colonization of many regions by European countries was the desire to establish access to horticultural products like beverage crops (tea, coffee, cocoa), herbs and spices. G.P. Mishra [1982] in his book states that in the wake of technological transforming in the rural areas, the greater intensity of input packages demands higher investment. The increasing demand for credit from all sources become encouraging in views of the impetus given to the process of transformation from primitive agriculture to commercial agriculture.

Lewis H. Nancy [1997] also put forward the views of Aristotle, “.....The mean of life must be provided beforehand by nature; for the business of nature is to furnish food to that which is born, and the food of the offspring always remains over in the parents. Wherefore, the art of making money out of fruits, vegetables, and animals is always numerals. In the light of his thought, the art of gardening and growing of more vegetables and fruits crops (horticultural crops) which can bring about development of the rural as well as urban to stand on its own productivity, producing marketed surplus for the market is needed in this demand driven world.

Another French economist namely Sismondi also stated man as “Acquiring dominion over nature”. He believes that wealth consists in such dominion and that it increases huge resources which are yet to be exploited fully.

A study conducted in Tamenglong district, India confirmed that the district which is remotest and backward among 500 backward districts in the country has been surviving primarily on Jhum cultivation as main occupation. It further commented that the occupation had no more rewarding as usually done in the past decades. So people have been on a look out for more rewarding activities” like horticulture activities in the region. It observed that people had been raising horticultural crops with own saving and government did not pay much attention. So necessarily they remain backward. The survey confirmed that the horticulture sector would be the only lifeline for this people (Kamei, 2013).

Further, the study observed that since, they had tremendous land, potentiality and viability for growing all kinds of horticulture crops. The upcoming Tran-Asian Railway connecting jiribam to tupul via Imphal to Myanmar connecting South East and South West Asian countries was a green signal for future growth. So also the International Highway I & II that would change the market structure of the entire north East and South East Asian countries. Therefore in such scenario, the district has no way to stay backward anymore as it used to be now. This way employment, income and standard of living and will gradually change the economy structure of the district and people will be more prosperous by undertaking this best alternative form of cultivation, in this market integration and globalised world (Kamei, 2013).

Another study conducted in Kinondoni Municipality, Tanzania observed that different varieties of vegetable products were grown by the smallholder farmers in the study area. The

results showed that amaranthus species were grown by majority (21.3 %) of smallholder farmers. That was followed by pumpkin (15.0 %), Chinese (13.3 %) and legume leaves (11.3%). However, notable differences in the proportion of respondents who reported production of the remaining vegetable products were apparent. For example, while a relatively larger number of smallholder farmers reported growing of salad (8.1 %), “mnafu” (7.5 %) and spinach (6.9 %), very few sample smallholder farmers reported growing of cabbage (5.6 %), pepper (4.4 %), okra (3.8 %) and tomato (2.5 %). Reason attributed to this variation is partly due to differences in profitability of the products, availability of customers and climatic condition. That is, farmers preferred to cultivate vegetables with high profit, good number of customers, and suitable to climate. These vegetables include amaranthus species, pumpkins and Chinese as compared to the vegetables with either low profit, low number customers or unsuitable for the climate such as, tomatoes because of low profit and, okra because it requires high rainfall (Masashua et al, 2008).

Horticulture is an important subsector of Kenyan agriculture, the mainstay of the country’s economy, in achieving food security, income and employment generation, foreign exchange earnings, raw material for agro-processing, and poverty alleviation. The subsector directly and indirectly employs over six million Kenyans. The horticulture industry is also the leading foreign exchange earner after tea. In 2009, Kenya earned KES 71.6 billion from horticultural exports and KES 153 billion from the domestic market (National Horticulture Policy, 2010).

The Horticultural Crops Development Authority’s Strategic Plan (2009-2013) recognizes the role of horticulture and it states that; “The horticultural industry is one of the fastest growing agricultural sub-sectors in the Kenyan economy, recording an average growth of 15-20% per annum. It is the most vibrant sub-sector in the agricultural sector and contributes immensely to socio-economic development. The sub-sector contributes more than 10% of total agricultural production and employs approximately 4.5 million people countrywide directly in production, processing and marketing while 3.5 million people benefit indirectly through trade and other activities. The sub -sector contributes positively to wealth creation, poverty alleviation and gender equity especially in the rural areas. It contributes to the Kenyan economy through income generation, creation of employment opportunities for rural people and foreign exchange earnings, in addition to providing raw materials to the agro-processing industry. In summary therefore, horticulture would contribute enormously to realization of the National Development Agenda through interventions in the following areas: wealth and employment creation, foreign

exchange earnings, provision of raw materials for the agro-processing industry, enhancing nutrition and food security and poverty alleviation.” (HCDA, 2009)

2.3 Dairy farming and enterprise diversification on socio-economic status

Milk is a source of regular income, because it is produced and sold daily and cannot be stored like arable crops. In developing countries dairy animals are kept by small-scale farmers, mainly in mixed-farming operations. In addition to meat, milk, hides and traction for carts and ploughs, animals provide income, employment, socio-cultural wealth and act as cash reserves. In some systems dairy animals are fed crop residues and their wastes furnish fuel for energy and organic fertilizer. Manure for fuel is fundamental in many countries, especially South Asia (Afghanistan, Bangladesh, India and Pakistan), and there is increasing interest in manure as a sustainable source of biogas in rural areas. In some farming systems manure is critically important for increasing yields in crop agriculture (A. Rota, personal communication, 2012).

Demand for milk and dairy products has grown significantly in many Asian countries, partly because of population growth but also because people are spending more disposable income on livestock products. Demand for milk in developing countries is increasing fast: Delgado et al (1999) estimated that milk consumption in the Asia–Pacific region would double to 231 billion litres of liquid milk equivalent (LME) by 2020, but it actually reached 240 billion litres LME by 2007 (FAO, 2013).

In developing countries, smallholders play an important part in providing milk and milk products; with demand increasing, they can also have a more significant role in dairy-industry development. We define dairy-industry development as activities that ensure milk and dairy products are available, affordable, nutritious and safe by assisting small- and medium-scale dairy producers, processors and service providers to maximize their capacities to meet demand (FAO, 2013).

In developing countries, dairy farmers range on a continuum from subsistence activities outside the cash economy, through more commercial/industrialized production in the formal cash economy, to specialized peri-urban pockets of dairying resembling highly-capitalized production in developed countries (World Bank, 2007a). FAO (2008) describes this evolution from

subsistence smallholder milk producer to small-scale commercial dairy farmer process as a virtuous circle (FAO, 2013).

Rising earnings from dairying foster indigenous expertise and manufacturing in off-farm jobs, which compete with dairying for labour but also boost demand for dairy products (Candler and Kumar, 1998). Smallholder production stimulates rural development in both developing and developed countries by creating on-farm employment and income opportunities beyond the farm gate, e.g. in Ghana one full-time job is created for every 20 litres of milk collected, processed and marketed (FAO, 2004a). The more this formalization of smallholder dairying proceeds the more it can be termed industrial.

Dairy production systems vary across agro-ecological zones. Feed is the largest input and cost in most systems, more so when labour involved in producing the feed is factored in. In addition to grazing and fodder crops, feed rations are commonly augmented with crop residues and industrial by-products, such as molasses, wastes from breweries and flour mills, oilseed cake, fruit pulp and vegetable waste (Henriksen, 2009).

About 85 percent of smallholders milk cows. But people of different cultures milk other animals, ranging from larger animals (cattle, buffalos, yaks, camels, llamas, alpaca, horses, donkeys, reindeer) to small, less costly ruminants (goats, sheep). There is a dearth of peer-reviewed international literature on the role and contribution of other species in meeting the needs of a growing human population. Field observations from a number of partners in developing countries do, however, indicate that their impact on both household food security and poverty alleviation is very significant (FAO, 2013).

There are thousands of unique, nutritious, traditional dairy products around the developing world whose main function is to preserve milk surpluses for consumption in the winter or during the dry season. A few cultures use dairy products for cosmetics, e.g. in Eritrea (likay from cow's blood and milk) and Ethiopia (butter). Elsewhere milk is sacred, e.g. Mongolia where it is sprinkled on horses' hooves and the wheels of vehicles before journeys. In India dairy cows are sacred. Milk animals are used for food production and draught purposes in Bangladesh, India and Pakistan (FAO, 2013).

Smallholder dairying is complex, requiring wide-ranging skills. Like other agricultural sectors, the dairy sector needs institutional support and guidance to contribute to national

development, family well-being and nutrition, particularly in rural areas. The nature of the institutions is critically important for inclusion or exclusion of smallholder dairy farmers. Development of smallholder dairy farmers' organizations is often seen as the single most important institutional factor for development of the dairy sector where the smallholders are included. Dairying helps to achieve the first Millennium Development Goal, the eradication of poverty and hunger (FAO, 2013).

About 12 to 14 percent of the world's population, nearly a billion people derive at least some part of their livelihood from livestock (Steinfeld et al., 2010). In 2005 the World Bank Agricultural Investment Sourcebook (World Bank, 2005a) reported that smallholder dairying was cost effective and a key source of nutrition and income to 300 million farm families globally, including 40 million in India. Mean herd size is around two cows, giving an average milk yield of 11 litres per farm per day and creating one full-time on-farm job; in developed countries over five times that volume of milk is needed to create one farm job (FAO, 2010a).

An ILRI study in Ethiopia and Kenya in East Africa and India and Pakistan in South Asia supported these findings (Staal, Nin Pratt and Jabbar, 2008a, 2008b). In India farm-level studies highlighted the continuing importance of dairy farming in generating regular employment (Shiyani and Singh, 1995; Singh, 1997).

These studies estimated that a dairy cow generated 60–100 work days per annum, depending on region, category of farm household and type of dairy cattle. On a per household basis, employment generated varied from 150 to 300 work days per year. The livestock sector provides much more employment and regular income than rice and wheat or allied activity. Productivity of labour in dairying is about 2.5 times higher than in agriculture generally, with corresponding annual returns per unit of labour of INR 45 000 (US\$1 020) and INR 17 000 (US\$390), respectively. On smallholdings in India and Pakistan, employment generated per unit of milk production decreases dramatically as herd size increases (Staal, Nin Pratt and Jabbar, 2008a).

In Kenya, smallholder surveys estimate two million dairy farming house-holds keep over five million grade or crossbred dairy cattle. Some 77 people are employed full time for every 1 000 litres of milk produced daily, equating to a total of 841,000 jobs (256,000 self-employed and 585 000 hired). Small- and medium-sized dairy enterprises represent 87 percent of this employment (SDP, 2005). In Kenya, dairy farming generates an average income per enterprise of

KSh 38,000 (US\$475) for small-scale farmers and KSh 298 129 (US\$6 025) for large-scale farmers, with an average weighted income of KSh 114 000 (US\$1 425) compared with an average per capita gross domestic product (GDP) of KSh 27 825 (US\$347) for Kenya (World Bank, 2003).

Ethiopia's livestock sector accounts for 30–35 percent of agricultural GDP or 12–16 percent of GDP; dairying represents half of livestock output, and livestock contribute to livelihoods of 60–70 percent of the population (Aklilu, 2002; Ayele et al., 2003). A study of employment and income from all dairy-related activities for two groups of farms in the Ethiopian highlands found urban/peri-urban systems produce 205 million litres of milk annually, creating 15 000 full-time jobs, while the small-scale mixed farming system produces 900 million litres of milk annually, creating over 550 000 jobs (Muriuki and Thorpe, 2001).

In Kenya, processing and marketing of about eight million litres of milk daily generate jobs for traders, transporters, mobile milk traders, milk bars and shops/kiosks, small and large processors, vehicle repairs, security firms and catering outlets. The number of direct and indirect jobs created in the marketing segment of the supply chain varies from 3 to 20 people per 1 000 litres traded daily. Informal marketing generates on average 18 jobs per 1 000 litres of milk handled daily, including three indirect jobs. Corresponding figures for the formal sector are 13 and one. Employees in formal processing and marketing and informal traders earn approximately the same monthly income of US\$150. In contrast, the government's minimum wage guideline is US\$43 (Staal, Nin Pratt and Jabbar, 2008a).

A joint study by ILRI and FAO found that in Kenya “the informal sector has been growing at over 10 percent in the last decade and its share of total employment, excluding employment in small-scale farming activities, was estimated at 70 percent in 2000” (Mburu, Wakhungu and Gitu, 2007).

2.4 Poultry keeping and enterprise diversification on socio-economic status

Poultry plays an important role in human nutrition, national income, employment, and income generation in Bangladesh. The importance of poultry as a source of income for the landless and marginal farmers, particularly women, has become increasingly recognized (Ogunlade and Adebayo, 2009). Gueye (2009) reported that poultry in rural areas is an important

system for supplying the fast-growing human population with high-quality protein and providing additional income to resource-poor small farmers, especially women.

Saleque and Mustafa (1996) studied possibilities for women's participation in poultry development and concluded that most of the rural and landless women (70%) are directly or indirectly involved in poultry rearing activities, but they have little experiences. In a latest study, Ali (2012) noted that 70% of women in Gezira Scheme Sudan are involved in chicken rearing.

Animal production in general and chickens in particular play important socioeconomic roles in developing countries (Alders, 2004; Salam, 2005). Provision of animal protein, generation of extra cash incomes and religious-/cultural considerations are amongst the major reasons for keeping village chickens by rural communities (Alders et al., 2009). Nearly all rural and peri-urban families in developing countries keep a small flock of free range chickens (Jens et al., 2004). Village chickens are also an integrated component of nearly all-rural, many peri-urban and some urban households and accounts for more than 60% of the total national chicken population in most African countries (Branckaert et al., 1999, Sonaiya, 1990). According to Robert et al. (1992) and Sonaiya (2005); small farming families, land-less labourers and people with incomes below the poverty line were able to raise village birds with low inputs and harvested the benefits of eggs and meat via scavenging feed resources. However; most rural communities lack the required husbandry skills, training and opportunity to effectively improve their chicken production (Mlozi et al., 2003).

Knowledge of the socio-economic and socio-cultural roles of poultry in rural livelihoods is to a great extent based on, or related to, project interventions and reported in project-related formats such as baseline studies, progress reports or project impact studies (e.g. Alam, 1997; Saleque, 1999; Riise et al., 2005; Huque, 1999; Houndounougbo, 2005; Subrahmanyam and Murthy, 2006, FAO 2003a; FAO 2003b; FAO, 1998; Islam and Jabbar, 2005). Such studies struggle with the methodological problems posed by confounding factors associated with the various support activities that are included in many development projects.

In contrast, academic research on village poultry tends to focus on disease-related issues – see, for example, the reviews by FAO (2004b), Permin and Madsen (2002) and Permin and

Bisgaard. (1999). In comparison, knowledge of the socio-economic and socio-cultural roles of poultry in the livelihoods of smallholders is, unfortunately, less robust and less diversified. Aklilu et al (2007a) reflect on this balance in the research on village poultry:

“Research to improve village poultry production tends to focus on technical aspects of poultry keeping in the belief that these constitute the principal constraints. It is however, increasingly recognized that marketing opportunities are crucial to capitalise on improved technologies by generating cash income ... Understanding of marketing structure and functioning is a prerequisite for developing market opportunities for rural households.”

Reviewing the material available on socio-economic matters it becomes clear that a detailed analysis of the role of village poultry in smallholder livelihoods and food security with comparisons across countries and regions is subject to some limitations.

Various dynamics are currently changing the structure of the poultry sector. In 1999, Delgado et al. (1999) labelled the massive changes taking place in the livestock sector the “livestock revolution”. The label covers the complex of trends, processes and effects that characterizes global livestock demand and supply. In brief, the growth in global demand for meat and other livestock products is tremendous – fuelled by population growth, economic growth, urbanization, changing diets and reductions in the relative prices of livestock products.

The market for poultry meat is growing faster than that for any other meat product, and is projected by the International Food Policy Research Institute (IFPRI) to maintain this position in the coming decades (Delgado et al., 2001). Rising demand has fuelled a structural change in the production and supply of poultry meat, with production for the global market concentrated in the hands of relatively few large companies, characterized by vertically integrated production and marketing. Smallholders in rural areas of developing countries face severe constraints to taking advantage of market opportunities and must pay high costs to overcome market imperfections brought about by poor physical and institutional infrastructure (Delgado et al., 1999).

There is a considerable degree of market segregation between broiler meat and meat from chickens from scavenging or semi-scavenging flocks. Meat from village chickens sells at a

premium price, often in the range of 50-100 percent higher than broiler meat on a per bird basis, i.e. the premium may be even higher when measured in terms of weight, as the carcass weight of village chickens is often lower than that of broilers (Riise, 2005).

However, smallholders have limited means and market access with which to capture new market share, and face increased competition as a result of increasing efficiency in broiler-meat production and marketing, the elimination of trade tariffs, etc (Rolaet al., 2003; Patrick, 2004; Delgado, 1999). Smallholders in general and the poor in particular, face problems accessing credit, obtaining market information or new technologies, purchasing inputs and accessing product markets. Price fluctuations and asymmetric power relations in the market add to the list of constraints that smallholders face (Delgado et al., 1999).

These processes potentially lead to the marginalization of smallholder poultry producers, but there may also be opportunities for smallholders to benefit from the surge in demand. In the Bangladesh Poverty Reduction Strategy Paper, for instance, contract farming is regarded as a promising opportunity for smallholders to escape poverty (Government of Bangladesh, 2005)

2.5 Crop farming and enterprise diversification on socio-economic status

Crop diversification refers to growing many crops at the same time. It is also concerned with the switch from subsistence food production to commercial agriculture. Rural households in many different countries have been found to diversify their income sources allowing them to spread risk and smoothen consumption (Chibnik, 1994; Ellis, 1998; Reardon, Delgado and Milton, 1992; Valdivia, Dunn and Jette, 1996). This is often necessary in agriculture based peasant economies because of risks such as variability in soil quality, household and crop diseases, price shock, unpredictable rainfall and other weather related events (Oyewole et al, 2009).

Income diversification can be achieved by producing a variety of crops and/or pursuing off-farm employment. According to the World Bank (1996), 52% of Nigerians live on less than a dollar per day. In addition to the high incidence of poverty, most rural areas of the world are characterized by poor infrastructure, low level of urbanization, low population density and a very important agricultural sector (Minot, Epprecht, Anh and Trung, 2006). In addition to a rapid

economic growth, a sustained and widespread growth in household income through diversification is a necessary condition for any developmental strategy for such areas (Minot et al., 2006).

Intercropping is defined as growing of two or more crops simultaneously on the same piece of land; crop diversification is in both temporal and spatial dimension; there is intercrop competition during all or part of the crop growth. There are many types of intercropping viz., mixed intercropping, row intercropping, strip intercropping and relay intercropping.

The usefulness of intercropping are: greater stability of yield over different seasons, intercropping provides biological insurance against failure of one crop due to biotic or abiotic factor, better use of growth resources, better control of weeds, insect-pest and diseases for some cases one crop provides physical support to the other crop (e.g. growing of betel vine or black pepper vines on the support of mango or coconut and arecanut), one crop provides shelter to the other crop e.g. growing of tea under the shade of Albizzia, erosion control through providing continuous leaf cover over the ground surface, and it is the small farmers of limited means who is most likely to benefit (Rao and Mandal, 2007).

There are some problems as well related to adoption by the farmers, as for example (a) yields decreased because of adverse competition effect, (b) allelopathic effect i.e. any direct or indirect harmful effect that one plant has on another through production of chemical compounds that escape into the environment, (c) creates obstruction in free use of machines for intercultural operations, particularly where the component crops have different requirements for fertilizer, herbicides, pesticides etc., and (d) large farmers with adequate resources may likely to get less benefit out of intercropping (Rao and Mandal, 2007).

In Tanzania, agriculture consists of two main actors, smallholder farmers and large-scale enterprises owned by private and transnational corporations. In totality, smallholder farmers outweigh the large-scale enterprises. These smallholder farmers operate largely under rain-fed agriculture with typical farm sizes ranging from about 0.9 to 3 ha. The major limitation on the sizes of the land holdings and utilization is the reliance on hand hoe as the main cultivation tool, reliance on rainfall and use of traditional technologies. Agricultural sector

contributes approximately 26.7% of the Country's GDP; 30% of total exports; and 65% of raw materials for Tanzanian industries (Hepelwa 2010).

The sector is the main supporter of rural livelihoods into which 77% of households in rural areas are engaged in agriculture using traditional technologies. The productivity of these traditional production systems is generally low resulting to low standard of living of most smallholder farmers in the country. Most farms by rural poor people are small and to a large extent being vulnerable to changes in climatic conditions. The sector is more than 95% dependent on rainfall. That is the crop cultivation is a function of the quantity and distribution of rainfall. Most crops are primarily produced and harvested for subsistence needs. Even so, part of the harvest is sometimes sold in order to purchase additional households needs (Hepelwa 2010).

2.6 Theoretical Framework

The researcher proposes to use the Sustainable Livelihood Framework (SLF) developed by the DFID (1999) for this study. The SLF has been used extensively in both planning new development activities and assessing the contribution to livelihood sustainability made by existing activities. It displays the relationship between people, their livelihoods and their environments, macro policies, enterprises and all institutions (Neefjes, 2000). To obtain sustainable livelihoods outcomes, households pursue different livelihood strategies for which several researchers have developed categorizations (e.g. Scoones, 1998; Carney, 1998 and Ellis, 2000). The livelihood strategies fall under two broad categories: agricultural intensification and livelihood diversification, including off-farm activities.

The household lives within a vulnerability context, which frames the external environment in which people live. People's livelihoods and the wider availability of assets are fundamentally affected by critical trends as well as by shocks and seasonality—over which they have limited or no control. These components within the vulnerability context affect different households in different ways. Given a particular context, the household will be expected to have a combination of livelihood resources (natural, financial, human, physical and social capital).

The most important aspect is the household's access to these assets either through ownership or through acquisition of the rights to use. Each household's capacity to pursue different livelihood strategies is dependent on these livelihood resources and their socioeconomic

characteristics. In order to create livelihoods, therefore, people must combine the ‘capital’ endowments that they have access to and control over. The ownership of a certain physical asset can enable the household to reap multiple benefits.

Ownership of natural assets, land for example, can empower a household to access financial assets since it can use the land for productive activities and also as collateral for loans. Farm enterprises such as livestock ownership and crop farming can be a source of social capital as a sign of power, prestige, and wealth and community connectedness (DFID, 1999). Livestock can also be used as a productive physical capital (animal traction), and also as natural capital. Consequently, depending on the type and amount of livelihood resources the household or individual has, they will have an ability to follow a certain combination of livelihood strategies. These could be agricultural intensification or extensification, livelihood diversification including out migration, or a combination of two or more of these.

2.7 Conceptual Framework

The conceptual framework represents the relationship between independent variables intervening and moderator variables and dependent variables. Conceptual framework has therefore been developed from the reviewed literature and related theories.

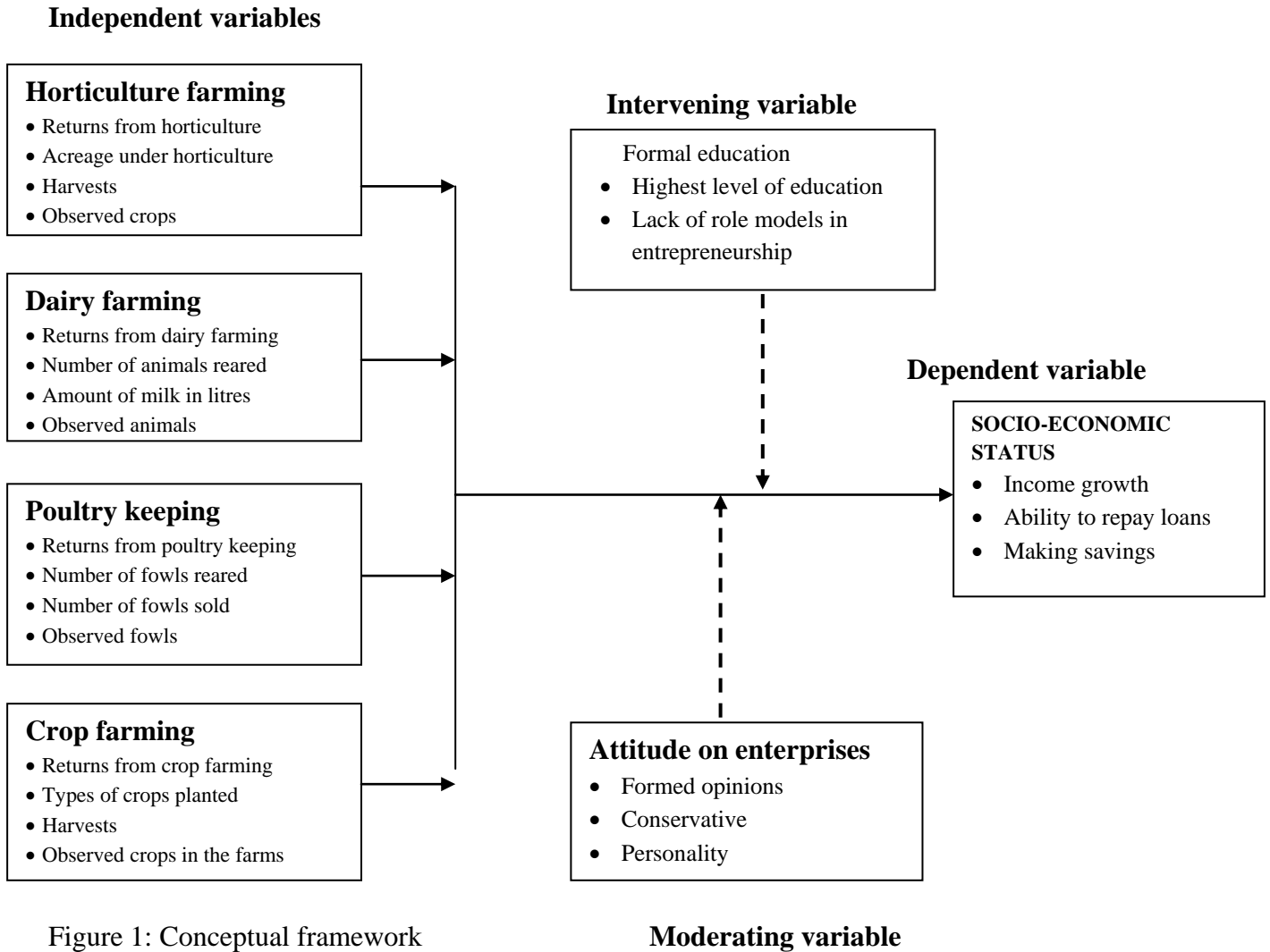


Figure 1: Conceptual framework

Intervening variable

The study considered the literacy levels or formal education levels of respondents as intervening variables. Managing enterprises require considerable level of education and ability to grasp concepts. The researcher will not have control over these variables but they do have a bearing on the adoption of alternative farm enterprises. This in turn affects the rate at which the socio-economic status would be lifted by such enterprises.

Moderating variable

Having an entrepreneurial character sometimes is affected by the attitude. There are small scale farmers whose attitude towards diversifying their enterprises is contrary. A poor attitude will hinder full realization of the benefits accrued by venturing into alternative enterprises. The

researcher in this study has no control over this aspect though would wish to find out how much effect it has on the socio-economic status of the farmers. This will therefore be treated as moderating variables.

2.8 Summary of literature review

In making decisions about farm enterprise diversification farmers need to consider whether income generated by new farm enterprises will be greater than the existing activities, with similar or less risk. While growing new crops or raising animals may be technically possible, these may not be suitable for many farmers in terms of their land, labour and capital resources. Moreover, markets for the products may be lacking. The United Nations Food and Agriculture Organization (FAO) has been one of the development organizations promoting diversification by small farmers and has produced booklets identifying beekeeping, mushroom farming, milk production, fish ponds and sheep and goats, among others, as diversification possibilities.

Productivity growth in agriculture is central to economic growth, poverty reduction and food security. Decades of economic research have confirmed that agricultural productivity growth has positive effects for the poor in three areas: lower food prices for consumers; higher incomes for producers; and growth multiplier effects through the rest of the economy as demand for other goods and services increases (Alston et al., 2000). However, serious questions and policy challenges must be addressed if the potential of the livestock sector to promote growth and reduce poverty is to be met in a sustainable way.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter will cover the methodology of study that will include the research design, the area of study, the target population, the sampling procedure, the sampling techniques, the research instruments, validity and reliability of the research instruments, and the procedure of data analysis.

3.2 Research Design

According to Kothari (2004), a research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. Descriptive survey design was used in this study. This is because as Kothari (2004) says, the descriptive research design assists the researcher in collecting data from a relatively larger number of cases at a particular time. Descriptive research studies, are those studies which are concerned with describing the characteristics of a particular individual, or of a group.

Mugenda and Mugenda (1999) add that a descriptive survey is an attempt to collect data from members of a given population so as to determine the current status of that particular population with respect to one or more variables. Therefore this descriptive research design assisted in collecting data so as to answer the questions concerning the current situation of the subject.

3.3 Target Population

Brenda, (2009) says that the target population for a survey is the entire set of units for which the survey data are to be used to make inferences. Thus, the target population defines those units for which the findings of the survey are meant to generalize.

According to the MSC register, Bumula district has eight sub-locations recognised by MSC which include South Mateka, North Myanga, West Bukusu, South Kanduyi, South Myanga, West Mateka, Khasoko and Buyofu. It has 20,294 sugarcane farmers with 19 Agricultural Extension Officers by the year 2013. Therefore the target population was 20,303 as shown in the table below.

3.4 Sample size and Sampling Procedure

This section describes the sample size and sampling procedure employed for this study.

3.4.1 Sample size

According to Intell, (2012) a sample is a part of an entire population that possesses attitudes, opinions, habits, or characteristics that you wish to study. The appropriate sample size is influenced by your purpose in conducting the research.

The researcher used Krejcie, and Morgan, (1970) tables to determine the sample size. Since the population of 20,303 is nearer to 20,000 then the sample size was 377 respondents as shown in appendix 4.

3.4.2 Sampling Procedure

The researcher used stratified sampling basing on the eight sub-locations as strata to select the farmers, systematic random sampling was then carried out in each sub-location considering the percentage of the weights of farmers in the sub-location to select the required sample. For the AEOs, purposive sampling was performed to get the intended sample. The researcher got the list of sugarcane farmers in Bumula district from the Agriculture Section, MSC.

Table 3.1 Table showing the number of farmers and AEOs in Bumula district

SUB-LOCATION	NUMBER OF FARMERS	AEOs	Sampling procedure	
			%ge weight	Sample
South Mateka	4,301	6	21.2	80
North Myanga	3,377	2	16.5	62
West Bukusu	556	2	2.8	12
South Kanduyi	91	1	1	1
South Myanga	3,560	2	17.4	65
West Mateka	2,777	2	13.6	52
Khasoko	2,330	2	11.4	43
Buyofu	3,302	2	16.3	62
TOTAL	20,294	19	100.0	377

3.5 Data Collection Instruments

According to Design, (2005) data collection instruments are the tools that assist the researcher in the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions and evaluate outcomes. For this study, the researcher used questionnaires.

In order to collect data for the study, the researcher used questionnaires to get information from the selected farmers in Bumula district. The questionnaires were both open-ended and closed-ended, and were divided into five sections whereby section A contained questions on general information of the respondent, Section B contained questions on horticultural farming, Section C contained questions on dairy farming, Section D had questions about poultry farming; lastly, Section E contained questions on the influence of crop farming.

3.6 Data Collection Procedure

Madhu, (2005) says that data collection procedure is the plan for the activities that are involved in a given study. The researcher got permit from Mumias Sugar Company to conduct the study. On acquisition of the permit, the researcher will proceed to the study area for appointments with farmers and AEOs for data collection which will flow accordingly. There was covering letter attached to the questionnaire to request the respondents to participate in the study.

The AEOs were informed beforehand about the purpose of the study. A total of 377 farmers and AEOs participated in the study and were given the questionnaires. A cover letter requesting the respondents to participate in the study was attached to the questionnaires.

The farmers had to fill the questionnaires and the researcher collected the completed questionnaires after the distribution or on the same day in case they filled it. The AEOs sampled were interviewed to give more information on the effect of farm enterprise diversification on socio-economic of sugarcane farmers in Bumula Sub County. The information collected was used for analysis.

3.7 Validity of the instruments

According to Best and Kahn (2003), an instrument is valid when it measures what it claims to measure. Kothari, 2004 opines that validity can also be thought of as utility. In other words, validity is the extent to which differences found with a measuring instrument reflect true differences among those being tested.

Both face Validity and content validity were checked. Face validity refer to the possibility that a question would be misunderstood or misinterpreted. Pre-testing was done during piloting stage to identify those items and then the items were modified accordingly. This was to increase face validity. The researcher prepared the document in close consultation with the supervisors. Borg and Gall (1985) points out that validity of an instrument is improved through expert judgment. The examiners during proposal defence and the supervisors therefore will expert judgment which will help improve content validity. The necessary adjustments will then be made on the instruments to enhance their validity.

3.8 Reliability of the instruments

According to Grinnel (1993), it is observed that reliability measures the degree of accuracy in the measurement that an instrument provides. In order to determine the consistency of the measuring instrument to return the same measurement when used at different times, the researcher will use Test-Retest method to determine the reliability of the instrument. This happened during the pilot study, before the actual research is done. Kombo and Tromp (2009) add that reliability is a measure of how consistent the results from a given test are.

The study used Spearman Brown Prophecy Formula to calculate the reliability coefficient. The formula for this test will be as follows;

Reliability on scores on total test= $\frac{2 \times \text{reliability for } \frac{1}{2} \text{ test}}{1 + \text{reliability for } \frac{1}{2} \text{ test}}$

Mugenda & Mugenda, (1999) suggested that a correlation of 0.6 for such studies indicate high reliability.

3.9 Data Analysis Techniques

There was cross checking of the questionnaires to ensure that the questions were answered well. Coding of the answered questions was done, and organisation of the whole information was done before the analysis of the data. Qualitative data was first divided into themes and sub-themes before being analysed.

The data was then entered and summarized in the computer using the Statistical Package for Social Sciences (SPSS). Frequency and percentages was used in the analysis and presented in a tabular form to enhance interpretation of the data. The frequencies and percentages were used to determine the influence of farm enterprise diversification on socio-economic status of sugarcane farmers in Bumula Sub-county.

3.10 Ethical considerations

The researcher first assured the respondents that the responses they would give will remain confidential. The respondents were not required to indicate their names on the questionnaires. The respondents were also informed of the purpose of the study and that the findings of the study would not be hidden at any time.

3.11 Operational definition of variables

This presented in a table (Matrix) form and tries to link the specific objectives of the study with their indicators, data collection instruments and means of analysis. The columns show the research objective, source of data to satisfy the objective, type of information that will be sought,

data collection instrument, the type of measuring scale that will be used and the data analysis techniques that will be use.

Table 2.2; Operational definition of variables

Objective/ research question	Source	Type of information	Data collection instrument	Measuring scale	Analysis techniques
1. What effect does horticulture farming have on socio-economic status among sugarcane farmers in Bumula sub county?	<ul style="list-style-type: none"> • Farmers • Agricultural extension officers 	Responses	Questionnaire Interview schedules	Ordinal	<ul style="list-style-type: none"> - Frequency tables - Percentages
2. What effect does dairy farming have on socio-economic status among sugarcane farmers in Bumula sub county?	<ul style="list-style-type: none"> • Farmers • Agricultural extension officers 	Responses	Questionnaire Interview schedules	Ordinal	<ul style="list-style-type: none"> - Frequency tables - Percentages
3. What effect does poultry keeping has on social economic status among sugarcane farmers in Bumula sub county?	<ul style="list-style-type: none"> • Farmers • Agricultural extension officers 	Responses	Questionnaire Interview schedules	Ordinal	<ul style="list-style-type: none"> - Frequency tables - Percentages

CHAPTER FOUR

DATA ANALYSIS, PRESENTATIONS AND INTERPRETATIONS

4.1 Introduction

This chapter covers the findings, presentations and discussions of the results for the study on 'Influence of farm enterprise diversification on socio-economic status among sugarcane farmers in Bumula Sub-county, Bungoma County Kenya. The main sub headings include instrument return rate, demographic characteristics of the respondents, horticultural farming and enterprise diversification on socio-economic status, dairy farming and enterprise diversification on socio-economic status, poultry keeping and enterprise diversification on socio-economic status and crop farming and enterprise diversification on socio-economic status among sugarcane farmers.

4.2 Instrument Return Rate

This study targeted sugarcane farmers and area agricultural extension officers within Bumula Sub-county. Questionnaires were distributed to 358 sugarcane farmers and 19 extension workers scheduled for interviews. Of these, 254 farmers responded well while 12 extension officers were available to participate in the interviews. Table 4.1 shows the distribution and return rates of respondents for this study.

Table 4.1; Return rate

	Target	Response	Percentage
Sugarcane farmers	358	254	71.0
Extension officers	19	12	63.2
Total	377	266	70.6

Out of 377 questionnaires and interview schedules administered to the sugarcane farmers and AEOs, 266 were responded to representing a return rate of 70.6% ($266/377 \times 100$). A response rate of 70% is sufficient for one to make generalizations, according to Kothari and Nachmias. Therefore this research attained a response rate of 70.6% which adequate for generalization of research finding.

4.3 Demographic Characteristics of the Respondents

This section presents the demographic characteristics of the respondent with the aim of establishing the general background of the respondents that participated in the study. The areas that to be discussed include gender, age, level of education, occupation, overall size of farm, size of farm under sugarcane and how long one has been growing sugarcane.

4.3.1 Distribution of respondents by gender

An item was included in the questionnaire which sought information on the gender of the farmers responding to the survey. The researcher was interested to establish how power dynamics and cultural settings influence women participation in farms and their accessibility to resources such as land.

Table 4.2; Gender

	Frequency	Percentage
Male	182	71.8
Female	72	28.2
Total	254	100

Out of the 254 interviewed, 182 which represented 71.8% were male and 72 which represented 28.2% were female as shown in table 4.2. From the study, it was revealed that there is a slight variation in the composition of farmers by gender.

The study also showed that majority of the sugarcane farmers are male since men are culturally inclined to be decision makers and have greater control in most households in area of study.

4.3.2 Distribution of Respondents by age

This question item sought to find the age distribution of the respondents. Age distribution was to help the researcher to establish which section of the population engages most in sugarcane farming. Table 4.3 summarizes the age distribution of the respondents.

Table 4.3 Age

Age	Frequency	Percentage
Less than 25 years	13	4.9
26-35 years	44	16.5
36-50 years	82	30.8
More than 55 years	126	47.4
Total	254	100.0

The age distribution across the age categories is varied though it was shown that most of the sugarcane farmers are advanced in age. The findings reveal that almost half of the respondents are more than 55 years of age at 47.4%. This is because sugarcane growing requires that one has to be officially registered and has the necessary particulars but the younger farmers who do not have land title deeds or have not been assigned by their parents' portions to do farming were not keen on engaging in sugarcane production.

4.3.3 Respondents highest level of education

This item was included to gauge the level of education of the sugarcane farmers. Education is important because it is believed that farmers who have certain level of education would enable one to make better decisions with regard to diversification looking beyond subsistence farming. There are recording keeping issues that require basic literacy level. The table 4.4 shows the summary of the education levels of the respondents.

Table 4.4; Education level

Level	Frequency	Percentage
None	23	8.6
Primary	121	45.5
Secondary	95	35.7
College/University	27	10.2
Total	254	100.0

The findings show that 8.6% of the sugarcane farmers have no education, 45.5% of sugarcane farmers had attained primary school education, 35.7% had secondary education while 10.2% have attained college or university level education.

The study revealed that majority of the sugarcane farmers had attained elementary or basic education. This is said to be important in influencing the kind and nature of the decisions about farming systems they engage or are likely to engage in.

4.3.4 Respondents occupation

This item was included to ascertain the occupation of the sugarcane farmers. The table 4.5 shows 25.2% of the sugarcane farmers were unemployed, 46.2% of sugarcane farmers had been practicing farming, 13.2% of sugarcane farmers were employed while 15.4% of the sugarcane farmers had been engaging in other activities like small scale businesses.

Table 4.5; Occupation

Level	Frequency	Percentage
Unemployed	67	25.2
Farming	123	46.2
Employed	35	13.2
Other	41	15.4
Total	266	100.0

The study revealed that majority of the sugarcane farmers were self employed in their farms. This is said to be important in influencing the kind and nature of the decisions on the farming enterprise diversification strategies made by the farmers. There is a correlation between occupation and decision abilities of individuals.

4.3.5 Respondents' overall farm size

The study found it important to establish the overall farm size owned by the sugarcane farmers. The table 4.6. shows the farm sizes in acres owned by the sugarcane farmers 31.2% sugarcane

farmers have less than 1 acre, 29.7% sugarcane farmers had between 1-3 acres of land, 29.3% have 3-5 acres and 9.8% indicated to own more than five acres of land.

Table 4.6; Overall farm size

Size	Frequency	Percentage
Less than 1	83	31.2
1- 3	79	29.7
3 – 5	78	29.3
5 and above	26	9.8
Total	254	100.0

The study revealed that majority of people owns small pieces of land. This may be due to overpopulation among other factors that are overstretching land ownership.

The study also sought to establish the size of land under sugarcane farming by the respective respondents. Table 4.7 summarizes the responses from the respondents where 47.0% have less than 1 acre of land under sugarcane farming, 40.2% have between 1-3 acres of land under sugarcane, 9.8% have between 3-5 acres and 3.0% of the respondents have above 5 acres of their land put under sugarcane growing.

Table 4.7; Farm size under sugarcane

Size	Frequency	Percentage
Less than 1	125	47.0
1- 3	107	40.2
3 – 5	26	9.8
5 and above	8	3.0
Total	254	100.0

The researcher was also interested to find out for how long the respondents have been engaging in sugarcane farming. The question was “For how long have you been growing sugarcane?”

The responses were summarized in the table 4.8.

Table 4.8; Period of growing sugarcane

Period	Frequency	Percentage
Less than 1 year	21	7.9
1- 3 years	35	13.2
3 – 5 years	89	33.5
5 years and above	121	45.5
Total	254	100.0

4.4 Horticultural farming and enterprise diversification on socio-economic status

The researcher was interested to find out whether horticultural farming has had an influence on the income by posing a question “Apart from sugarcane, which of the following horticultural crops do you grow and indicate the farm size for each of them?” Table 4.9 gives the summary of the respondents given by the respondents.

Table 4.9; Farm size under horticultural crops

Horticultural crop	Less than 1 acre		1-2 acres		2-3 acres		3-5 acres		Above 5 acres	
	Freq	%age	Freq	%age	Freq	%age	Freq	%age	Freq	%age
Vegetables (sukuma wiki, Indigenous etc.)	57	22.4	14	5.5	0	0	0	0	0	0
Tomatoes	27	10.6	18	7.1	0	0	0	0	0	0
Fruits	15	5.9	4	1.6	0	0	0	0	0	0
Onions	13	5.1	0	0.0	0	0	0	0	0	0
Other	0	0.0	0	0.0	0	0	0	0	0	0

The researcher sought to establish for how long the respondents have been growing the horticultural crops mentioned above. To get this, a question item “For how long have you been

growing the crops above?” was posed in to the respondents. Table 4.10 shows the summary of the responses.

Table 4.10; Period of growing horticultural crops

Horticultural crop	Less than 1 years		1-2 years		2-3 years		3-5 years		Above 5 years	
	Freq	%age	Freq	%age	Freq	%age	Freq	%age	Freq	%age
Vegetables (sukuma wiki, Indigenous etc.)	27	10.6	44	17.3	0	0	0	0	0	0
Tomatoes	31	12.2	14	5.5	0	0	0	0	0	0
Fruits	5	2.0	14	5.5	0	0	0	0	0	0
Onions	5	2.0	8	3.1	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Horticultural crops are known to be short term and harvested regularly. However the researcher wanted to find out from the respondents how often do they harvest these crops by asking “How often do you harvest the crops above?” Table 4.11 gives a summary of the responses.

Table 4.11; Frequency of harvesting horticultural crops

Horticultural crop	Daily		Weekly		Monthly		Year		More than 1	
	Freq	%age	Freq	%age	Freq	%age	Freq	%age	Freq	%age
Vegetables (sukuma wiki, Indigenous etc.)	0	0.0	71	28.0	0	0	0	0	0	0
Tomatoes	0	0.0	45	17.7	0	0	0	0	0	0
Fruits	0	0.0	7	2.8	0	0	0	0	0	0
Onions	0	0.0	0	0.0	0	0	11	3.6	0	0
Other	0	0	0	0	0	0	0	0	0	0

The findings show that harvesting is on weekly basis. This allows the crops either to mature or ripen before the next harvest. Onions are seasonal and harvesting is done once they are ready.

The researcher again sought to establish the average income the respondents get from the sale of the horticultural crops by asking “what is the average income from these horticultural crops per harvest?” Table 4.12 gives the summary of the average income received by the respondents after selling the crops.

Table 4.12; Income from these horticultural crops

Horticultural crop	Less than 100		100-500		500-1000		1000-3000		Above 3000	
	Freq.	%age	Freq.	%age	Freq.	%age	Freq.	%age	Freq.	%age
Vegetables (sukuma wiki, Indigenous etc.)	0	0.0	15	5.9	24	9.4	21	8.3	11	4.3
Tomatoes	0	0.0	5	2.0	16	6.3	18	7.1	6	2.4
Fruits	2	0.8	4	1.6	5	2.0	5	2.0	5	2.0
Onions	0	0.0	0	0.0	3	1.2	5	2.0	5	2.0
Other	0	0	0	0	0	0	0	0	0	0

It was revealed from the findings that farmers are able to get some income whenever they sale their produce. When vegetables, tomatoes, fruits and onions are sold either on retail or wholesale, one is assured of some income in the range of Kshs. 100-3000.

The study sought to find out whether the income received by respondents from the sale of horticultural products would enable them accomplish many of the family obligations like payment of school fees, construction of better shelter, meeting medical expenses and have some fun with their families. The question item read “Income you receive from these horticultural crops is used to do various things. Please indicate your view concerning the statements below”.

Table 4.13 summarises the responses from the respondents.

Table 4.13; Statements concerning horticultural crops

	Not adequate	Quite adequate	Moderate	Adequate	Very adequate
Construction of residential houses	11.6	12.5	23.2	38.4	14.3
Paying school fees for children	15.2	18.8	28.6	32.1	5.4
Catering for medical expenses for the family members	10.7	17.0	16.1	12.5	43.8
Catering for recreational activities for family members	4.5	9.8	36.6	23.2	25.9

The responses provided indicate that income received from engaging in horticulture was adequate to accomplish many tasks in the family.

4.5 Dairy farming and enterprise diversification on socio-economic status

Dairy farming has been known to earn income for many people worldwide. The researcher therefore sought to establish to what extent are the respondents engaging into this enterprise. The question item therefore read “Apart from sugarcane, which of the following dairy animals do you keep and indicate the number of each of them?” Table 4.14 shows the type of dairy animals and the number kept by respondents.

Table 4.14; Dairy animals

Animal	1		2-3		4-5		Above 5	
	Freq.	%age	Freq.	%age	Freq.	%age	Freq.	%age
Exotic dairy cows	13	4.9	14	4.5	13	5.1	5	2.0
Traditional cows	27	1.3	25	9.4	37	14.6	13	5.1
Goats	0	0.0	0	0.0	0	0.0	0	0.0
Other	0	0.0	0	0.0	0	0.0	0	0.0

To know how long the respondent has been rearing the dairy animals, the researcher posed a question “For how long have been rearing the animals above?” Table 4.15 summarizes the responses as given by the respondents.

Table 4.15; Period of rearing dairy animals

Animal	Less than 1 year		1-2 years		3-4 years		4-5 years		More than 5 years	
	Freq.	%age	Freq.	%age	Freq.	%age	Freq.	%age	Freq.	%age
Exotic dairy cows	3	1.2	15	5.9	24	9.4	6	2.4	7	2.8
Traditional cows	10	3.9	14	5.5	16	6.3	19	7.5	31	12.2
Goats	0	0	0	0	0	0	0	0.0	0	0.0
Other	0	0	0	0	0	0	0	0.0	0	0.0

The study indicates that the respondents who reported to rear the dairy animals have been doing for varied times, there are those who have done for long while there are those who are just beginning. It was also revealed that within the area of study, milk can only be found from found cows either exotic or traditional. No respondent reported to rear goats for milk.

It was also important for the study to establish how often the animals are milked

How often do you sell milk from the animals above?

Table 4.16; Period of milking

Animal	Daily		Weekly		Monthly		Yearly		More than a year	
	Freq.	%age	Freq.	%age	Freq.	%age	Freq.	%age	Freq.	%age
Exotic dairy cows	47	31.2	0	0	0	0	0	0	0	0
Traditional cows	68	43.9	0	0	0	0	0	0	0	0
Goats	0	0	0	0	0	0	0	0.0	0	0.0
Other	0	0	0	0	0	0	0	0.0	0	0.0

From the findings, most of the milking is done on daily basis, sometimes twice in a day.

Income from milk can either be on daily basis, monthly basis, sometimes yearly. To ascertain this, the researcher posed a question “What is the average income from milking these animals?”

The summary of responses is given in table 4.17.

Table 4.17; Income from milk

Animal	Less than 100		100-500		500-1000		1000-3000		Above 3000	
	Freq.	%age	Freq.	%age	Freq.	%age	Freq.	%age	Freq.	%age
Exotic dairy cows	3	1.2	15	5.9	24	9.4	21	8.3	11	4.3
Traditional cows	10	3.9	14	5.5	16	6.3	18	7.1	19	7.5
Goats	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Other	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

It further important to know how adequate the income received from the sale of milk and dairy activities by the respondents is in helping them meet various needs in their households. To obtain this information the question item “Income you receive from dairy farming is used to do various things. Please indicate your view concerning the statements below?” Table 4.18 gives a summary of the responses.

Table 4.18; Statement concerning income from dairy farming

	Not adequate	Quite adequate	Moderate	Adequate	Very adequate
Construction of residential houses	3.6	18.8	16.1	42.9	18.8
Paying school fees for children	8.0	12.5	25.9	40.2	13.4
Catering for medical expenses for the family members	6.3	10.7	30.4	23.2	29.5
Catering for recreational activities for family members	5.4	9.8	16.1	14.3	54.5

From the findings, it is shown that dairy farming significantly generates income for households. This income enables the households to uplift their living standards. Milk is a source of regular income, because it is produced and sold daily and cannot be stored like arable crops. In developing countries dairy animals are kept by small-scale farmers, mainly in mixed-farming operations. In addition to meat, milk, hides and traction for carts and ploughs, animals provide income, employment, socio-cultural wealth and act as cash reserves. In some systems dairy animals are fed crop residues and their wastes furnish fuel for energy and organic fertilizer.

Manure for fuel is fundamental in many countries, especially South Asia (Afghanistan, Bangladesh, India and Pakistan), and there is increasing interest in manure as a sustainable source of biogas in rural areas. In some farming systems manure is critically important for increasing yields in crop agriculture (A. Rota, personal communication, 2012).

4.6 Poultry farming and enterprise diversification on socio-economic status

Poultry keeping can also be regarded as one of the viable enterprises in agriculture. They fetch considerable income when properly treated with utmost commitment. This section will cover items on the type and number of birds kept, period reared, frequency of selling their products, average income and comments on the income received from the birds and their products.

The first question item was “Apart from sugarcane, which of the following birds do you keep and indicate the number of each of them?” Table 4.19 shows the type and number of the birds kept by the respondents.

Table 4.19; Birds kept

Type of bird	1		2-3		4-5		Above 5	
	Freq.	%age	Freq.	%age	Freq.	%age	Freq.	%age
Exotic chicken; layers	0	0	6	3.8	25	9.8	13	5.1
Exotic chicken; broilers	0	0	0	0	13	5.1	30	11.8
Traditional chicken	0	0	15	5.7	27	10.6	39	15.4
Ducks	0	0	12	4.8	9	3.5	18	7.1
Turkeys	0	0	0	0	0	0.0	0	0.0

The findings show that the mostly commonly reared birds are traditional chicken because they are not capital and labour intensive like the layers and broilers. This finding shows that most of the respondents who rear birds own more 3 birds.

It was also important to establish for how long the respondents have been rearing the birds listed. The question item was “For how long have you been rearing the birds above?” Table 4.20 gives a summary of the responses.

Table 4.20; Period of rearing poultry

Type of bird	Less than 1 year		1-2 years		3-4 years		4-5 years		More than 5 years	
	Freq.	%age	Freq.	%age	Freq.	%age	Freq.	%age	Freq.	%age
Exotic chicken; layers	0	0	13	4.7	20	8.2	23	9.1	15	5.9
Exotic chicken; broilers	0	0	8	12.4	15	5.9	31	12.2	14	5.5
Traditional chicken	35	15.3	28	10.70	36	13.9	31	12.2	35	13.8
Ducks	7	4.6	5	3.2	7	4.6	5	2.0	8	3.1
Turkeys	0	0	0	0	0	0	0	0.0	0	0.0

The findings show that birds rearing are a common venture and respondents have been doing this for quite some time.

The researcher further sought to establish the frequency of selling the poultry and their products by asking “How often do you sell products from the birds above?” The responses are show in table 4.21.

Table 4.21; Frequency of selling poultry products

Type of bird	Daily		Weekly		Monthly		Yearly		More than a year	
	Freq.	%age	Freq.	%age	Freq.	%age	Freq.	%age	Freq.	%age
Exotic chicken; layers	0	0	33	12.4	21	8.5	0	0	0	0
Exotic chicken; broilers	0	0	0	0	32	11.6	25	8.8	0	0
Traditional chicken	0	0	15	5.9	31	12.2	28	10.70	0	0
Ducks	0	0	0	0	5	2.0	8	3.1	0	0
Turkeys	0	0	0	0	0	0	0	0	0	0

Since birds rearing can be a venture that can earn income, the researcher also sought to establish the average income received from the sale of poultry and poultry products like eggs and poultry

themselves. The question therefore was “What is the average income from selling products from the birds above?” Table 4.22 shows the summary of the average income received by the respondents who engage in this venture.

Table 4.22; Income from poultry products

Type of bird	Less than 100		100-500		500-1000		1000-3000		Above 3000	
	Freq.	%age	Freq.	%age	Freq.	%age	Freq.	%age	Freq.	%age
Exotic chicken; layers	0	0	31	12.2	28	10.70	25	8.8	23	9.1
Exotic chicken; broilers	0	0	0	0	8	12.4	15	5.9	0	0
Traditional chicken	0	0	0	0	5	2.0	8	3.1	0	0
Ducks	0	0	0	0	7	4.9	5	2.0	0	0
Turkeys	0	0	0	0	0	0	0	0	0	0

The researcher was then interested to find out how useful this income from poultry keeping was to the respondents. Table 4.23 gives a summary of Income you receive from poultry keeping is used to do various things. Please indicate your view concerning the statements below.

Table 4.23; Statements concerning income from poultry keeping

	Not adequate	Quite adequate	Moderate	Adequate	Very adequate
Construction of residential houses	7.1	22.3	24.1	37.5	8.9
Paying school fees for children	12.5	23.2	25.9	27.7	10.7
Catering for medical expenses for the family members	8.0	25.0	18.8	12.5	35.7
Catering for recreational activities for family members	7.1	9.8	36.6	23.2	23.2

4.7 Crop farming and enterprise diversification on socio-economic status

Apart from sugarcane growing, farmers can also chose to engage in the farming of the main cereal crops such as maize, beans, sorghum and millet with intention of not only for food but

also earning cash from their sale. The study sought to establish this occurrence from the respondents by posing the question “Apart from sugarcane, which of the following cash crops do you grow and indicate the farm size for each of them?” Table 4.24 shows the number of respondents who engage in the growing of this crops and the size of land they grow on.

Table 4.24; Farm size under cash crop

Horticultural crop	Less than 1 acre		1-2 acres		2-3 acres		3-5 acres		Above 5 acres	
	Freq	%age	Freq	%age	Freq	%age	Freq	%age	Freq	%age
Maize	21	8.3	9	3.5	5	2.4	0	0.0	0	0.0
Beans	13	5.1	7	2.8	0	0.0	0	0.0	0	0.0
Sorghum	7	2.8	0	0.0	0	0.0	0	0.0	0	0.0
Millet	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Other	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

The study revealed that land size has really shrunk among the respondents for none of them had committed more than three of land to this venture.

Table 4.25 shows the summary of responses to the question item “For how long have you been growing the crops above?”

Table 4.25; Period of growing cash crops

Crop	Less than 1 years		1-2 years		2-3 years		3-5 years		Above 5 years	
	Freq	%age	Freq	%age	Freq	%age	Freq	%age	Freq	%age
Maize	0	0.0	5	2.0	6	2.4	26	10.2	14	5.5
Beans	0	0.0	5	2.0	28	11.0	31	12.2	14	5.5
Sorghum	0	0.0	3	1.2	14	5.5	15	5.9	5	2.0
Millet	0	0.0	0	0.0	0	0.0	5	2.0	8	3.1
Other	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

Table 4.26 summarizes the responses to the question item “How often do you harvest the crops above?” This item sought to establish how often the crops are harvested by the respondents who engage in growing them.

Table 4.26; Frequency of harvesting

Crop	Daily		Weekly		Monthly		Year		More than 1	
	Freq	%age	Freq	%age	Freq	%age	Freq	%age	Freq	%age
Maize	0	0.0	0	0.0	0	0.0	35	13.8	0	0.0
Beans	0	0.0	0	0.0	0	0.0	41	16.1	0	0.0
Sorghum	0	0.0	0	0.0	0	0.0	14	5.5	0	0.0
Millet	0	0.0	0	0.0	0	0.0	13	3.0	0	0.0
Other	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

It was important for the study to determine the average income received by the respondents who grow the crops. The question item thus was “What is the average income from these crops per harvest?” Table 4.27 give a summary of the responses provided by the respondents.

Table 4.27; Income from cash crops

Crop	Less than 100		100-500		500-1000		1000-3000		Above 3000	
	Freq.	%age	Freq.	%age	Freq.	%age	Freq.	%age	Freq.	%age
Maize	0	0.0	5	2.0	28	11.0	21	8.3	27	10.6
Beans	0	0.0	3	1.2	14	5.5	22	8.7	15	6.4
Sorghum	0	0.0	19	7.5	16	6.3	18	7.1	3	1.1
Millet	2	0.8	5	2.0	4	1.6	8	3.1	18	7.1
Other	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter covers summary of the findings, discussion of results and conclusions drawn from the study as well as recommendations based on the study findings and suggestions for further studies.

5.2 Summary of the findings

Horticultural crops provide an alternative source of income. Given that these crops take shorter periods to mature, the famers are assured of immediate income as compared to sugarcane proceeds. Sugarcane farmers who reported to be growing horticultural crops also reported to access income for shorter periods which can help to sort out immediate family financial obligations.

Dairy production can contribute to household livelihood, food security and nutrition. Strong demand for dairy products and increasingly complex processing and marketing systems offer significant opportunities for growth and poverty reduction at every stage in the value chain. However, these new market opportunities and livelihood options are accompanied by rapidly changing patterns of competition, consumer preferences and market standards, which may undermine the ability of smallholders to remain competitive.

As most of village chicken production activity is managed by women, provision of successive trainings on modern chicken husbandry practices to women would be essential for the improvement of chicken production and productivity. Provision of credit facilities to chicken owners and linking the production with marketing will encourage chicken owners and contribute to the improvement of the sector.

Growing of main crops for commercial purposes is gaining ground in majority of farmers whom especially those with large pieces of land. Crops such as maize, beans, sunflower among others last for one season which reduces the long wait as it is for sugarcane. Therefore selling these crops provides an alternative source of income within a season.

5.3 Discussions

The study shows that the farmers who have engaged in horticultural farming beside sugarcane growing are better off. This is because this can enable them access disposable income. A farmer who sells vegetables or fruits and earns Kshs. 3,000 per week on average for instance, is likely to have Kshs. 12,000 in a month which translates to Kshs. 144,000 in a year. If this is compared to cane farming where after a period of between 14-18 months of waiting is expected before the cane is harvested then a further waiting of about 2-4 months before payment is done not withstanding other costs, the farmers may not even get Kshs. 50,000 from one acre piece of land under sugarcane.

This is the reason majority of the respondents who reported to engage in horticultural farming indicated that they can afford many basic needs and live a modest life as compared to dependence on sugarcane growing alone.

The findings agree with conclusions of a study by It highlights the pivotal role of milk and dairy products in the diet of peoples in many parts of the developing world, and how DIDPs have leveraged milk's unique functional properties, contributing both to household food security and to improving rural livelihoods for millions of small-scale dairy farming families through generation of regular income and employment along the dairy value chain. Experience indicates that investments in national capacity and local dairy organizations and institutions can facilitate smallholder participation in DIDPs. They can also significantly enhance household food security, and pay both economically and socially. There are particular benefits to women, often the decision-makers for household food and nutrition choices. High importance is attached to modest but regular cash incomes from dairying. Investment risks in dairying must be well managed, but there appear to be compelling opportunities to drive the expansion and upscaling of DIDPs in many developing countries.

These findings agree with similar studies done in Ethiopia. In Ethiopia chickens are the most widespread and almost every rural family owns chickens, which provide a valuable source of family protein and income (Tadelle et al., 2003).

The findings reveal that most farmers engaging in growing of alternative high level crops for income seem to have benefited immensely instead of waiting for the income from sugarcane. These studies agree with the evidences from other countries for the positive consequences of farm diversification on agriculture. For example, in Northern Zambia, maize was produced as a mono-crop through various governmental supported incentives. Later, it was realized that just specializing in maize production had drawn much of the governmental resources than what was gained from increased maize production. Further, the Zambian maize policy had also negative environmental effects in those areas where soils are not suited for growing maize, or in the areas where the production had been without sustainable soil management practices. As a result, the new agricultural policy in Zambia does not emphasize maize production in the Northern region as the past policy did, and “diversification” from maize mono-cropping to other cash crops and animal husbandry are encouraged. And this diversification process is expected to make some positive developments in the farming systems, environment and in the household economy in the Northern Zambia (Culas, 1995).

5.4 Conclusions

Horticultural farming should be encouraged among the sugarcane farmers with smaller pieces of land left because it requires not big acreage to engage in horticulture. Horticultural crops like vegetables and fruits are fast moving thus generating income faster without waiting for longer periods. Horticultural farming is viable option to diversify in.

Dairy farming is another farm enterprise that promises to fetch income faster. Given that majority of the farmers who reported to own a dairy cow said they milk on daily basis, sell the milk and receive money either on daily, weekly or monthly basis. This in itself ensures a steady cash flow that improves their standard of living.

Poultry keeping is a viable farm enterprise in agriculture and therefore the sugarcane farmers would take advantage of the demand for poultry and poultry products such as eggs to earn income. This venture could involve rearing exotic chicken like layers and broilers and sell to hotels both the birds and eggs or the traditional chicken which are not labour and capital intensive.

Cash crop growing is another alternative and viable option for the sugarcane farmers who still have large pieces of land. Crops such as maize, sunflower, beans, tobacco and other emerging varieties fetch good income. Therefore farmers are advised to explore these varieties that will ensure financial stability rather than relying on cane growing alone.

5.5 Recommendations

1. The future scenarios in horticulture production in the country should take note of the aforementioned impact of the global financial crisis on the industry. They should therefore, work with larger horticulture industry and produce maximum fresh exports, food processing, and look for domestic markets. Also establish stronger linkages with various support and service industries.
2. The rapid growth of the livestock sector as a whole, and the dairy sector in particular, in a setting of weak institutions and governance has given rise to risks with potentially large negative implications for livelihoods, human and animal health and the environment. To meet the challenges and constraints it faces, the sector requires renewed attention and investments from the agricultural research and development community and robust institutional and governance mechanisms. The future contribution of dairy and livestock products to human welfare will depend also on how these issues are addressed.
3. People in low-income countries spend an average of 55 percent of their expenditures on food, as compared with 16 percent in high-income countries (Regmi, 2001). Agricultural policies that reduce production costs, create incentives to produce more nutrient-rich and

diversified crops and improve access to markets can improve food supply, nutrition and income.

4. Marketing intermediaries cover all steps between primary production and consumer sales. They play important roles in linking rural markets to urban outlets. Marketing strategies must address all links in the value chain from production to consumption and consider the nature of the product, size of the market, distance between production site and the market and transport and communications infrastructure. For fresh products, organization of transport, quality control and loss minimization are critical.

5.6 Suggested areas for further study

- Food security and socio-economic sustainability during population explosion
- Effects of global warming on farm enterprise diversification

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APPENDICES

APPENDIX 1; LETTER OF TRANSMITTAL

Dear respondent,

RE: FILLING OF THE QUESTIONNAIRE

I am a postgraduate student at the University of Nairobi, School of Continuing and Distance Education, currently undertaking masters Degree in Project Planning and Management. You have been identified as a respondent to this questionnaire. Please find the attached questionnaire, which is designed to gather information on the “**Influence of farm enterprise diversification on socio-economic status among sugarcane farmers in Bumula Sub County, Bungoma County**”. All answers are confidential and will only be used for academic purposes.

This research will be carried out in partial fulfilment of the requirements for the award of the degree of Master of Arts in Project Planning and Management of the University of Nairobi.

I will be glad if you fill and return the completed questionnaire at your earliest convenience.

Thank you.

Yours faithfully,

NYAMBANE LILIAN KERUBO

APPENDIX 2: QUESTIONNAIRE

PART I: Description and analysis of household characteristics

1. What is your gender?

1. Female 2. Male

2. Age of respondent:

- [] Less than 25 years
[] 26-35 years
[] 36-50 years
[] More than 50 years

3. What is your highest level of education?

- [] None
[] Primary
[] Secondary
[] Tertiary
[] University

4. Occupation before you started the farming?

- [] Unemployed
[] Farmer
[] Operating another type of business
[] Employed
[] Others (Specify)_____

5. What is the overall size of your farm?

- [] Less than 1 acre
[] 1- 3 acres
[] 3 – 5 acres
[] 5 acres and above

6. What is the size of your land under sugarcane?

- [] Less than 1 acre
[] 1- 3 acres
[] 3 – 5 acres
[] 5 acres and above

7. For how long have been growing sugarcane?

- Less than 1 year
- 1- 3 years
- 3 – 5 years
- 5 years and above

PART II: HORTICULTURAL FARMING

1. Apart from sugarcane, which of the following horticultural crops do you grow and indicate the farm size for each of them?

Type horticultural crop	Farm size (please Tick where applicable)				
	Less than 1 acre	1-2 acres	2-3 acres	3-5 acres	Above 5 acres
Vegetables (sukuma wiki, Indigenous etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tomatoes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fruits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Onions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. For how long have been growing the crops above?

Type horticultural crop	Years (please Tick where applicable)				
	Less than 1 year	1-2 years	2-3 years	3-5 years	Above 5 years
Vegetables (sukuma wiki, Indigenous etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tomatoes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fruits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Onions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. How often do you harvest the crops above?

Type horticultural crop	(please Tick where applicable)				
	Daily	Weekly	Monthly	Yearly	More than a year
Vegetables (sukuma wiki, Indigenous etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tomatoes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fruits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Onions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. What is the average income from these crops per harvest?

Type horticultural crop	Income in Kshs. (please Tick where applicable)				
	Less than 100	100-500	500-1000	1000-3000	Above 3000
Vegetables (sukuma wiki, Indigenous etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tomatoes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fruits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Onions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Income you receive from sugarcane is used to do various things. Please indicate your view concern the statement below.

5= Very adequate, 4=Adequate, 3= Moderate, 2= Quite adequate, 1= Not adequate

Statement	Please tick (✓) appropriately				
	5	4	3	2	1
a) Construction of residential houses					
b) Paying school fees for children					
c) Catering for medical expenses for the family members					
d) Catering for recreational activities for family members					
e) Time given by the fund before repayment begins					
f)					

6. In your opinion, give your comment on the engaging in sugarcane farming and horticulture farming

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PART III: DAIRY FARMING

1. Apart from sugarcane, which of the following dairy animals do you keep and indicate the number of each of them?

Type dairy animal	Number of animals (please Tick where applicable)				
	1	2-3	4-5	5-10	Above 10
Exotic dairy cows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Traditional cows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Goats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. For how long have been rearing the animals above?

Type dairy animal	Years (please Tick where applicable)				
	Less than 1 year	1-2 years	2-3 years	3-5 years	Above 5 years
Exotic dairy cows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Traditional cows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Goats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. How often do you sell milk from the animals above?

Type dairy animal	(please Tick where applicable)				
	Daily	Weekly	Monthly	Yearly	More than a year
Exotic dairy cows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Traditional cows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Goats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. What is the average income from milking these animals?

Type dairy animal	Income in Kshs. (please Tick where applicable)				
	Less than 100	100-500	500-1000	1000-3000	Above 3000
Exotic dairy cows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Traditional cows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Goats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Income you receive from dairy farming is used to do various things. Please indicate your view concerning the statements below.

5= Very adequate, 4=Adequate, 3= Moderate, 2= Quite adequate, 1= Not adequate

Statement	Please tick (√) appropriately				
	5	4	3	2	1
a) Construction of residential houses					
b) Paying school fees for children					
c) Catering for medical expenses for the family members					
d) Catering for recreational activities for family members					
e) other expenses.....					

6. In your opinion, give your comment on the engaging in sugarcane farming and dairy farming

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PART IV: POULTRY FARMING

1. Apart from sugarcane, which of the following birds do you keep and indicate the number of each of them?

Type of bird	Number of birds (please Tick where applicable)				
	1	2-3	4-5	5-10	Above 10
Exotic chicken; layers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exotic chicken; broilers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Traditional chicken	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ducks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Turkeys	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other					

2. For how long have been rearing the birds above?

Type of bird	Years (please Tick where applicable)				
	Less than 1 year	1-2 years	2-3 years	3-5 years	Above 5 years
Exotic chicken; layers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exotic chicken; broilers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Traditional chicken	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ducks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Turkeys	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. How often do you sell products from the birds above?

Type dairy animal	(please Tick where applicable)				
	Daily	Weekly	Monthly	Yearly	More than a year
Exotic chicken; layers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exotic chicken; broilers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Traditional chicken	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ducks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Turkeys	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. What is the average income from selling products from the birds above?

Type dairy animal	Income in Kshs. (please Tick where applicable)				
	Less than 100	100-500	500-1000	1000-3000	Above 3000
Exotic chicken; layers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exotic chicken; broilers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Traditional chicken	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ducks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Turkeys	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Income you receive from poultry keeping is used to do various things. Please indicate your view concerning the statements below.

5= Very adequate, 4=Adequate, 3= Moderate, 2= Quite adequate, 1= Not adequate

Statement	Please tick (✓) appropriately				
	5	4	3	2	1
a) Construction of residential houses					
b) Paying school fees for children					
c) Catering for medical expenses for the family members					
d) Catering for recreational activities for family members					
e) other expenses.....					

6. In your opinion, give your comment on the engaging in sugarcane farming and poultry keeping

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PART V CROP FARMING

1. Apart from sugarcane, which of the following cash crops do you grow and indicate the farm size for each of them?

Type of crop	Farm size (please Tick where applicable)				
	Less than 1 acre	1-2 acres	2-3 acres	3-5 acres	Above 5 acres
Maize	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sorghum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Millet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. For how long have been growing the crops above?

Type horticultural crop	Years (please Tick where applicable)				
	Less than 1 year	1-2 years	2-3 years	3-5 years	Above 5 years
Maize	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sorghum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Millet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. How often do you harvest the crops above?

Type of crop	(please Tick where applicable)				
	Daily	Weekly	Monthly	Yearly	More than a year
Maize	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sorghum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Millet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. What is the average income from these crops per harvest?

Type of crop	Income in Kshs. (please Tick where applicable)				
	Less than 100	100-500	500-1000	1000-3000	Above 3000
Maize	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sorghum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Millet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Income you receive from these crops is used to do various things. Please indicate your view concern the statement below.

5= Very adequate, 4=Adequate, 3= Moderate, 2= Quite adequate, 1= Not adequate

Statement	Please tick (√) appropriately				
	5	4	3	2	1
a) Construction of residential houses					
b) Paying school fees for children					
c) Catering for medical expenses for the family members					
d) Catering for recreational activities for family members					
e) Time given by the fund before repayment begins					
f)					

6. In your opinion, give your comment on the engaging in sugarcane farming and crop farming

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Thank You Very Much For Participating In This Study

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	256	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	370
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	1800	317	20000	377
75	63	230	144	550	226	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	250	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	382
95	76	270	159	750	254	2600	335	100000	384

NOTE; From R.V. Krejcie and D.W. Morgan (1970). Determining sample size for research activities, Educational and Psychological measurement, 30, 608. Sage publication.