

**FACTORS INFLUENCING SMALLHOLDER FARMERS'
ACCESS TO MARKETS: THE CASE OF INTERNATIONAL
CHILD SUPPORT - AFRICA'S AGRIBUSINESS PROJECT IN
NAVAKHOLO DIVISION, KENYA**

BY

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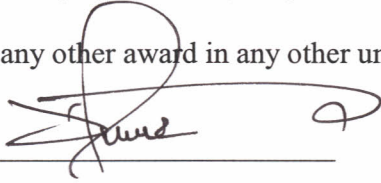
**A RESEARCH PROJECT REPORT SUBMITTED IN PARTIAL FULFILMENT OF
REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF ARTS IN
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2012

DECLARATION

This research proposal is my original work and has not been presented for any degree award or any other award in any other university or college.

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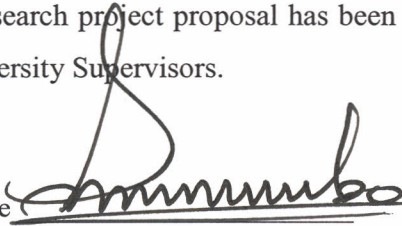
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DEDICATION

This work is dedicated to my wife Edith, my children Daphne, David, Celine and to my late grandmother Salina Nyar-Awasi.

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LIST OF ABBREVIATIONS AND ACCRONYMS

ACP	Caribbean and Pacific countries
AGRA -	Alliance for Green Revolution in Africa
ASDS	Agricultural Sector Development Strategy
CAADP	Comprehensive African Agricultural Development Program
EAC	East African Community
ECA	Economic Commission for Africa
ESAPS	Enhanced Structural Adjustment Programs
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
Gok	Government of Kenya
ICS-	International Child Support- Africa
Africa	
IFAD	International Fund for Agricultural Development
KAMPAP,	Kenya Agricultural Marketing and Policy Analysis Project
KARI	Kenya Agricultural Research Institute
MDG	Millennium Development Goals
MoA	Ministry of Agriculture
MPHTF	Millennium Project Hunger Task Force
NGOs	Non Governmental Organizations
SAPS	Structural Adjustment Programs
SPSS	Statistical Package for Social Packages
SSA	Sub-Saharan Africa
SRA	Strategy for Revitalizing Agriculture
UNDP	United Nations Development Programs

ABSTRACT

The Strategy to Revitalize Agriculture, Kenya Vision 2030, Comprehensive African Agricultural Development Program and Alliance for Green Revolution in Africa have underscored the importance of increasing agricultural productivity in the fight against poverty. The Kenya government identifies smallholder agriculture as the major sub-sector for realizing accelerated annual economic growth rate to attain the country's Vision 2030. Commercializing smallholder agriculture is critical to achieve this growth. Smallholder farmers' access to markets and agricultural support services has been a major concern for Kenyan policy makers since independence. This study undertook to assess the factors that influence smallholder farmers' access to markets in Navakholo division. The purpose of this study was to assess the factors that influence smallholder farmers' access to markets in Navakholo division. Objectives of the study included; to establish the extent to which technical inputs affects smallholder farmers access to markets, to examine how physical infrastructure affects smallholder farmers on access to markets, to assess the extent to which technical institutions affects smallholder farmers' access to markets and to establish the extent to which technical information affects smallholder farmers' access to markets in Navakholo division. The study was guided by the induced innovation theory and a conceptual framework showing the relationship between independent variables and the dependent variable. The study used descriptive survey design. The study used a sample size of 196 farmers drawn from target population of 416 farmers. A mixture of probability and non-probability sampling methods were employed to arrive at the respondents for interviews. Quantitative data was collected through use of questionnaire while qualitative data was collected through interview guides administered to key informants. The researcher and 12 research assistants personally administered the questionnaires to the respondents. Data was analyzed using descriptive statistics with the aid of Statistical Package for Social Sciences and Microsoft S Excel while data presentation was done through use of tables, frequencies, percentages, modes and mean. The study found that very few smallholder farmers in the division uses technical inputs in their farms due to high input costs. Majority of smallholder farmers 137(71%), do not apply fertilizer consistently while 169(86%) of farmers do not use certified seeds. This results into low yield and limits farmers' access to markets. Majority of farmers 194(99%) sell their produce at the farm gate immediately after harvesting because of poor physical infrastructures especially access roads which results into increased cost of transporting farm inputs and farm produce to the market. The study also found that most of the respondents 168(86%) would join farmer groups for social benefits rather than economic gains. The study further revealed that 127(65%) of farmers have never had contact with reliable source of technical information. The study concluded that the existence of huge market presented by Kakamega town did not stimulate agribusiness market among smallholder farmers in the Division. The study recommends that development agencies and policy makers should strengthen farmer groups as vessels for social and economic development and provide adequate and reliable market information to the farmers. The study suggests that further research should be undertaken on the influence of Kakamega town on smallholder agribusiness practices in Navakholo division.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Agriculture continues to be a fundamental instrument for sustainable development, poverty reduction and enhanced food security in developing countries. The challenges of smallholder farmers, especially in sub-Saharan Africa, are multifaceted and tackling them requires numerous interventions. These may include institutional reforms that facilitate efficient rural service delivery, development of markets, physical infrastructure and supportive government policies while ensuring a stable and conducive political environment. As the agricultural sector in developing countries transforms towards commercialization, the smallholder farmers and intermediaries require systems that are responsive to their needs, which include access to markets, market information, market intelligence and effective farmer organization. Though marketing chains are changing, smallholder farmers in most developing countries are not yet able to meet the requirements of high-end markets (i.e. supermarkets) and, hence, the traditional markets still play a vital role in the agricultural marketing systems in sub-Saharan Africa (FAO, 2003).

Agriculture is a vital development tool for achieving the Millennium Development Goals (MDG), one of which is to halve by 2015 the share of people suffering from extreme poverty and hunger (World Bank, 2008). Meeting this Millennium Development Goal is an immense challenge; and particularly so in rural areas where nearly half of the population lives on dollar poverty and one-third is malnourished (FAO, 2003). Small holder farmers account for a significant share of

developing countries' rural poor, who in turn account for 75 per cent of the total poor population in those countries (World Bank, 2008).

Approximately 2.5 billion people in poor countries live directly from agriculture and 1.5 billion people live in smallholder households. Agriculture will remain crucial to economic development and poverty reduction in Africa and South Asia (Jayne *et al*, 1999; Upton, 2004) and Caribbean and Pacific countries (ACP) (Ingco and Nash, 2004) for the foreseeable future. This is because agriculture contributes to industrial growth through provision of cheap labour, capital for investment, foreign exchange earnings, market for manufactured consumer goods, enhanced rural incomes to support increasing numbers dependent on the industry, as well as food and raw material needs for the fast growing urban populations (Eicher, 1998). According to DeVries (2000), the multi-functional role of agriculture in many developing countries implies that various developmental activities hinge around the sector. It is thus recognized that agricultural development must be a central policy goal in much of the developing world (Orden, *et al*, 2004). According to Jayne *et al* (1999), the majority of the world's poor population lives in rural areas and relies on agriculture for their welfare. This means that the agricultural sector plays a crucial role in poverty reduction (Hanmer and Naschold, 2001). However smallholder farmers cannot compete on equitable terms in local, regional or global markets because they lack access to markets because roads are poor or transportation is too expensive (IFAD, 2009). In the context of globalization and market integration, small farmers are often at a disadvantage relative to larger and better-endowed commercial farmers who

have superior access to information, services and capital, and who can offer larger volumes of quality products to market agents (Johnson, 1991).

In the United States of America (USA), despite the fact that agriculture contributes only 2% of the gross domestic product and employs about 2.8%, agriculture produces more than domestic food requirements and a surplus for export worth \$ 680 billion. This has been made possible by protection policies, heavy government farm subsidies, highly mechanized efficient production methods and function domestic markets (Johnson, 1991).

About 75% of the food consumption in Britain is dependent on agricultural production whereas more than 75 % of the land in the United Kingdom is occupied by the farmers. More than two third of the food consumption in the country is dependent on British agriculture. Agriculture is intensive, highly mechanized, and efficient by European standards, producing employing less than 2% of the labor force.

In Asia, agriculture is characterized by smallholders cultivating small plots of land. The average size of operational holdings (actual area cultivated) is only 0.5 hectares in Bangladesh, 0.8 hectares in Nepal and Sri Lanka, 1.4 hectares in India and 3.0 hectares in Pakistan. About 81 per cent of farms in India have land holdings of less than 2 hectares, whereas their share in total cultivated area is about 44 per cent (UNDP, 2003). In India for example small-holder farmers comprise 78 percent of the country's farmers, but own only 33 percent of the total cultivated land; they nonetheless produce 41 percent of the country's food-grains.

Agriculture is the backbone of Africa's economy. About 70% of Africans and roughly 80% of the continent's poor live in rural areas and depends mainly on

agriculture for their livelihood. The sector accounts for about 20 % of Africa's GDP (ECA, 2004), 60% of its labour force and 20% of the total merchandise exports (ECA, 2003). Agriculture is the main source of income for 90% of rural population in Africa (ECA, 2005). The agricultural sector in Africa is dominated by peasant farmers with land holdings being smaller than 2 hectares (FAO, 2010).

In South Africa, there are many factors influencing agricultural market access at both domestic and international level. One of the factors is that farmers must produce products that conform to certain standards regarding quality, packaging and labeling among other aspects (Magingxa *et al.*, 2003). Another factor is that if farmers are to be in better bargaining position, output must be high enough to cater for economies of scale (Gupta, 1985). In addition, having marketing information also becomes crucial (Ministry for Agriculture and Land Affairs, 1998). In order for marketing information to be accessible, there has to be necessary market infrastructure that facilitates communication (Machethe, 2004) and physical infrastructure such as roads to reach different markets (Machethe, 2004). There are many other factors which directly or indirectly influence market access namely: asset ownership (Kodhek *et al.*, 2001), good agricultural practices (Ortmann, 2002), extension (Umali and Schwartz, 1994), credit, labour and skills (Braun, 2004) among other factors.

In west Africa and especially in Ghana, the rural smallholder farmers are seen as particularly important catalyst for wider economic transformation and government development objectives places a great deal of emphasis on broad based, pro-poor agricultural growth (Eilitta, 2006). Smallholders in Ghana, as elsewhere, are widely considered to be the largest as well as the most vulnerable component of the rural

sector. Ghana professes national development objectives of reducing rural poverty through the increased productivity and commercialization of smallholder agriculture (Eilitta, 2006).

In Uganda, agriculture is dominated by smallholder farmers who occupy the majority of land and produce most of the crop and livestock products. The key long-standing challenge of the smallholder farmers is low productivity stemming from the lack of access to markets, credit, and technology, in recent years compounded by the volatile food and energy prices and very recently by the global financial crisis (Ahmed *et al.*, 2005).

Agriculture is the mainstay of the Kenyan economy directly contributing 26 per cent of the GDP annually, and another 25 per cent indirectly. The sector accounts for 65 per cent of Kenya's total exports and provides more than 70 per cent of informal employment in the rural areas. Therefore, the agricultural sector is not only the driver of Kenya's economy but also the means of livelihood for the majority of Kenyan people (Republic of Kenya, 2010). Kenyan agriculture has been on the decline since 1980 recording an average annual growth rate of 1.3 per cent (Republic of Kenya 2010). The decline was attributed to low investment in the sector, mismanagement, virtual collapse of agricultural institutions and, more importantly, negligence of agricultural extension and research (Republic of Kenya, 2010). Consequently the Kenya government developed and launched the Agricultural Sector Development Strategy (ASDS) in 2010 as a follow up and response to the Strategy for Revitalizing Agriculture (SRA) launched in 2004. 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. The Government's vision pointed to a paradigm shift from subsistence agriculture to agriculture as a business that is profitable and commercially oriented.

In Kenya, factors influencing agricultural market access at both domestic and international level are that farmers must produce products that conform to certain standards regarding quality, packaging and labeling among other aspects (Nyangito, Jayne, Kodhek, 2007). Another factor is that if farmers are to be in better bargaining position, output must be high enough to cater for economies of scale (Nyoro *et al.*, 2003). In addition, having marketing information also becomes crucial (Kodhek, 2008). In order for marketing information to be accessible, there has to be necessary market infrastructure that facilitates communication (Machethe, 2004) and physical infrastructure such as roads to reach different markets (Narender, 2005; Machethe, 2004).

Western Kenya has favorable conditions for food crop production: a bimodal rainfall regime and relatively deep soils dominated by inherently fertile clay and loam textures (Nyoro, 2008). This notwithstanding, western Kenya is also characterized by subsistence farming, low crop yields, and low household incomes (Killick *et al.*, 2003). Average farm sizes are in the neighborhood of 0.02-0.2 hectares (Republic of Kenya, 2010). While rural families may adapt to such stresses through different coping strategies, there are thresholds in resource endowment (e.g., land size) below which most families are forced to step-out of agriculture as their main activity for food production (Nyoro, 2008).

The Kakamega county marketing environment presents lucrative opportunities for different farming enterprises (Republic of Kenya, 2010). However, certain conditions need to be fulfilled by farmers to be in a position to explore these opportunities. In this respect, awareness regarding modern supply chain requirements, including changing consumer demand in terms of taste, health and safety, sustainability, among other factors, need consideration (Van T *et al.*, 2004). In line with the foregoing, Mrema *et al.*, (2002) noted that smallholder farmers in many cases encounter two major challenges which include the choice of enterprise and the ability to commercialize. The latter involves technical change because the commercialization process involves introducing new production technologies and giving up antiquated farming techniques often used by smallholder farmers (Mrema *et al.*, 2002). Lack of market access is also an institutional issue involving asymmetry of information, lack of infrastructure, credit facilities, and high transaction costs among other reasons (Magingxa and Kamara, 2003). According to Ortman (2002), market access refers to whether or not consumers and sellers are well-informed about demand/supply situations and how easily each party can take advantage of the available opportunities. Invariably, this will be influenced by the transaction costs which will in turn depend on, among other factors, the physical conditions of the infrastructure, access to production and marketing equipment, and the way the marketing functions are regulated. These factors also have implications for production of farm produce and determine the level of farm income. The International Fund for Agricultural Development (IFAD) takes a similar view of market access which is seen as a three-dimensional condition comprising questions of physical access, structure, and

producer's access to the required skills and information to participate profitably in the marketing process (IFAD, 2003).

Despite the importance of smallholder agriculture in Kenya, the strategic conceptual and empirical analysis in the context of smallholder farmers in Navakholo division, which would guide policymakers and NGOs (development practitioners) in their efforts to revitalize agriculture in the division, is sparse. The findings of this study therefore provide critical recommendations and strong basis on which development interventions should be designed to enhance smallholder agribusiness among rural farmers.

1.2 Statement of the problem

Agriculture is the backbone of Kenya's economy. Agriculture production in Kenya is dominated by rural small holder farmers who account for 89% of total food producers. Despite the significant role smallholder farmers play in feeding the nation, smallholder farmers remains the poorest segment of the Kenya society (Nyoro, 2009). Although opportunities for growth and poverty reduction through commercialization of agriculture are immense, access to local markets by smallholder farmers is low due to various factors. Technical inputs such as fertilizer and hybrid seeds improve farm productivity and enables smallholder farmers to produce sufficient food for home consumption and surplus for the market.

The presence of physical infrastructure such as access roads often determines input or produce prices in a liberalized market as transport costs depend on the distance and the quality of roads and physical market sites (Bart, 2009). The local support institutions such as farmer producer groups are essential since they improve

farmers bargain power for inputs and produce. Equally significant to market access are the technical information such as extension services which enable farmers prioritize on crops with high market value and also provide farmers with reliable market information.

Despite the favorable conditions for food crop production and agribusiness in Navakholo division: a bimodal rainfall regime, good soils and the huge produce market offered by consumers from the nearby Kakamega town, smallholder farmers continue with farming methods that hardly meet household food needs and are not selling their produce in lucrative markets. Farmers use own-farm regenerated seeds and do not apply fertilizer because of high input costs. This results into low yields that are inadequate for home consumption throughout the year. Households in the division experiences annual 3-5 hunger months when have food shortages. During those periods the price of maize which is the staple food of the region is more than tripled making it inaccessible to many families.

Access roads in the division are mainly earthen roads which are impassible during rainy seasons. Transportation costs to the markets are usually high during rainy and farmers are unable to take farm produce to the local markets on time. Farmers who grow high value crops like vegetables suffer heavy losses during rainy season because farm produce cannot reach markets on time. The high transportation costs discourages from investing in high value crops that that will improve their income.

Farmers in the division are unable to get timely technical information regarding inputs costs, appropriate farming technologies and product market prices. The situation is exacerbated by unreliable government extension services. There are

very few government extension officers in the division based at the division headquarter which is far away from farmers. The government is only providing extension services on demand driven basis. Farmers find it expensive to travel all the way to the division headquarters to seek extension services and other technical information regarding markets. There are also no farmer producer/marketing groups who would bargain on behalf of farmers and accelerate access to farm credit facilities. If this situation is not addressed farmers will not be able to adopt new technologies and venture into commercial agriculture due to lack of reliable technical information support.

There is also poor coordination of interventions by implementing and support institutions due to lack of consensus in priority setting (Republic of Kenya, 2005a). This leads to resource wastage on non-priority areas, duplication of efforts and low participation of farmers in commercialization (Bahiingwa, 2006).

1.3 Purpose of the study

The purpose of the study was to assess the factors that influence smallholder farmers' access to markets in Navakholo division.

1.4 Objectives of the Study

The study was guided by the following objectives;

1. To establish the extent to which technical inputs influence smallholder farmers access to markets in Navakholo division.
2. To examine how physical infrastructure influence smallholder farmers on access to markets in Navakholo division.

3. To assess the extent to which support institutions influence smallholder farmers access to markets in Navakholo division.
4. To establish the extent to which technical information influence smallholder farmers' access to markets in Navakholo division.

1.5 Research questions

1. To what extent do technical inputs influence smallholder farmers' access to markets in Navakholo division?
2. How does physical infrastructure influence smallholder farmers on access to markets in Navakholo division?
3. To what extent do support institutions influence smallholder farmers' access to markets in Navakholo division?
4. To what extent does technical information influence smallholder farmers' access to markets in Navakholo division?

1.6 Significance of the study

The Strategy to Revitalize Agriculture (SRA), Kenya Vision 2030, Comprehensive African Agricultural Development Program (CAADP) and Alliance for Green Revolution in Africa (AGRA) have underscored the importance of increasing agricultural productivity in the fight against poverty. The Kenya government has identified smallholder agriculture as a major sub-sector in realizing the country's Vision 2030 which has identified agriculture as one of the key sectors to deliver the 10 per cent annual economic growth rate envisaged under the economic pillar. To achieve this growth, transforming smallholder agriculture from subsistence to an innovative, commercially oriented and modern agricultural sector is critical.

Smallholder farmers' access to markets and agricultural support services has been a major concern for Kenyan policy makers since independence. Agricultural policies have often been conceived as a necessary response to weak market access. It is commonly perceived that private traders and input suppliers tend to locate and confine their business close to towns and market hubs where infrastructure is relatively well developed. Consequently, farmers residing in the more remote rural areas are largely cut off from markets and services, with obviously adverse implications for farm productivity growth and poverty reduction.

The researcher hopes that research findings generate will be useful to government policy makers to design policies, strategies and intervention measures for addressing smallholder agriculture. The researcher also hope that the research findings are relevant to community development funding agencies such as NGOs and that the finding will enable such organizations in enhancing service delivery mechanism and greater decision making at the management level.

1.7 Basic Assumptions of the Study

The study was premised on the assumption that smallholder farmers are facing similar conditions in relations to access to production technologies and produce markets. The study also assumed that farmers who were interviewed were honest and provided unbiased information and farmers relied on their farm records. The study assumed that the political environment would not affect research activity given that the study was carried out during heightened political campaign period.

1.8 Limitations of the Study

The study was carried out during the long rains when most roads in the division were impassible and many farmers were out in the fields tending to their farms. This limited mobility as well as access to respondents at their homes where administering questionnaires would have been convenient. The researcher also had limited financial and time resources thereby restricting the study to the sampled smallholder farmers in Navakholo division of Kakamega County.

To mitigate the mentioned challenges the researcher used ICS-Africa's frontline agricultural extension officers as research assistants for data collection. This ensured that the data collection was carried out in farmer fields without interrupting farm activities. This also helped in minimizing cost of data collection. Despite the limitations the researcher managed to collect data from 196 out of the planned 200 respondents within planned time schedule.

1.9 Delimitation of the study

The study was confined among smallholder farmers in the six sub-locations in Navakholo division. Navakholo division was specifically selected for the study because of its closer proximity with and accessibility to Kakamega town where the researcher was based. It was also one of the two divisions where ICS Africa has been piloting the implementation small holder agribusiness project since 2011. The study was also delimited to investigating key farm productivity enhancing input constraints faced by smallholder farmers in the division and their influence on access to local farm produce markets.

1.10 Definitions of Significant Terms Used in the Study

Technical inputs: comprise farm complementary inputs such as hybrid seeds, agrochemicals and fertilizer (Gebremedhin, 1993; Urech, 2000).

Smallholder farmer: any farmer cultivating less than 3 acres of his land and practicing mixed farming

Physical infrastructure: All-weather feeder access roads and physical market places where smallholder farmers buy farm inputs from retailers and sell farm produce to consumers and other buyers

Support Institutions: Farmer organizations such producer/marketing groups that enable farmers get extension services. Support institutions also include CSOs that work with farmers

Technical Information: information through extension service providers that relates to farming skills and market information

Access to Market: this refers to ease with which farmers reach the target customers with the right quantity and quality of farm produce. It also refers to ease with which farmer acquire farm inputs and farm credits

International Child Support: A Dutch based Non-Governmental Organization implementing agribusiness project among smallholder farmers in Navakholo division

1.11 Organization of the Study

The study report is organized into five chapters. Chapter one highlights the background of the study, statement of the research problem, purpose of the study,

objectives of the study, research questions, significance of the study, assumptions, limitation, delimitations and definitions of significant terms used in the study. Chapter two provides literature review related to the concept of smallholder agriculture in Kenya; technical inputs, physical infrastructure, support institutions and technical information on smallholder farmers access to markets. This chapter further reviews the theoretical and conceptual framework which highlights the interplay of the variables of the study. Chapter three describes the methodology that was applied to collect, process and analyze data. This includes the research design, target population, sample and sampling procedures, research instruments, validity and reliability of the instrument, data collection procedures and data analysis techniques. Chapter four provides key results from data analysis, presentation and interpretations. Finally chapter five provides summary of main findings, conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents an examination of the smallholder farmer, the characterization and importance of the smallholder agricultural sub-sector, a review of literature on constraints faced by farmers as well as the theoretical literature on technical change. The chapter begins by defining a smallholder farmer in the Kenyan context followed by smallholder farm characteristics. The importance of smallholder farmers is also highlighted. The section further examines past studies on the various themes such as technical input constraints, physical infrastructure, institutional infrastructure, technical information and their effects on smallholder access to markets. This section further explains the technical frameworks which the study is underpinned as well as the conceptual framework which shows the relationship independent variables, dependent variable intervening variables as well as the moderating variables.

2.2 The Concept of Smallholder Farming in Kenya

Agriculture has remained the mainstay of the economy since independence in 1963 (Nyangito, 2006). Although its contribution to the GDP decreased from 35 per cent in 1963 to 25 per cent in 1996, it employs about 75 per cent of the labour force, provides most of the food requirements for the nation and earns the country about 60 per cent of the foreign exchange and 45% of government revenue (Kenya, 1997). Despite the importance of the agricultural sector in Kenya, and in most sub-Saharan

African countries, the performance of the sector has been poor for most years since 1970 (World Bank, 1981; Chiremba, 2003; MacDonald, 2004). Over 70% of the population in Kenya live in rural areas and derive their livelihood from agriculture and the agricultural production dominated by smallholder farmers (Nyangito 2006).

As noted by Kodhek (2009), the agricultural policy in Kenya revolves around the main goals of increasing productivity and income growth, especially for smallholders; enhanced food security and equity, emphasis on irrigation to introduce stability in agricultural output, commercialization and intensification of production especially among small scale farmers; appropriate and participatory policy formulation and environmental sustainability. Diverse range of policies has been used to foster growth of the agricultural sector in Kenya. The first set of policies for the period 1964 to 1980 emphasized government intervention in nearly all aspects of agricultural production and marketing (Smith, 1976). From 1981, however, there was a major shift from government controls to liberalized markets. The shift meant that the government had to reduce its control of agricultural production and marketing and provide an enabling environment for enhanced participation by the private sector. Upon attainment of independence, agricultural policies were based on principles outlined in the Sessional Paper No. 10 on African Socialism and its Implications to Planning in Kenya which emphasized political equality, social justice, and human dignity.

Kenya's smallholder agriculture remains a major engine of rural growth and livelihood improvement, yet it is largely semi-subsistence (Olwande, 2011). In Kenya, the smallholders farmers specifically are known to be resource poor and therefore operate below their potential (Tegemeo, 2009). The scenario in many other countries

is that of farm size ranging from subsistence (small) to agribusiness type (large) (Kirsten and Van Zyl, 2004). The smallholder farmers derive their livelihood from land holdings that are about 0.2-5ha, and at most own 20 heads of livestock, with a mix of commercial and subsistence production; have a greater share of family labour in production, and the farm is the main source of income (Devris, 2000). Smallholder farmers in Kenya and other comparable regions of Sub-Saharan Africa (SSA), Asia and South and Central America are the poorest category in the world population (Ruttan, 2002).

Kirsten and Van Zyl (1998) dismiss land size as a good measure of distinguishing small farms from larger commercial farms. Indeed, it is true because one hectare of irrigated land appropriate for herb gardening can have profit potential equal to or higher than 500ha of low quality land in the Karoo (Kirsten and Van Zyl, 1998). In some cases, a typical farm may grow crops on a smaller portion of the land and leave the larger portion fallow due to shortage of complementary inputs, for instance (Huang, 1973). Again, there is a modernity illusion that an efficient farm is the one equipped with modern technology such as combine harvesters, tractors and other complex machinery (Kirsten and Van Zyl, 1998). In this respect small farmers are in danger of being incorrectly declared as less efficient or inefficient (Kirsten and Van Zyl, 1998).

Smallholder agriculture remains the main engine of growth in rural Sub-Saharan Africa (SSA). Faced with limited options for rural industrialization, most countries in SSA face a challenge of transforming the semi-subsistence and low productivity farming systems into commercialized agriculture (Govereh *et al.*, 1999).

Worth noting is that 95% of agricultural land in SSA is rain-fed (Rockström *et al.*, 2003), but yields remain low with no likely changes in the near future. Nevertheless, the observed suboptimal performance of rain-fed agriculture is not necessarily due to low physical potential, but primarily to management related issues (Rockström *et al.*, 2003).

Ruttan (2002), argues that smallholder farmers in most parts of the world, especially developing nations, are “rational allocators of available resources” but have limited technical and economic opportunities. As a consequence, these farmers remain “poor but efficient” (Ruttan, 2002). In addition, Pauw (2005) noted that due to poverty, smallholder farmers often struggle to support themselves with meager income from agricultural activities. Hence, they rely on other sources of income such as wage remittances and pensions as well as government transfers or nonagricultural labour income. The Millennium Project Hunger Task Force (2004) asserts that smallholder agriculture is the main source of food for the rural population as well as an income generating occupation because it is the main activity for many rural parts developing countries. This implies that smallholder agricultural productivity is very crucial in alleviating poverty and hunger. In recognizing this potential role of smallholder farmers, it is necessary to have a deeper insight into their key characteristics especially regarding their technological status, location, production objectives and factor intensity.

The smallholder farm sector of Kenya is characterized by rudimentary production technology (Okoko *et al.*, 1998). Kipkoech *et al.*, (2007) argues that smallholder farmers in western Kenya mainly use traditional production techniques

and productivity levels are often low. Given this condition, a narrow production base often characterize smallholder farming (Kalibwani, 2005). The rudimentary technology status can be explained by the fact that the sector is also labour intensive with minimal usage of machinery (Ministry for Agriculture, 2010). Based on farmers' reports, several constraints contribute to yield fluctuation on crops production, including: unreliable rainfall; lack of high yielding disease tolerant varieties; pests and diseases; low producer prices; poor agronomic practices; and lack of institutional support (Bucheyeki *et al.*, 2008; Okoko *et al.*, 1998). Moreover, shrinking farm size coupled with a population growth rate of 3% in Western Kenya suggests that some agricultural interventions are needed to improve farm productivity (Kipkoech *et al.*, 2007).

Production in smallholder farming is mainly for subsistence purposes and to a lesser extent marketable surplus (Nyikal, 2003). Cousins (2005) also confirm this characteristic by asserting that output from smallholder farming for some rural households constitutes a greater proportion of their total livelihoods. Given this picture, production in smallholder farming is mainly to meet household subsistence/survival needs. In fact, it is because of such low production levels that there are calls by researchers and policy makers alike, for smallholder farmers to produce beyond subsistence in order to meet national food security goals (Nyikal, 2003). In Kenya, smallholders produce most of their own food and also contribute about 68 percent of the nation's total marketed output (Republic of Kenya ,1998).

The smallholder agriculture in Kenya is characterized by intensive use of labour which is mainly derived from family members (Nyikal, 2003; Nyoro, 2007). In

this case, there is limited usage of external inputs such as machinery and fertilizers (Nyoro, 2007). Dorward (1999), argues that intensive use of labour in smallholder farming is in some cases a form of self exploitation arising from the fact that the majority are poor hence cannot afford external farm inputs. Unlike in larger commercial farms, costs of labour are too high for smallholder farmers in general, hence they have to do with family labour (Dorward, 1999).

There is a lot of literature supporting the importance of market access to smallholder farmers and for alleviating/eradicating hunger and poverty through increased production and cash income generation (Ostertag, Lundy, Gottret, Best and Ferris, 2005; Magingxa and Kamara, 2003). Kamara (2003) noted cash crops having a key role in rural growth and livelihood enhancement. However, without proper access to profitable markets, smallholder farmers are likely to remain poor.

Access to markets by smallholder farmers is influenced by such factors as: quantity and quality of output, physical and marketing infrastructure, marketing information, asset ownership, good agricultural practices, contract farming, land tenure security, technical capacity, extension services, labour and skills, value addition and credit (Nyoro, 2009).

2.3 Technical Inputs on Smallholder Farmers Access to Markets

Increasing farm productivity is important in reducing poverty in rural agrarian societies. The structural transformation paradigm espoused by Johnston and Mellor (1961) and Mellor (1976) underscores the role of agricultural productivity growth in rural poverty reduction, demographic change, and economic development. This structural and demographic transformation was seen in many Asian countries during

their Green Revolutions. There is general agreement among researchers and policy makers that increased levels of fertilizer use, improved soil fertility and farmer management practices, and improved seed technologies are also required in Africa to generate these gains in farm productivity growth (Morris *et al.*, 2007). On the other hand production for the markets is dominated by the use of purchased technical inputs. In a situation where credit is missing, liquidity constrained farmers are likely to have difficulty in purchasing technical inputs and hiring labour (Bagamba, 2005).

While studying trends and patterns of fertilizer use by smallholder farmers in Kenya, Nyoro *et al.*, (2009) found out that where farmers do not use fertilizer and plants traditional seed they realize average yield of approximately 5 bags per acre of 90 kilograms of maize production. The study further revealed that farmers that either use fertilizer with traditional seed or hybrid seed had an average yield of about 15-25 bags/acre. Clearly, the adoption of a combination of appropriate technologies appears to be associated with smallholder productivity and therefore incomes which will raise food security status. Commercialization enhances agricultural productivity by encouraging shifts in crop mix towards high value crops and the use of productivity enhancing inputs like certified seeds and fertilizer (Owuor, 2008). This is consistent with evidence from elsewhere that commercialization of agriculture increases agricultural income (Kennedy and Cogill 1987; von Braun, Kennedy, and Bouis 1990). Improved market access, therefore, is not only important for better-off producers or for the production of cash crops rather than food crops; it is also very important for smallholder farmers (IFAD, 2003).

Use of fertilizer is critical to unlocking the genetic potential of hybrid maize in Kenya (Ariga *et al.*, 2006). Inorganic fertilizers complement other inputs and practices (e.g., improved seeds and better weed control) resulting in higher yields on infertile soils (Heisey and Mwangi, 1996). In the study on agronomic and financial implications of using farm save seeds from naturally segregated certified maize hybrids by smallholder farmers in western Kenya, Macharia (2007), found that combined use of hybrid maize seed and inorganic fertilizer has distinct agronomic advantage. Maize grain yield increased significantly ($P < 0.05$) when certified first generation (CG1) seed was grown with fertilizer thus confirming the work of Pixley and Banzinger, (2001) that maize hybrids grown from certified first generation (CG1) seed yield approximately 18% more than the best local varieties.

2.4 Physical Infrastructure on Smallholder Farmers Access to Markets

Machethe (2004) pointed out that most small producers in South Africa lack appropriate transportation facilities and road infrastructure, communication links and storage infrastructure. Further, smallholder farmers have limited ability to add value to their produce. Lack of such facilities usually constrains farmers' supply response to any incentives in both agricultural production and marketing (Dorward *et al.*, 2003). Moreover, poor roads and poor telecommunication networks results in high transaction cost (Fenwick and Lyne, 1999). Sometimes these costs are too high for farmers and traders to get any meaningful benefits from their trading activities, thus discouraging farmers from marketing activities. For this reason, institutional development has to be accompanied by technological changes, in order to sustain market participation among smallholder farmers. In a study carried out among

smallholder dairy farmers in Kenya, Staal (2000), found out that transport difficulties over poor roads directly affect farmer ability and willingness to participate in dairy market for a highly perishable commodity, even where asset and information levels would otherwise permit such participation.

Bahiigwa (2006), in his research carried out in Eastern Africa, found that there are several constraints affecting different types of domestic markets in Eastern Africa. Firstly, the high sales tax incidence on smaller quantities or units of farm output has often discouraged farmers from accessing rural/local markets even though they are nearby. Consequently, this has had a tendency of discouraging commercialization. Secondly, there is a problem of accessing urban markets. This problem is traced back to logistical problems such that farmers are forced to use traders who transport in bulk to urban markets. In line with the foregoing, farmers are susceptible to poor transactions in the case of information asymmetry on their part (Bahiigwa, 2006). The other problem is that farmers may incur high transaction costs under such circumstances (Bahiigwa, 2006). The supermarkets that in the past used to purchase high quality imports have recently (mid 1990s) opened doors to African farmers as well (Bahiigwa, 2006). In this regard, the opportunity offered by supermarkets presents alternative marketing outlets for many farmers if properly explored. However, with the prevailing structural, organizational and institutional constraints, smallholder farmers often fail to meet market requirements such as high quality and/or quantity product specifications or deliver their output on time (Cruz, 2006).

Cruz (2006), in his study on smallholder banana producers in Latin America found out that fungal diseases in bananas constrained smallholder farmers in meeting

the quality standards set by retailers and supermarkets which can be traced back to absence of technical inputs in solving the problem. In terms of sea transportation of bananas, producers in Latin America heavily depended on other peoples' vessels which might not be timely given the perishability of the product. Such a constraint could be surmounted by individual or group ownership of the vessel by the producers. This problem has also been noted by Bagamba *et al* (2005) who found logistics combined with distance to market in Uganda to be one of the major constraints to market access. The implication here is that, with inadequate arrangements all aspects such as transportation from farm to the market place, farmers are likely to find it unprofitable to attempt to transport their produce to distant markets. Limited access to credit was found to be hindering infrastructural development whilst trading high tariff limited exports (Cruz, 2006).

2.5 Support Institutions for Small holder Farmers Access to Markets

Support Institutions are usually community-based and resource-orientated organization and commodity-based and market-orientated organizations (Gupta, 1989). The Community-Based, Resource-Orientated Farmer Organizations are the village-level cooperative or associations important for dealing with inputs needed by the members to enhance the productivity of their agribusinesses (Chamala, 1991). These organizations are generally small, have well-defined geographical areas, and are predominantly concerned about inputs. This group of organizations can generate income from the sale of inputs and outputs and such income can be put back into the organization by spending it on extension services, data generation, business planning, and administration (Gupta, 1989). On the other hand commodity-based, market-

orientated farmer organizations specialize in a single commodity and promote value-addition to products thereby expand markets and returns (Chamala, 1991). Research, input supply, extension, credit, collection of produce, processing, and marketing are all integrated to maximize the returns on the investments of the members who invested in the collective enterprise (Gupta, 1989).

The type and amount of benefits acquired by smallholders depend largely on the strength of their bargaining power. Small farms typically have limited bargaining power, particularly if they possess few assets and scarce alternative income opportunities (Key and Runsten, 1999). Farmers' support institutions such as farmer groups can play an important role in the success of contract farming arrangements through the power of group clout (Glover, 1987). In an effort to reduce transaction costs, firms often prefer to organize farmers into groups or deal with existing farmer organizations. Farmers' groups appear not only to improve the bargaining power of smallholders, but also serve to lessen some of the criticisms of contract farming.

Baumann (2000) in the study about impact of timely input acquisition among farmers in Cambodia assert that in remote areas with low inputs and limited transportation infrastructure, timely access to inputs is a significant problem which is best addressed through farmer groups. Lack of non-traditional inputs and production resources such as improved seeds, fertilizers, or tools is a common constraint for productivity improvement of smallholders. Underdeveloped inputs and product markets may make it difficult for firms to obtain the desirable quantity and timely delivery of crops. To achieve projected yields and desired quality, buying firms frequently undertake measures to ensure that contracted farmers are clustered in

producers groups to accelerate timely access to inputs including seeds and fertilizers, in addition to training support and the monitoring of proper crop husbandry practices (FAO, 1999; Eaton and Shepherd, 2001).

According to Baumann (2000) small-scale farmers are often reluctant to adopt new technologies and diversify from traditional crops due to the possible risks and costs involved. Through support institutions, firms can provide the support needed for smallholders to shift from subsistence agriculture to market-oriented production (Eaton and Shepherd, 2001; Patrick, 2004). Since agro-business firms possess a vested interest in the production of high-value crops, their contractual arrangements often facilitate the introduction of new production techniques and further measures that serve to upgrade agricultural commodities (Baumann, 2000).

According to North (1994), institutions are “The rules of the game: the humanly devised constraints that structure human interaction. They are made up of formal constraints (such as rules, laws, constitutions), informal constraints (such as norms of behavior, conventions, self imposed codes of conduct), and their enforcement characteristics.”

2.6 Technical Information on Smallholders Access to markets

Agricultural productivity among small scale farmers is influenced by access, efficiency and affordability of agricultural information (Muriithii, 2009). Owens (2003) asserts that agricultural extension is the mechanism by which technical information on new technologies, more effective management options, and better farming practices can be transmitted to farmers. Extension agents interact with farmers, providing information and aiding in developing their managerial skills

(Birkhaeuser *et al.*, 1991). In addition, extension agents disseminate information on crop and livestock practices, optimal input use, and consult directly with farmers on specific production problems, thus facilitating a shift to more efficient methods of production. That is, agricultural extension not only accelerates the diffusion process and the adoption of new varieties and technologies but also improves the managerial ability of farmers and affects the efficient utilization of existing technologies by improving farmers' know-how.

Agricultural extension, or agricultural advisory services, comprises the entire set of organizations that support people engaged in agricultural production and facilitate their efforts to solve problems; link to markets and other players in the agricultural value chain; and obtain information, skills, and technologies to improve their livelihoods (Birner *et al.* 2009; Davis 2009). George *et al.*, (1993) pointed out that farmer's demand for information has increased in recent years due to greater market instability, more complex production technologies among others. Differences in decisions about what crops to grow can be attributed to differences in resources, levels of knowledge, environment, approaches concerning uncertainty and other factors (Ma Corazon *et al.*, 1998). Mosher (1987) defined that adoption of an innovation is the process by which a particular farmer is exposed to, considers, and finally rejects or practices a particular innovation. Farmers require information to link various inputs at reasonable prices, and also link output markets (Adekunle *et al.*, 2004).

The innovation decision model by Rogers (1983) shows the process through which an individual (or other decision making unit) passes from first knowledge of an

innovation to forming an attitude towards the innovation, to a decision to adopt or reject, to implement of the new idea, and the confirmation of this decision.

In the study on the impact of improved market information, Goyal (2010) found that in areas where there was much improved access to and dissemination of market price information (through the presence of e-chopals), farmers obtain wholesale prices of between 1 to 5% higher (with an average of 1.6%) than in areas where market information was less transparent.

2.7 Theoretical Framework

Theory is a reasoned statement or groups of statements, which are supported by evidence, meant to explain phenomena. They are systematic explanations of the relationship among phenomena. This section reviews the theory on which this study will be premised. The study is hinged on induced innovation theory reflecting on how technical change and relative factor price influence the path of technological development in agriculture (Ellis, 1988). In this regard Ellis (1988), defines a technique as: "...any single production method, i.e. it is a precise combination of inputs used to produce a given output." And technical change as: "...a reduction in the quantity of resources required to produce a given output..."

In this regard technical "inputs" comprise farm implements and technical knowledge/information, farm infrastructure and complementary inputs such as seeds and fertilizer (Gebremedhin, 1993; Urech, 2000).

2.7.1 Induced Innovation Theory

Induced innovation is a macroeconomic hypothesis first proposed in 1932 by J.R. Hicks in his work "The Theory of Wages". He proposed that "a change in the

relative prices of the factors of production is itself a spur to invention, and to invention of a particular kind—directed to economizing the use of a factor which has become relatively expensive." This view is supported by Hayami and Ruttan (1971) when they explain how technical and institutional changes come about in order to clarify the development process. The "induced innovation" theory suggests the process by which public sector investment in agricultural research, the adaptation and diffusion of agricultural technology and the institutional infrastructure that is supportive of agricultural development are employed in order to relieve the agricultural production constraints. The implication of the "induced innovation" theory is that the development of new technology and institutional structures should be stimulated by the prevailing problem within the agricultural sector (Ruttan, 2002).

The theory is relevant to agricultural sector development since it can be used to explain how farmers adapt to a new set of factor and product prices. This adaptation involves the innovation to a new production level as well as change along a fixed production surface (Ellis, 1988). For instance, when the price of fertilizer decreases relative to capital (land), its increased usage is useless unless a responsive new seed variety is developed as a complementary input (Ellis, 1988). Figure 1.0 Presents an illustration of the induced innovation model.

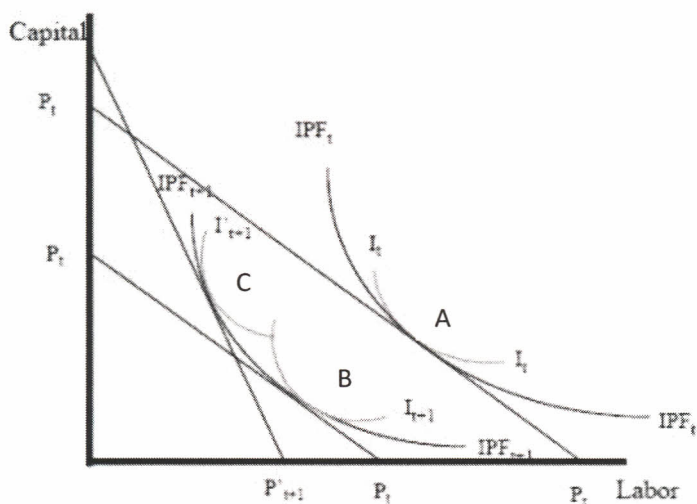


Figure 1.0:

Induced innovation model. Adapted from Grabowski (1979)

Figure 1.0 presents an illustration of the induced innovation model. Suppose factor in X axis is land and factor in Y axis is labour/fertilizer and the farmer is operating at point A on isoquant IPF_t . Suppose the price of land (factor X) rises relative to the variable inputs like fertilizer (factor Y). The change in the factor price induces research and development into land saving technology (Ellis, 1988; Jaffe, Newell, and Stavins, 2001). The outcome of research is an inward shift to innovation possibility curve IPF_{t-1} , an envelope to all possible alternative isoquants (I_{t-1} and I_{t+1} are the other two alternatives as shown on Figure 1.0).

However the induced innovation theory has limitations since it does not address that affect adoption of new technologies (innovations). Crawford and Weber (1998) noted smallholders' lack of knowledge about technologically improved inputs in Mozambique as one of the causes for low productivity. New technologies such as genetically modified organisms (GMOs) usually come with controversies and their

adoptions depend on how much information is available to the farmers (Ruttan, 2002). There are several changes happening from the traditional self-sufficiency to a scenario whereby farm output has to respond to market trends. These changes, which include grading system, standards for food quality and safety and adoption of contracts, are to be taken into account by farmers if they are to survive in the farming business (Van Roekel *et al.*, 2002). The commercialization processes are only feasible by overcoming constraints to production and market access (Pingali *et al.*, 2005). This study seeks to provide proof that improved farm productivity is also affected by availability of technical information, transaction costs and farmer support institutions.

2.8 Conceptual Framework

This section describes the perceived conceptual framework used to guide the study.

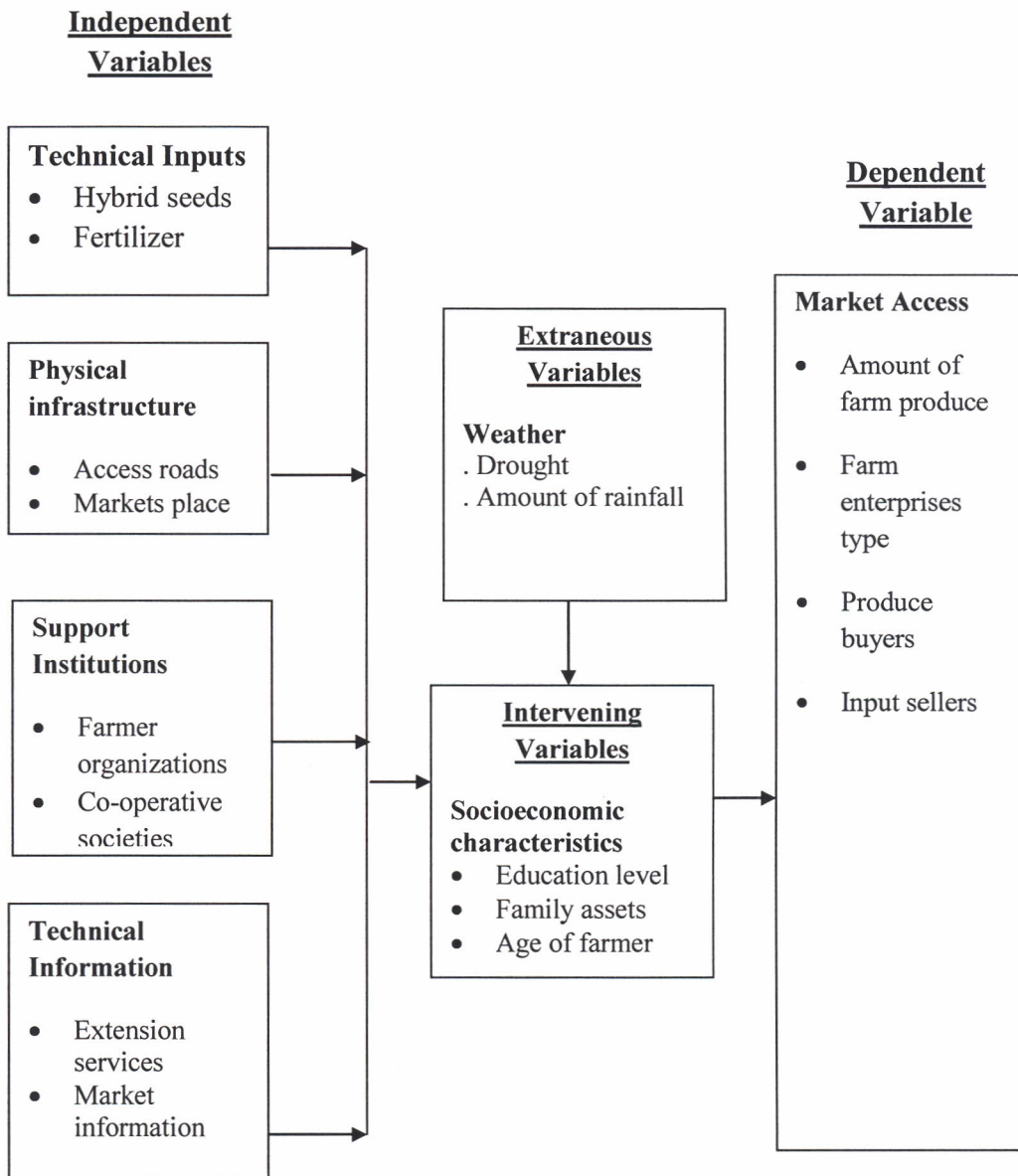


Figure 2:

Conceptual Framework of Factors Influencing Smallholder Access to Market

The schematic diagram in figure 2 reflects the concept of factors that influences smallholder farmers' access to markets. The factors which have been conceptualized as independent variables include technical inputs such as certified seeds and fertilizers. In this study these technical inputs determine the productivity of a given land and hence crop yields. Use of fertilizer in combination with certified seeds results into three fold yields compared to non use of technical inputs. The use technical inputs is positively correlated to access to markets since smallholder farmers who uses such inputs are likely produce enough food for domestic use and surplus for the markets.

The other independent variable conceptualized in this study is physical infrastructure especially access roads and distance to input and produce markets. State of access roads determines the cost of transportation. When access roads are impassible at certain periods of the year, the transportation costs are increased and this increases transaction costs for both input and produce thereby influencing access to markets.

Support institution in this study refers to farmer groups. Farmer groups are socio-economic vessels that members can use to increase their bargaining power. Such farmer groups enable farmers to access credit facilities, facilitate communal labour and lowers transportation costs when farmers take their produce to the market jointly. All these reduces transactional costs to the farmer thereby influences access to the markets.

Technical information in this study refers to both production information that farmers get through reliable extension service providers as well as market information.

Technical information enables farmers to make informed farm enterprise choice as well as different markets quality demands.

2.10 Summary of Literature Review

The literature captured in this section elaborated the significant role of smallholder agriculture to global economy. Several authors from the global and local arena are referred to in discussion the critical role smallholder agriculture plays. The literature has underscored the critical role smallholder agriculture plays in feeding the world, creating employment opportunities and spurring growth and development of other sectors of the economy.

Literature on technical inputs has demonstrated that use of inputs such as fertilizer and hybrid seeds increases crop yields significantly and farmer are able to provide food for home consumption and have surpluses for the market. The literature has demonstrated that smallholder farmers seldom use certified seeds due to high costs and therefore resort to regenerated on-farm seeds that give low yield and poor quality products. The literature has also looked into role of credit input market as critical catalysis for smallholder farmers' use of productivity enhancing technical inputs.

The literature has demonstrated that physical infrastructure such as condition of roads affect the cost of transaction for both input and output prices. It has also come out in the literature that distance from farm gate to all weather roads and market centers also influences cost of transporting inputs and produce. Presence of good storage facilities has been cited as another physical infrastructure that influences farmers' ability to maximize income from produce.

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Support institutions such as farmer producer groups have been discussed in the literature as critical in facilitating farmers' access farm inputs and extension services. They reduce transaction costs when farmers buy bulk inputs. They also enable farmers get input credit and secure contract with bulk buyers and input suppliers.

The literature review has also examined how technical information through farmer extension accelerates technology adoption and provides market information that enables farmers to adopt high value crop enterprises.

The literature review finally looked into the theoretical framework on which the study was premised as well as the conceptual framework that illustrated the relationship between dependent and independent variables of the study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the research design that was used in conducting the study. This includes research design, target population, sample frame, sample selection, research instrument; validity and reliability of the instrument, data collection procedure, data analysis techniques and ethical considerations.

3.2 Research Design

The research design is the structure of the investigation conceived to obtain answers to research questions (Cooper and Schindler, 2008). This study used both qualitative and quantitative approaches using descriptive survey design. Descriptive cross sectional study design was adopted in conducting this study because the study was guided by the farmer records and memory of a given cropping season period. Descriptive survey design was appropriate because it involves collecting data in order to answer questions concerning the current status of subjects of the study. For example the crop yields of the farmers from the in the main cropping season. Longitudinal study design was not adopted here because it would have involved collecting data relating to cropping period stretching for a long period of time.

Cross sectional study design has been recommended by Babbie (2009), for gathering information on a population at a single point in time. In the case of this study, the effort was to establish the relationship between factors of production and production level and access to local market and the study adopted a questionnaire-based survey approach in addition to use of key informant discussion guide.

Advantages associated with the survey design include ease of establishment of association between variables and comparison, possibility of administration to many people and anonymous completion of questionnaires. Shortcomings include possibility of response biases.

3.3 Target Population

Target population is the collection of elements that possesses information sought for the study by the researcher (Oso and Onen, 2005). The study targeted all 416 smallholder households in Navakholo division involved in the agribusiness project being implemented by ICS Africa. The farmers were identified from the records of beneficiary farmers held by ICS-Africa. The records of registered farmers from these records formed the frame from which a sample of farmers was drawn and interviewed. The study was conducted in all the 6 sublocations of Navakholo division. The division was purposely selected for this study because ICS-Africa was already implementing a pilot agribusiness project with smallholder farmers in the division.

3.4 Sample Size and Sample Selection

Sampling is selecting a number of individuals for a study in such a manner that the individuals selected fairly represent the larger population from which they were selected (Mugenda and Mugenda, 2003). According to Babai (2004), working with sample reduces the length of time needed to complete research; cut cost and is almost a mirror of the target population. This section describes the sample size and sampling procedure that will be used in the study.

3.4.1 Sample Size

The sample size for this study was 200 smallholder farmers drawn from a target population of 416 smallholder farmers from Navakholo division. The sample size was determined using a formula. According to Fisher, Laing and Stoeckel as cited by Mugenda (2003), the desired sample size when the population is less than 10,000, the following formula is suggested for estimating sample sizes;

$$\text{Sample size } n_f = \frac{n}{1+n/N}$$

Where: n_f = the desired sample size when population is less than 10,000

n = sample size when population is more than 10,000

N = the estimate of the sample size

The sample size was selected at 95% confidence level. The following formula by Fisher *et al* (1998) was used to calculate the value of n .

$$n = \frac{z^2pd}{d^2}$$

Where n = desired sample size when population is more than 10,000

z = desired normal deviate at the required confidence level

p = estimated proportion in target population with characteristics being measure

$q = 1-p$

d = the level of statistical test

Fisher recommends 50% of the target population should be assumed to have characteristics of interest with a z-statistic of 1.96. Then;

$$p = 0.5$$

$$q = 1-p = 0.5$$

$$z = 1.96^2 \times 0.5 \times 0.5 / 0.5^2 = 384$$

However the population in the study area was 416, which is less than 10,000.

Therefore;

$$\begin{aligned} n_f &= \frac{n}{1+n/N} \\ &= \frac{384}{1+384/416} = 199.68 \end{aligned}$$

The study therefore used a round figure sample size of 200 farmers to cater for the 0.68 decimal.

3.4.2 Sampling Technique

A mixture of probability and non-probability sampling methods was employed to arrive at the respondents for interviews. The study used same sampling criterion to determine sample size per location. After the appropriate sample size for every sub-location was established the researcher employed systematic sampling technique in picking the farmers who were interviewed. The names of the farmers were arranged alphabetically then randomized and the respondents determined through systematic sampling technique. Population-proportion sampling procedure was used to distribute respondents to the 6 sub-locations in the division. Proportional sampling (Van Dalen, 1979) was appropriate for this study because it provided the researcher a way to achieve even greater representativeness since selection of individuals was

accomplished by selecting individuals at random from the sub-locations in proportion to the actual size of the population in the total population.

Table 3.1

Sample Size Distribution per Sub-location

Sub-location	Total household population	Distribution criteria	Sample size
Sidikho	122	$(122/416) \times 200$	59
Lusumu	84	$(84/416) \times 200$	40
Budonga	74	$(74/416) \times 200$	36
Mukhweso	32	$(32/416) \times 200$	15
Namarema	56	$(56/416) \times 200$	27
Kochwa	48	$(48/416) \times 200$	23
Total	416		200

3.5 Research Instruments

Instruments are the tools used to collect data (Oso and Onen, 2009). The study used questionnaires and interview guides to obtain primary data. The questionnaires used in the study were divided into sections addressing the study objectives.

Questionnaires were used since the study was concerned with variables that cannot be observed directly such as level of skill, feelings, opinions and behavior. Such information was best collected through questionnaire (Touliatos and Compton, 1988). The questionnaire was divided into section; section A (elicited information on socio-demographic characteristics of the household), section B (application of technical inputs), section C (availability of physical infrastructure), section D (membership of farmer organization) and section E (access to contact with technical information through extension services).

The literacy level of respondents was not assumed in this study. The researcher therefore conducted face to face interviews using questionnaires and interview guides. The instruments were both open and closed ended questions for generation of data. Focus group discussions were conducted in this study using discussion guides to gather information regarding the institutional set-up of the study area. Essentially, the method involved discussion with community leaders and other people with knowledge of the area. However, only general information of concern to Navakholo communities was acquired using focus groups. In this regard, issues such as the market players, status of farmers and their perceptions was obtained.

Both qualitative and quantitative data were principally collected through questionnaires. Although Bourque and Fielder (2002) assert that questionnaires are used to collect data from people who complete the questionnaires themselves, the research assistants in this study used the questionnaires to carry out interviews with farmers. Unlike in a posted questionnaire, this interview process ensured direct communication with respondents. In this case, there was clarity whenever a question

posed to the interview was not clear. Information from illiterate respondents was also captured using this method. An interview provides the platform to gain cooperation, hence there is minimal loss of information (Leedy and Ormrod, 2004). The method also ensured avoidance of spoilt or lost questionnaires. Timely response was also achieved using this method.

3.5.1 Pilot Testing of Instruments

Nachmias and Nachmias (1996) noted that pilot testing is an important step in the research process because it reveals vague questions and unclear instructions in the instruments. It also captures important comments and suggestions from the respondents that enable the researcher to improve the efficiency of instruments, adjust strategies and approaches to maximize response rate.

To ensure data collection instruments were reliable, a pretesting and practical interviewing was conducted by the researcher. The sampled farmers for pre-testing were drawn from the neighboring district in order to avoid interviewing farmers who later formed part of the sample for the study. This sub-location was considered ideal for pilot testing because, being in the same environment (same district) as the target area of the study; respondent were expected to display similar characteristics as the actual study respondents. In piloting the instruments questionnaires were administered to 36 smallholder farmers sampled randomly from the neighboring Esichenyi sublocation in Kakamega north district. The findings were used to refine the instruments to enable increased reliability for use in Navakholo division. During the piloting attention was focused on questions that made respondents uncomfortable

hence were made unambiguous so as to reduce despondence fatigue during the administration of the questionnaire.

3.5.2 Validity of Instruments

According to Mugenda and Mugenda (2003), a valid instrument measures what it is supposed to measure. Validity of research instrument is measure of the extent to which the instrument measures what they are intended to measure (Kathuri and Pals, 1993). The validity of the instruments was ascertained by conducting a pilot study using the instruments. This ensured that the instructions that were clear and all possible responses to a question were captured. Content validity for the instrument is the extent to which the instrument provides adequate coverage of the investigative questions guiding the study. The instruments were reviewed by my supervisors who are research experts to assess the appropriateness of the questions in terms of their relevance in generating answers to the research questions.

3.5.3 Reliability of Instruments

Reliability is the extent to which results from an instrument is consistent and reliable (Amin, 2005; Kothari, 1990). A reliable instrument is that which yields consistent results after repeated measurements (Cooper and Schindler, 2008). The researcher adopted Split half technique of assessing reliability because it requires only one testing session. The researcher preferred this technique of the test because it eliminates errors due to the subjects ease in remembering responses from the first test. The Split half attempts to overcome this problem by developing one scale for each variable then dividing the scale into two halves (odd and Even) and then calculating the Pearsons correlation coefficient (r) between the two halves of the test. The split

half procedure is based on correlation between scores obtained from both halves of the test is needed to determine reliability of the entire test. The Spearman-Brown Prophecy formula was used to make correlation as follows;

$$R_e = \frac{2r}{1+r}$$

Where r is Coefficient of correlation.

The instrument (especially the questionnaire) was deemed to have high degree of reliability since the value of correlation coefficient fell within the range of 0.85 to 1. This was considered sufficient since Mugenda and Mugenda (2003), asserts that any correlation coefficient that fall within 0.65 to 1 is considered to have high degree of reliability.

3.6 Data Collection Procedure

Before commencement of data collection, this study proposal was taken through approval procedures as required by the University of Nairobi. The researcher obtained a letter from the university which he used to obtain a research permit from the National Council of Science and Technology. The researcher also sought permission from ICS-Africa to be allowed to get secondary data from project documents as well as primary data from farmer groups involved in the implementation of the agribusiness project. The researcher employed 12 research assistants who were field officers working for ICS-Africa in the same division. The research assistants were trained for two days on correct interpretation of the questions in the instruments, language of interviews and ethical considerations. The researcher also informed the

local administration (area chief) and the divisional agricultural officer about the study before he conducted the study in the division.

The researcher personally administered discussion guides to focused group discussion and key informants. This allowed the research to gain valuable insights into the factors that farmers face while trying to gain access to the local markets. The research assistants interviewed individual farmers using structured questionnaires and respondents were assured of strict confidentiality. To ensure high response rate the researcher and research assistants conducted the interviews with farmers in their farms during the day so that respondents were not distracted from attending to their farms. The researcher collected all completed questionnaires every evening and had daily review meetings with research assistant to evaluate the progress and address emerging issues.

3.7 Data Analysis Techniques

Data analysis means the computation of certain indices or measure along with search patterns that exist among data sets. Data analysis seeks to fulfill research objectives and provide answers to research questions. Quantitative data analysis began in the field where data was sorted and checked for correct completion and consistency. This was followed by coding the open ended data, data entry, data cleaning, transformation, analysis and interpretation. Qualitative data was collected using discussion guides and the responses were grouped into themes that are corresponding to the objectives of the study. Data was analyzed using descriptive statistics and the findings were presented using tables, frequencies, percentages, modes and mean.

Quantitative data was analyzed with the aid of statistical package for social sciences (SPSS) and Microsoft Excel.

3.8 Ethical Considerations

Information obtained from other sources or from other authors to support the relevance of this research is adequately acknowledged in the form of references. The researcher and assistants adequately and clearly explained the purpose of the study to the respondents. Before commencing interviews with the respondent, the researcher sought permission from the respondent to participate voluntarily in the study. Information provided by respondent was treated with high confidentiality and the information provided was used for the research purpose only.

In conducting this study due consideration was made to avoid plagiarism by ensuring that other people's works used in both the proposal and research report were duly acknowledged and proper citations documented.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter presents the findings of the study, which have been discussed under thematic and sub-thematic areas in line with study objectives. The thematic areas include: demographic characteristics of respondents, the extent to which technical inputs influence smallholder farmers access to markets, examine how physical infrastructure influence smallholder farmers on access to markets, the extent to which support institutions influence smallholder farmers access to markets and the extent to which technical information influence smallholder farmers' access to markets. These results are summarized in the following sub-sections.

4.2 Questionnaire Return Rate

Poor response rates reduce sample size, and consequently the precision, and are a potential source of bias, lessening the confidence with which findings can be accepted and generalized. The study targeted 200 farmers for interviewing but only 196 farmers were interviewed giving a response return rate of 98%. The researcher did not find the 4 respondents in their homes or farms at the time scheduled for interview. On subsequent follow-up the researcher was informed that the respondents had travelled out of the district during the period of data collection exercise. The study managed to get this response rate due to the good organization of the field work after learning from the pilot survey. It was possible to achieve this high response rate because most respondents were informed prior to the interview dates through the area

assistant chiefs and project officers from ICS-Africa. This return rate was acceptable since it was above the 65% return rate recommended by Amin (2005).

4.3 Demographic Characteristics of the Respondents

Demographic information was collected in relation to age, level of education, gender, and marital status, land size owned by the farmers and how long the respondents have been involved in farming. The results are presented in the following sub-sections.

4.3.1 Distribution of Respondents by Gender

Gender implies socially constructed roles, behavior, activities and attributes that a particular society considers appropriate for men and women. It was appropriate to determine the gender balance among farmers and relate it access to market. This is because gender of the head of the household determines decisions as what crop type is grown which greatly determines market access. Gender of the respondents was observed by the researcher and noted down.

Table 4.1:

Distribution of Respondents by Gender

Gender	Frequency	Percentage
Male	143	73
Female	53	27
Total	196	100

n=196

The results in Table 4.1 show the respondents distribution by gender. The study found out that out of the 196 farmers who participated in the study, majority of

respondents 143(73%) were male while only 53(27%) of respondents were female. The findings show that the views of both genders on factors influencing smallholder access to markets were included. This finding on smallholder farmers, access to markets could mean that men dominate what crops or farm enterprises are adopted by the families. The finding in this study concurs with the findings of Lyne (1996) on establishing the basis for transforming development agriculture. He asserted that over 70% farmland in rural Africa is owned by men while women only have user rights in the same lands. He found out that women farmers unlike men frequently lack access to market information and technology inputs and this affects farm output marketed.

4.3.2 Distribution of Respondents by Age

The study asked respondents about their ages, the ages were important for the study because this could determine their experience in adoption of productivity enhancing inputs as well as adoption of high labor intensive farm enterprises. The age of the farmer could also influence risk taking on new farm technologies. The older generation generations are likely to have savings and other asset base which they could use to buy inputs compared to the younger generations. The respondents were asked to state their ages and results of age category of farmers is presented in Table 4.2

Table 4.2:

Distribution of the Respondents Age

Age group	Frequency	Percentage
15-20 years	0	0
21-30 years	16	8
31-40 years	86	44
41-50 years	43	21
51-60 years	39	20
61 and above	12	6
Total	196	100

n=196

The results in Table 4.2 show the distribution of respondents by age. The study found that out of the 196 farmers who participated in the study, no farmer was aged between 15-20 years, 16(8%) of farmers were aged between 21-30 years, 86(44%) of respondents were aged between 31-40 years, 43(21%) of farmers were aged between 41-50 years, 39(20%) of respondents were aged between 51-60 years and only 12(6%) of farmers were aged 61 and above years.

The study revealed that there should be high farm production since the majority ages of between 31-50 years (65%) are the most productive ages of any sector. This could be attributed to the fact that land in this area is predominantly inherited from the family and older members take ownership for sometimes before land is given to the younger generation. The findings of this study concurs with Manfred *et al.*, (1997), who in his study on determinants of technology adoption

asserted that the age of a farmer is expected to influence the technology adoption in any direction depending on his position in the life cycle, level of education and experience. Younger farmers are more likely to be interested in adopting farm enterprises and technologies that are geared towards commercial agriculture if they are not constrained by limited financial resources, while older farmers are less likely to take up new technologies and farm enterprises if they require more physical labour. From these findings majority of farmers 168(85%) should be actively involved in production and accessing markets.

4.3.3 Marital status of Respondents

It was necessary to determine the marital status of the respondents and relate it to the access to markets. Marital status is a significant determinant since it influences the amount of family investment. Many households invest into the family farms with income from off-farm sources. Such incomes could determine the amount of farm produce for home consumption and surplus for markets. The respondents were asked to state their marital status and their responses are summarized in Table 4.3

Table 4.3

Distribution by of Respondents Marital Status

Marital Status	Frequency	Percentage
Single	5	3
Married	161	82
Widowed	23	12
Separated	7	4
Total	196	100

n=196

The results in Table 4.3 show the marital status of respondents. The study found that of the 196 farmers, who participated in the study, majority of the respondents 161(82%) were married, 23(12%) of the respondents were widowed, 7(4%) of the respondents were separated and only 5(3%) were singles. This finding could mean that majority of farmers in this division must be able to access markets to buy technical inputs such as fertilizer and certified seeds to enable families produce enough food for home consumption and to sell surplus production to the market to meet other family needs such as clothing, education, medical care among others. This finding concurs with Orden (2004) whose study on agricultural markets and the rural poor found that rural agriculture is dominated by family labour comprising of 81% of farming households.

4.3.4 Level of Education of Respondents

The study sought to know the level of education as it is believed that those with higher level of education would have more exposure to what is emerging in

agricultural innovations resulting into higher per acre and that the level of education dictates the ability of a person to understand and assimilate concepts and adopt new technologies. On the level of education, the respondents were asked to indicate the highest level of education they have attained. The respondents were presented with a question asking them to state the highest level of education they have attained and their responses were summarized in the Table 4.4 below.

Table 4.4

Distribution of Respondents Level of Education

Highest Level of Education	Frequency	Percentage
Non	8	4
Primary	131	67
Secondary	41	21
Tertiary college	16	8
University	0	0
Total	196	100

n=196

The results in Table 4.4 show the level of education of the respondents. The study found that of the 196 respondents who participated in the study majority of the respondents 131(67%) had primary education as the highest level of education they have attained, 41(21%) have secondary level of education, 16(8%) of the respondents had tertiary education, no respondent had attained university education and only 8(4%) of the respondents had no education. The findings also indicate that only 57 farmers representing 29% had qualification above secondary level of education. This

is an indication that most of people who have higher education qualification do not show a lot of interest in smallholder farming. This could also be as a result of many feeling that smallholder farming does not provide good earnings. The level of education among respondents influences farmers ability to take risks associated with commercial agriculture. This concurs with observation by Tilman *et al.*, (2002) that the level of education is a significant factor in facilitating awareness and adoption of agricultural technologies. The finding of this study indicates that majority 131(67%) of farmers have only attained primary level of education, they are unlikely to adopt technical farming technologies. Equally they are unlikely to access markets that require technical consumer preference analysis.

4.3.5 Land Sizes owned by Respondents

It was necessary to determine the land sizes owned by the respondents and relate it to the access to markets. Land size is a significant determinant since the amount of land under farming determines the amount of farm produce for home consumption and surplus for markets. The amount of land owned by the farmer also dictates the types and number of farm enterprises a farmer can engage in profitably. The respondents were asked to state the sizes of their farmland in acres and their responses are summarized in Table 4.5

Table 4.5

Land Sizes Owned by Respondents

Land sizes	Frequency	Percentage
Less than 1 acre	33	17
1-2 acres	81	41
2-5 acres	63	32
More than 5 acres	19	10
Total	196	100

n=196

The results in Table 4.5 show the land sizes owned by respondents. The study findings shows that majority of farmers who participated in the study 81(41%) had between 1-2 acres, 63(32%) of the respondents had between 2-5 acres of land, 33(17%) of the respondents had less than 1 acre and only 19(10%) of the respondents had more than 5 acres of land. This concurs with the findings of Nyoro (2009) who observed that over 80% of rural smallholder farmers own less than less than 5 acres of land. This could mean that many smallholder farmers in the division do not invest much in commercial farming and hence do not benefit from agribusiness. This also concurs with assertion by Bagamba (2005), in his survey study on allocative efficiency in the banana sector in Uganda found 70% of farmers with larger farm size are encouraged to invest in productivity enhancing inputs with effective returns to investment compared to only 14% of farmers with land holdings less than 2 acres of land. The small land sizes owned by farmers in this division will mean that farmers must stop relying on rain-fed agriculture, access input and produce markets to invest

in productivity enhancing technical inputs and irrigation equipment and farmers should have adequate technical information to enable them adopt only farm enterprises with high gross margins.

4.4 Technical Inputs on Smallholder Farmers Access to Markets

The study further sought to establish from the farmers whether they use productivity enhancing farm inputs. The component of farm inputs included fertilizers and certified hybrid seeds. The first objective of the study was to establish the extent to which technical inputs influence smallholder farmers' access to markets in Navakholo division. Use of fertilizer coupled with certified hybrid seeds improves farm productivity more than three folds (Nyoro, 2009). Smallholder farmers are known to continuously intensively cultivate their farms resulting rapid loss of nutrients for their crops. Use of fertilizer quickly replenishes the lost nutrients. This objective was further discussed in the following sub-themes:

4.4.1 Use of Fertilizer by smallholder farmers

To understand influence of technical inputs to smallholders' access to markets it was necessary to determine use of fertilizer among the respondents. The use of fertilizer in crop production results into high yields that will enable farmers to supply sufficient quantities to the market. The study sought to establish the proportion of farmers who are applying fertilizer in their farms. Respondents were asked to state whether or not they have been applying fertilizer in their farms and the responses obtained are contained in the Table 4.6

Table 4.6

Use of Fertilizer by smallholder farmers

Responses	Frequency	Percentage
YES	57	29
NO	117	60
Sometimes	22	11
Total	196	100

n=196

The results in Table 4.6 show use of fertilizer by respondents. The use of fertilizer among smallholder farmers in the division as revealed by the study is low. Majority of farmers 117(60%) did not use fertilizer, 22(11%) of respondents sometime apply fertilizer in their farms and only 57 (29%) of respondent applied fertilizers in their farms. This low rate of fertilizer use among respondents could mean that farmers are constrained and cannot produce sufficient for home consumption and still remain with some surplus to take to the market. The resultant effect could mean that even where there exists market that offers good prices of produce, farmers are unlikely to benefit. The low number of farmers applying fertilizer in their farms means that farmers are producing little that cannot meet home food need and still have some surplus for the market. On this account this study can conclude that majority of farmers in the division are not accessing the produce markets because they cannot produce sufficient products to satisfy market demands. This finding concurs with Jayne *et al.*, (2005) whose study on effects of agricultural commercialization on food

crop input use and productivity in Kenya where they found that the rate of fertilizer use among smallholder farmers in sub-Saharan Africa is low at 12%.

4.4.2 Reasons for not Using Fertilizer

Smallholder farmers’ access to inputs such as fertilizer is key to understanding input market dynamics. The study also sought to establish why some farmers are not using fertilizer to improve their crop yields. Understanding the reasons why some farmers find were unable to use fertilizer was critical because the government has been distribution subsidized fertilizers to smallholder farmers throughout the country in the last five years. The study sought to establish the reasons that hinder some farmers from using fertilizer. Farmers who stated that they are either sometimes using or are not using fertilizer in their farms were asked to state reasons why and the responses obtained from such farmers are contained in the Table 4.7

Table 4.7

Reasons for not Using Fertilizer

Statements	Frequency	Percentage
Cannot afford	125	90
Don’t know how to use	4	3
Fertilizer not locally available	10	7
Total	139	100

n=196

The findings in Table 4.7 show reasons why some respondents were either not using fertilizer or only using fertilizer sometimes in their farms. The study found that 125(90%) of the respondents were not using fertilizer because of they could not afford

it, 10(7%) did not use fertilizer because fertilizer was not locally available and only 4(3%) of respondent were not applying fertilizers in their farms because of lack of knowledge of fertilizer application. The inaccessibility of fertilizer could be attributed to the high cost of fertilizer. It could also mean that farmers find the cost of fertilizer in rural areas high during planting seasons. This study reveals that smallholder majority of farmers in Navakholo division are having difficulties in acquiring technical input due to the high cost of fertilizer in the local markets despite the government input subsidy scheme. This confirms earlier findings by Eicher (1999) which was a longitudinal survey on fertilizer use by smallholder farmers in Malawi. He found that 68% of farmers were unable to use fertilizer in the beginning of the government subsidy scheme. Two cropping seasons later by increased to 89% and he attributed this high rate of fertilizer use among smallholder farmers to effective fertilizer subsidy schemes by the government

4.4.3 Use of Certified Seeds by smallholder farmers

Smallholder farmers' market access is determined to a great the type of crop the farmer planted. The smallholder families can only sell crops to the market when they are able to produce enough food for their household consumption and have some surplus for the market. Crop yield depends on whether the farmer has planted the right seed variety for a given agro-ecological zone. Such seed varieties are usually hybrid certified seeds produced by government accredited seed companies and sold to farmers through agro-dealers. To further understand smallholder farmers' access to markets the study sought to establish the proportion of farmers who are using certified

seeds in their farms. Farmers were asked to state whether they use certified seeds in their farms and the responses obtained are contained in the Table 4.8

Table 4.8

Use of Certified Seeds by smallholder farmers

Responses	Frequency	Percentage
YES	27	14
NO	108	55
Sometimes	61	31
Total	196	100

n=196

The results in Table 4.8 show use of certified seeds by respondents. Based on the findings in table 4.8, the study established that 108 (55%) of the respondents did not use certified seeds, 61(31%) of the respondents sometimes uses certified seeds and only 27(14%) of respondent used certified seeds in their farms. This low number of farmers consistently using certified seeds among respondents could mean that farmers are either using recycled seeds regenerated from their farms or buying regenerated seeds from the open markets. Such seeds do not give good yields sufficient for home consumption and surplus for the market. The resultant effect could mean that the quantity and quality of produce are low such that even where there exists market that offers good prices for the produce, farmers are unlikely to benefit much. The impact of this finding therefore is that majority of farmers in Navakholo division are unable to access markets because they cannot produce high quality produce demanded by supermarkets and high end consumers in the nearby Kakamega town. This finding is

consistent with Jayne *et al.* (2005) in their study on smallholder maize hybrid uptake in Zimbabwe where they found that only about 40% of smallholder farmers grow maize hybrids.

4.4.4 Reasons for not Using Certified Seeds

Smallholder farmers' stand to gain immensely when they use certified seeds because such seeds are likely provide very good yields. Access to inputs such as certified seeds is key to understanding input market dynamics. This study also sought to establish why some farmers were unable to consistently or not using certified seeds to improve their crop yields. Understanding the reasons why some farmers were unable to use certified seeds was critical because the government through Kenya Agricultural Research Institute is currently carrying out certified seed bulking program among smallholder farmers in the division such reasons as advanced by farmers could be used by policy makers to accelerate rapid seed bulking. Farmers who stated that they were either sometimes using or were not using certified seeds in their farms were asked to state reasons why and the responses obtained from such farmers are contained in the Table 4.9

Table 4.9

Reasons for not Using Certified Seeds

Statements	Frequency	Percentage
Cannot afford	117	69
Hybrid seed not locally available	51	30
Do not know appropriate varieties	1	1
Total	169	100

n=196

The findings in Table 4.9 show reasons why some farmers are unable to use certified seeds. The study revealed that 117(69%) of the 196 farmers who participated in the study were not using certified because of they cannot afford, 59(30%) did not use certified seeds because they are not locally available and 2(1%) of respondent were not using certified seeds in their farms because they lacked knowledge. The high cost of seeds could be attributed to absences of seed subsidy unlike the case of fertilizer input subsidy being promoted by the ministry of agriculture through National Cereal and Produce Board. It could also mean that farmers find the cost of seeds in rural areas high during planting seasons due to unregulated input prices. This confirms earlier findings by Jayne *et al* (2005) that in Malawi 87% of smallholder farmers have adopted use of hybrid maize seeds due to government subsidy schemes. The impact of the findings of this study is that the high cost of certified seeds hinders farmers' access to input markets. Equally the widespread use of uncertified seeds occasioned by the high cost of certified seeds in the market prevents farmers from producing high value

crops that meets quality standards required by such reliable markets as supermarkets in the nearby Kakamega town.

4.4.5 Opinion of Respondents on What Influences Input Prices

The study established that farmers know that the high cost of technical inputs such as fertilizer and certified seeds is the main reason why they are unable to use technical inputs. It was also important to establish what farmers believe is the cause for high cost for the inputs. Understanding this causal factor would be important in determining whether there are remedial actions that farmers can take to so that the costs for inputs are brought down. Farmers were asked that in their opinion, what do they believe causes high input costs and the responses obtained from respondents were contained in the Table 4.10.

Table 4.10

Opinion of Respondents of Causes of High Input Costs

Statements	Frequency	Percentage
Transportation costs	118	60
High demand over supply	45	23
Supplier monopoly	33	17
Total	196	100

n=196

The results in Table 4.10 show opinion of respondents on the causes the high input prices. The study established that out of the 196 farmers who participated in the study, 118(60%) attributed the high input cost to high transportation cost, 45(23%) of respondents attributed the high cost of inputs to high input demand during planting

while only 33(17%) of respondent said the high cost of inputs is due to monopoly of input suppliers. This high number of farmers attributing the high cost of inputs to high cost transportation could mean that transport cost is high due to poor state of roads. The resultant effect could mean that farmers use recycled seeds regenerated from own farm which results into low quantity and quality of produce that even where there exists market that offers good prices for the produce, farmers are unlikely to benefit much. This finding concurs with Nyoro *et al.*, (2005) in his study about determinants of transactional costs in rural markets among rural dairy farmers in Kenya where he asserted that high transportation costs prevent farmers from delivering milk to dairy cooperatives thereby selling their produce at throw away prices to middlemen. High transaction costs are caused, *inter alia* by poor infrastructure and communication services (Kirsten, 2003). Transaction costs results form information inefficiency and institutional problems such as lack of formal markets (Makhura, 2001). This finding therefore means that majority of farmers are unable to access input markets.

4.5 Physical Infrastructure on Smallholder Farmers Access to Markets

Physical infrastructure such as access motorable roads and good storage facilities at farm level are necessary in facilitating smallholder farmers' access to markets. Good roads ensure that farm produce reached the market on time and more often than not transporters are likely to charge lower transportation cost on tarmac roads than bad roads. Transportation costs also determines the number of farmers who would transport and sell in distant markets as well as the amount of farm produce that farmers can take to the market. Good storage facilities also ensure that farmers are able to keep their produce for longer periods of time as they wait for seasonal markets

without losing quality of their products. This objective was further discussed in the following sub-themes:

4.5.1 Smallholder Farmers Who Sell Farm Produce

The study established how many farmers were selling their produce to any market. This was important to demonstrate that farmers are engaged in agribusiness but are facing challenges. The study sought to establish if proportion of farmers engaged in commercial agriculture and farmers were asked to state whether or not they sell produce to the market. The responses obtained are contained in the Table 4.11

Table 4.11

Respondents who Sell their Produce to the Market

Responses	Frequency	Percentage
YES	100	51
NO	96	49
Total	196	100

n=196

The results in Table 4.11 show number of respondents who sell farm produce after harvesting. The study established that 96(49%) of respondents do not sell their produce. This modest number of farmers who sell their harvest to the market could be because not many farmers are producing sufficient food for domestic consumption and surplus for sale in the market. This state of affairs can also be attributed low yields occasioned by non use of productivity enhancing inputs such as fertilizer and certified seeds. This study finding confirms earlier finding by Kodhek (2005) in his study about marketed maize surplus among rural smallholder farmers in western Kenya

where he found that on 48% of farmers produce enough maize for home consumption and sell the surplus to the local markets.

4.5.1 Period after Harvesting When Smallholder Farmers Sell Produce

Post harvest handling practices of farm produce determines whether farmers get better prices for their produce. When farmers sell their produce immediately after harvest, the farm gate prices tend to be low since most the supply tend to outstretch demand since most farmers harvest nearly at the same time. Farmers who are able to keep their produce longer get better prices for their produce. It was therefore necessary to establish from the farmers who sell their produce the period farmers take with the produce before they sell after harvesting. Respondents were asked to state how long they take with the produce before they take them to the market and the responses obtained are contained in the Table 4.12

Table 4.12
When Farmers Sell Produce after Harvest

Statements	Frequency	Percentage
Immediately after harvest	80	80
One month after harvest	10	10
Two months after harvest	7	7
Three months after harvest	3	3
Total	100	100

n=196

The results in Table 4.12 show the number of respondents and period within which they sell produce after harvesting. From the findings, the study revealed that

80(80%) sell part of their produce immediately after harvesting 10(10%) of farmers sell their produce one month after harvesting, 7(7%) of respondents sell their produce two months after harvesting and only 3(3%) sell their farm produce three months after harvesting. The high number of farmers who sell produce immediately after harvesting could be attributed to lack of proper storage facilities. It could also point out that farmers receive very low prices since at that time nearly every farmer is selling his produce and the supply may exceed the demand. Lack of on-farm structures such as store rooms to keep their produce after harvesting constitute a barrier to entry into agricultural markets since emphasis of buyers is quality. This confirms assertions by Bienabe *et al.*, (2004), that access to storage facilities increases farmers flexibility in selling their products as well as their bargaining power. This also means they are not able to add value to the produce and therefore are not able to access better markets provided by high-end consumers and supermarkets in the nearby Kakamega town.

4.5.2 Where Farmers Sell Produce

Produce market access is determined by the customers who buy from the farmers or the location of the physical market where producers take their products. Among smallholder farmers a number of players are involved and such market players influences the price farmers receive for their produce. To determine whether farmers sell to lucrative market and get good return for their produce the study found it necessary to establish to whom or which markets the farmers prefer to sell their products. Respondents were asked to whom or where they were selling or would prefer selling their produce. The responses obtained are contained in the Table 4.13

Table 4.13

Where Farm Produce is Sold

Statements	Frequency	Percentage
Middlemen at farm gate	125	64
Nearby shopping center	69	35
Lucrative distant big markets	2	1
Total	196	100

n=196

The results in Table 4.13 show the preferred markets where respondents sell or would sell their farm produce after harvesting. Out of the 196 farmers who participated in the study, 125(64%) sell or would sell their produce to the middlemen at the farm gate, 69(35%) of farmers sell or would sell their produce at the nearby local markets after harvesting and only 2(1%) of respondents sell or would their produce to the traders in the distant lucrative big markets. The high number of farmers who sell produce immediately at the farm gate or nearby local shopping centers could indicate that farmers prefer selling their produce in the nearby markets due to high transportation costs and lack of market information thereby settling for the exploitative prices offered by middlemen and brokers in the local markets. This finding is in agreement with Ortman (2002) who carried out study on Industrialization of Agriculture and the role of supply chains in promoting competitiveness in South Africa. He asserted that lack of market information consign farmers into selling to middlemen at exploitative farm gate prices.

4.5.3 Reasons Why Farmer Sell Produce to Particular Markets

Farmer sell or would sell their produce to specific preferred customers. This choice of who to sell to influences the type of enterprises the farmer adopts and even the amount the farmer produce to satisfy such market. Buyers also determine the quality of products they want from the farmers and all these would compel farmers to seek technical information regarding quantity and quality of products required. It was necessary to establish reason farmers have for selling their produce to particular markets and the respondents were asked to what reasons makes them sell to the preferred markets. The responses obtained are contained in the Table 4.14

Table 4.14

Reason for Selling to Specific Buyers or Markets

Statements	Frequency	Percentage
Transport cost to other markets is high	90	46
Offers better price than others	28	14
Have no market information about other markets	78	40
Total	196	100

n=196

The results in Table 4.14 show the reasons farmers have for selling to preferred markets after harvesting. Majority of farmers 90(46%), indicated that their choice of customers is influenced by high transportation cost that hinders them from selling to other market, 28(14%) farmers prefer selling at their current customers because the current markets offers better prices and 78(40%) of farmers cannot sell elsewhere

because they do not have market information. Transportation costs and lack of information appears to be the major constraints that hinder farmers from accessing markets that offers good prices. This finding is in agreement with assertion by Ahmed (1992) who carried out study on Industrialization of Agriculture and the role of supply chains in promoting competitiveness in South Africa. He found that poor rural infrastructure increases transaction cost because transporters charge high costs thereby inhibiting smallholder farmers from selling to lucrative distant thereby confining farmers into selling to middlemen at exploitative farm gate prices.

4.6 Support Institutions for Small holder Farmers Access to Markets

Support institutions such as farmer groups are important vessels through which farmers receive extension services and vital market information. Farmer groups are also critical for accessing both input and produce markets. When farmers come together to buy input in bulk they are likely to acquire such inputs cheaply since bulk buying is cheaper than farmers would have purchased such inputs individually. Farmer groups can also enable farmers to reduce cost of transportation if they transport in bulk together thereby resulting in higher margins. This objective was further discussed in the following sub-themes:

4.6.1 Farmers Involvement with Farmer Group Activities

The study sought to establish whether farmers in the division are organized into farmer groups where members can derive economic benefits accruing to members. Where smallholder farmers act individually, they are likely to find government extension services more expensive because more often than not farmers seeking government extension services are asked to meet transportation cost for the

technical officers. Respondents were asked to state whether or not they belong to farmer groups and the responses obtained are contained in the Table 4.15

Table 4.15
Farmers Involvement with Farmer Group Activities

Responses	Frequency	Percentage
YES	37	19
NO	159	81
Total	196	100

n=196

From the results in Table 4.15, the study revealed that majority of smallholder farmers in Navakholo division do not belong to farmer groups. The study established that out of the 196 farmers who participated in the study, only 37(19%) of respondents interviewed belonged to farmer groups and the large majority 159(81%), do not belong to farmer groups. The high number of farmers who do not belong to farmer groups could point out that farmers in the region do not benefit from economies of scale of pooling resources to buy inputs collectively and/or better produce prices from collective bargaining. It could also mean that smallholder farmers in this division are not able to collectively bargain to secure farm credits cheaply from financial institution. This study confirms earlier assertions by Chamala, (1995) in his study on group effectiveness in service provision among smallholder farmers in Ghana. He found that credit is elusive to smallholder agriculture mainly because of absence of formal structures such as farmer groups and cooperatives to be used for financing

smallholder farming. This finding reveals that large number smallholder farmers in this division cannot competitively access both input and farm produce markets.

4.6.1 Reasons why Smallholder Farmers Join Farmer Groups in Relation to Market Access

The primary reason why farmers come together is either to form producer groups, marketing groups or combination of both. Smallholder farmers stand to benefit when they form farmer groups because it increases their bargaining capacity and they are likely to attract credit inputs and extension services than when they are acting individually. It was key to establish what motivate farmers to join support institutions such as farmer groups so that development agencies working in the division enable members achieve their ambitions the by strengthening the farmer groups. The study sought to establish whether farmers attach strong economic benefits to joining farmer groups. Farmers were asked to give their opinion on what value they attach to joining farmer groups and the responses obtained are contained in the Table 4.16.

Table 4.16

Farmers Reasons for Involvement with Farmer Group Activities

Responses	Frequency	Percentage
Communal labor	6	3
Accessing farm credit	3	1
Collective marketing	4	2
Receiving extension services	15	8
Other social benefits	168	86
Total	196	100

n=196

The results in Table 4.16 show the why farmers would join farmer groups. The findings of this study disapproved popular belief that smallholder farmers come together only for economic reasons. The study found that of the 196 farmers who participated in the study 168(86%) would join farmer groups because they anticipate to derive social benefits rather than economic benefits, 15(8%) of respondents would join farmers groups to get extension services, 4(2%) of respondents would join farmer groups for collective marketing, 6(3%) of respondents would join farmer groups in order to benefit from communal labor and only 3(1%) of respondents would join farmer groups for purposes of accessing farm credits. From the finding it can be deduced that many farmers in the division are not members of farmer groups because they do not attach any economic value to membership of a farmer groups. This study results concurs with another study carried out by Kodhek (2005) among small holders

in Rachuonyo district where he found out that 78% of rural farmers favors joining social welfare groupings than joining farmer groups.

4.7 Technical Information and influence on Smallholders Access to markets

Acquisition of technical inputs such as fertilizer and certified seeds is not an end in itself. Farmers may have inputs but lack technical skills on how to use these inputs. Farmers can only acquire technical skills when they are getting technical information on production and marketing. A lot of smallholder farmer are bound to suffer losses or will accept low prices because they are unable to know what prices other markets are offering. It was necessary to establish how technical information to the farmers affects smallholder access to the markets. This objective was further discussed in the following sub-themes:

4.7.1 Sources of Technical Information to Smallholder Farmers

Smallholder farmers can only effectively participate in the market when they are producing crops that are targeting particular markets. Source of such information is key because technical information provide guidance to the farmer on the right farm investment to adopt. The study sought to establish sources of technical information to smallholder farmers and their influence on access to markets. The respondents were asked to state where they get input or market information and the responses obtained are contained in the Table 4.17.

Table 4.17

Sources of Technical Information to Smallholder Farmers

Responses	Frequency	Percentage
Friend/neighbors	6	3
Traders	25	13
Private Extension service providers	51	26
Radio/television	110	56
Chiefs <i>barazas</i>	4	2
Total	196	100

n=196

The results in Table 4.17 show the where farmers get input and market information. From the study findings farmers do not seek information or learn much from neighbors or local forums such as chiefs baraza. Out of the 196 respondents who participated in the study 6(3%) of respondents interviewed got market information from friends and neighbors, 25(13%) of respondents got market information from traders, 51(26%) of respondents get information from private extension service providers and the majority of respondents 110(56%) rely on radio to get production and market information. From the finding it can be deduced that farmers in the division do not have sufficient access to critical production information that would accelerate technology adoption through practical demonstration in farmer field schools. The market information famers get from uncertified sources other players such as friends and traders in the value chain only reduces their chances to trade their

products efficiently and to derive full benefits from their marketable part of their production because such information tend to be biased since such actors exhibit opportunistic behaviors. This finding concurs with the findings of Rollings (1998). In his study about government extension services in third world countries, he noted that in many developing countries, extension services lack the human resource capacity to reach the critical mass of their target audience effectively.

4.7.2 Smallholder Farmer Contact with Government Extension Officers

Smallholder farmers' participation requires that farmers get updated information to conform rapidly changing consumer demands. New farming technologies keep on emerging and farmers require regular credible sources of information. It was necessary to establish how regular farmers in the division get into contact with reliable source of production and market information - government extension officers. The study sought to establish how regular farmers in the division get into contact with government extension officers. Regular contact with government extension officers ensure that farmers get unbiased updated technical information that enable them make production and market decisions. Farmers were asked how often they get visited by the government extension officers and the responses obtained are contained in the Table 4.18.

Table 4.18

Farmers Contact with Reliable sources of Production and Market Information

Responses	Frequency	Percentage
Every month	20	10
Irregularly	49	25
Never	127	65
Total	196	100

n=196

The results in Table 4.18 show the reason why farmers would join farmer groups. The study found that 127(65%) of the respondents who participated in the study were never visited by government extension officers, 49(25%) of respondents were irregularly visited by extension officers and only 20(10%) were regularly visited every month by government extension officer. From the findings, it can be deduced that a critical mass of most farmers lack technical guidance that would enable them adopt new market oriented production technologies. This therefore greatly limits farmers' access to markets in Navakholo division. This study confirms the findings by Okoko (1999) who conducted a survey research on participatory evaluation of ground nut production in south west Kenya and found that regular contact with extension agents accelerated new farming technology adoption among farmers.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings, conclusions, recommendations and suggestions for further research and contribution to the body of knowledge.

5.2 Summary of Findings

The objectives of this study were to established the extent to which technical inputs affects smallholder farmers' access to markets, to establish the extent to which technical inputs affects smallholder farmers access to markets, to examine how physical infrastructure affects smallholder farmers on access to markets, to assess the extent to which support institutions affects smallholder farmers access to markets and to establish the extent to which technical information affects smallholder farmers' access to markets in Navakholo division.

In this research a total of 196 respondents were subjected to the actual study out of which only 45 (23%) were women and 151(77%) were men. It was quite clear that most of the families in Navakholo division are headed by males like have been researched and confirmed as happening in other African communities (Kodhek, 2005). The research has confirmed that most of farmers, 114(58%) are smallholder farmers owning with land holding of less than 2 acres. In terms of age, 169(65%) of farmers are aged between 30-50 years meaning that majority of the farmers fall within the most economically active age groups who are capable in engaging in commercial farming activities.

On the influence of technical inputs, the study found that a vast majority of farmers 57(29%) did not apply fertilizer in their farms while only 27(14%) of farmers use certified seeds. High cost of fertilizer was cited by 176(90%) of the farmers as the main reason why they are not applying fertilizer, 14(7%) of farmers cited unavailability of fertilizer in the local markets while only 6(3%) of the respondents said that they do not use fertilizer due to lack of knowledge. Only 27(14%) of respondent were using certified seeds while 168(86%) of farmers interviewed did not use certified seeds. Majority of farmers 135(69%) again said that they do not use certified seeds due to high cost. A good proportion of farmers 118(60%) attributed the high cost of inputs to high cost of transportation while only 33(17%) attributed the high cost to monopoly.

In the objective two, the study found that 100(51%) of farmer sell part of the produce while 96(49%) did not sell their produce. Farmers interviewed indicated that 256(80%) of farmers sold their produce immediately after harvest, 20(10%) sold after one month, 14(7%) of farmers sold after two months and only 6(3%) of farmers sold their produce three months after the harvest. Farmers gave reasons for selling to particular markets; 90(46%) of farmers cited lack high transportation costs to other markets, 28(14%) of farmers sell in those particular markets because they offer better price and 78(40%) sell to the particular markets because they do not have market prices in other markets.

In the objective three the study found out that majority of farmers at 159(81%) did not belong to farmer groups, only 37(19%) were members of farmer groups. the study also revealed that farmers join farmer groups for various reason; 168(86%) of

interviewed respondents would join farmer groups for social benefits, 15(8%) of respondents would join farmer groups to access extension services and only 13(6%) of respondents would join farmer groups for agribusiness reasons.

In the fourth objective, the study found that majority of farmers at 110(56%) depended on neighbors and friends to get production and market information, 25(13%) of farmers got on local traders to get technical information, 25(13%) of farmers received technical information from private extension service providers and only 4(2%) of farmers received technical information from government info structure.

5.3 Conclusions

Few farmers from Navakholo division are benefiting from the government input subsidy scheme. The presence of lucrative produce market in the nearby Kakamega town has not stimulated and does not influence what farmers in Navakholo division grow in their farms. Instead, farmers in the division provide huge market for food traders from Kakamega town.

Few farmers from Navakholo division are benefiting from the government input subsidy scheme. The presence of lucrative produce market in the nearby Kakamega town has not stimulated and does not influence what farmers in Navakholo division grow in their farms. Instead, farmers in the division provide huge market for food traders from Kakamega town.

The cost of farm input in Navakholo division fluctuates with the season of the year. Input prices is high during rainy season when farmers need them most and low during the sunny season when farmers do not require farm inputs. This seasonality

price fluctuation affects farmers' ability to increase production beyond home food consumption thereby limiting smallholder participation in farm produce markets.

Many farmers in Navakholo division could be missing out on the extension services provided by government and non government institutions that work with farmer through farmer groups. The farmers are also likely to miss out from benefiting from financial institutions which uses farmer groups to advance input credit facilities to farmers since group members are used as guarantors for such input credit facilities.

With regard to technical information, farmers in Navakholo division are not adopting new market oriented production technologies since they have limited contact with credible research and extension institutions such as ministry of agriculture extension workers. Farmers are also not getting good prices for their produce because they lack reliable regular market information.

5.4 Recommendations

Based on the findings and conclusions drawn above, this study makes the following recommendations:

1. The first objective established the extent to which technical inputs affects smallholder farmers' access to markets. The study recommends that the Ministry of Agriculture should use the divisional agricultural offices as the distribution centres since the current collection centres at the NCPB are far away from farmers making accessing the subsidized fertilizer more costly due to transportation costs. The current government input subsidy scheme should also include certified hybrid seeds other than fertilizers only.

2. In the second objective the study examined how physical infrastructure affects smallholder farmers on access to markets. The study recommends that the National Cereals and Produce Boards should buy farm produce especially grains from administrative locational centres to enable farmers benefit from the better prices NCPB offers to large scale farmers who are able to transport produce to NCPB depots. This will also minimize transportation costs that farmers incur while taking their produce to the markets. The study further recommends that farmers' capacity should be strengthened to adopt post harvest handling technologies that will increase the shelf life of their products to be able to be transported to distant markets.
3. In the third objective, the study determined the extent to which support institutions affects smallholder farmers' access to markets. The study recommends that institutions working with farmers should organize farmers into economically viable groups that will act as producer and marketing groups that enable farmers to benefit from bulk buying of farm inputs and transporting their produce in bulk to distant lucrative markets. This will ensure that farmers take advantage of economies of scale.
4. The fourth objective the study determined the extent to which information influences smallholder farmer market access. The study recommends that to ensure reliability and accuracy of market information government should foster public private partnership which adds value to market information delivery mechanisms. Non Government Organizations and private sector extension service providers should build capacity of farmers to demand and use market information. Extension service providers should consider involving farmers through participation on on-

farm demonstration fields hasten technology adoption and validation of indigenous technologies.

5.5 Contribution to the Body of Knowledge

Objectives	Contribution to Knowledge
<p>1 To establish the extent to which technical inputs affects smallholder farmers access to markets.</p>	<p>Despite the fact that smallholder farmers know that use of technical inputs such as fertilizer and certified seeds will give them good harvest to enable them access markets, there still exist low usage among farmers due to high input cost even with the government subsidized inputs.</p>
<p>2 To examine how physical infrastructure affects smallholder farmers on access to markets</p>	<p>Farmers are unable to participate in distant markets that offer better produce prices due to high transportation cost associated with bad conditions of the roads. The absence of good storage facilities compels the smallholder farmers to sell their products before adding value.</p>
<p>3 To assess the extent to which support institutions affects</p>	<p>Famer do not attach much economic value to belonging to farmer groups</p>

smallholder farmers access to markets	whenever they join them but they join the groups mainly for social gains
4 To establish the extent to which technical information affects smallholder farmers' access	Many farmers get market information and extension services from non state actors. There is need for government to strengthen public private partnership to accelerate technology adoption rate for improved production and marketing.

5.6 Suggestions for Further Research

Despite the findings by this study, there are some more areas that need further research to be able to understand the problems better;

1. While undertaking the study it was apparent that there are non-technical inputs that influence market access. Such inputs include farm input credit, labour and equipment used by the farmers which could determine the crop type and amount of land put under cultivation. It is therefore suggested that a similar study be undertaken on these inputs to determine their influence on market access.
2. The study suggests that further studies should be carried out to establish the influence of market provided by Kakamega town on smallholder farmers' agribusiness practices.
3. A similar study should be undertaken in the neighboring districts for comparison

This study did not delve into these issues yet such information is necessary for proper planning and implementation of agribusiness projects among rural smallholder farmers.

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APPENDICES

Appendix I: Letter of Transmittal

Abel Benard Otieno
University of Nairobi
P.O. Box 584 – 40100
Kisumu
June, 2012

Dear Sir/Madam,

RE: MASTERS RESEARCH PROJECT

I am Abel Benard Otieno, a student at the University of Nairobi, College of Education and External Studies, School of Continuing and Distance Education, pursuing Master of Arts Degree in Project Planning and Management. I am currently carrying out a study on factors affecting smallholder farmers' access to markets in Navakholo division.

You have been selected to participate in this study. The purpose of this letter is to humbly request you to participate in the study by completing the attached questionnaire. Your contribution is crucial and will ensure the success of this study. Any information provided will be treated with utmost confidentiality and will only be used for the purpose of this study.

Your assistance and cooperation is highly appreciated.

Yours sincerely,

Abel Benard Otieno

- 9 Do you use fertilizers in your farm? YES 1 NO 2
Sometimes 3
- 10 IF response in Q6 is NO or sometimes WHY? Can't afford 1
Don't know how to use 2
Fertilizer not available locally 3
- 11 Do you use certified hybrid seeds in your farm? YES 1 NO 2
Sometimes 3
- 12 IF response in Q6 is NO or sometimes, WHY? Can't afford 1
Don't know how to use 2
fertilizer not available locally 3
- 13 Do you know that use of fertilizer and certified seeds results into high yield?
YES 1
NO 2
- 14 In your opinion what do you think influences the cost of inputs to farmers in this area?
Transportation cost 1
High demand above supplies 2
Monopoly by few input suppliers 3

SECTION C: PHYSICAL INFRASTRUCTUR

(Instruction: Mark X within only one box of response provided by the respondent)

- 15 Do you sell any of your farm produce after harvest? YES 1 NO 2
- 16 To whom or where would do you prefer to sell to? At the farm gate 1
Nearby shopping center 2
At the distant markets 3

- 17 What is your reason for selling at that place? *High transportation cost* 1
Offers better prices 2
Have no information about other markets 3
Other specify 4
- 18 In your opinion how does the road in this area affect farmers from access to markets for inputs and outputs? *Increases the cost of transport* 1
Impassible during rainy season 2
Influences choice of crops 3

SECTION D: SUPPPORT INSTITUTIONS

(Instruction: Mark X within only one box of response provided by the respondent)

- 19 Do you belong to any farmer group? YES 1 NO 2
- 20 If YES what benefit do you get from your group? *Communal labor* 1
Access to farm credit facilities 2
Selling products together 3
Receiving extension services 4
Learning from group members 5
- 21 What is your reason for selling at that place? *High transportation cost* 1
Offers better prices 2
Have no information about other markets 3
Other specify 4
- 22 In your opinion how does the road in this area affect farmers from access to markets for inputs and outputs? *Increases the cost of transport* 1
Impassible during rainy season 2
Influences choice of crops 3

SECTION E: TECHNICAL INFORMATION

(Instruction: Mark X within only one box of response provided by the respondent)

19 From where do you obtain information about input and output prices?

Friends/neighbors 1 *Extension provider* 2 *Radio/ Television* 3 *Other* 4

20 How often are you being visited by extension officer?

Every week 1 *Every month* 2 *Irregularly* 4 *Never* 3

Appendix III: Focused Group Discussion Guide

1. The average farm holding under crop production in Navkholo division
2. The challenges farmers in the region face when it comes to accessing and using farm inputs
3. State feeder roads in the division and storage facilities and their affect on farmers' access to both input and produce markets
4. Sources of technical information on farming and marketing

Appendix IV: Key Informant Question Guide

1. What are some of the challenges farmers in this region encounter in improving their farm productivity?
2. What are some of the challenges farmers face whenever they market their produce?
3. Who are some of the key players in availing technical information on marketing and extension programs in this area?
4. In view of the technical constraints facing farmers how do farmers market their produce

Appendix V: Research Authorization Letter

REPUBLIC OF KENYA



NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telephone: 254-020-2213471, 2241349
254-020-310571, 2213123, 2219420
Fax: 254-020-318245, 318249
When replying please quote
secretary@ncst.go.ke

P.O. Box 30623-00100
NAIROBI-KENYA
Website: www.ncst.go.ke

NCST/RCD/14/012/1054
Our Ref:

23rd July 2012

Date:

Benard Abel Otieno
University of Nairobi
P.O.Box 825-40100
Kisumu

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "*Factors influencing smallholder farmers' access to markets: The case of international child support- Africa's Agribusiness project in Navakholo Division, Kenya,*" I am pleased to inform you that you have been authorized to undertake research in **Western Kenya Province** for a period ending **30th September 2012**.

You are advised to report to **the District Commissioner and the District Education Officer, Navakholo District** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

DR. M. K. RUGUTT, PhD, HSC.
DEPUTY COUNCIL SECRETARY

Copy to:

The District Commissioner
The District Education Officer
Navakholo District

"The National Council for Science and Technology is Committed to the Promotion of Science and Technology for National Development."
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PAGE 3

Research Permit No. NCST/RCD/14/012/1054

THIS IS TO CERTIFY THAT:

Date of issue 23rd July, 2012

Prof./Dr./Mr./Mrs./Miss/Institution

Fee received KSH. 1,000

Benard Abel Otieno

of (Address) University of Nairobi

P.O.Box 825-40100, Kisumu.

has been permitted to conduct research in

Navokholo
District
Western

Location
District
Province



on the topic: Factors influencing smallholder farmers access to markets: The case of international child support Africa's agribusiness project in Navokholo Division, Kenya.

for a period ending: 30th September, 2012.

Applicant's
Signature

Secretary
National Council for
Science & Technology