FACTORS THAT INFLUENCE IMPLEMETATION OF AGRICULTURAL PROJECTS IN ARID AND SEMI ARID AREAS IN KENYA: A CASE OF FARMERS IN HABASWEIN DISTRICT, WAJIR COUNTY, KENYA.

BY
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DECLARATION

This is my original work and has not been presented for a study in any University or college.

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This project has been submitted for examination with my approval as the University supervisor

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DEDICATION

This project is dedicated to my parents Ephraim and Irene, My wife Isabel and daughter Nicole, my siblings Noni, Tutu, Shiro and Gitau, my fellow students who provided me with emotional and material support during the draft of this project. I humbly and kindly appreciate their support and prayers that led to the completion of this project within the stipulated timeframe.

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ABBREVIATIONS AND ACRONYMS

AEZ	Agro-Ecological Zones
ASAL	Arid and Semi-Arid Land
AEZ	Agro-Ecological Zone
ALRMP	Arid Lands Resource Management Project
CBO	Community Based Organization
DFRD	District Focus for Rural Development
DSG	District Steering Group
ERSWEC	Economic Recovery Strategy for Wealth and Employment Creation
ICRAF	International Council for Research in Agro-forestry
KARI	Kenya Agricultural Research Institute
KFSM	Kenya Food Security Steering Meeting
MDGs	Millennium Development Goals
NEMA	National Environmental Management Authority
NGO	Non-governmental Organization
KACCAL	Kenya Adaptation to Climate Change in the Arid Lands

ABSTRACT

Agriculture remains the backbone of the Kenyan economy. It is the single most important sector in the economy, contributing approximately 25% of the GDP, and employing 75% of the national labour force (Republic of Kenya 2005). Over 80% of the Kenyan population live in the rural areas and derive their livelihoods, directly or indirectly from agriculture. Given its importance, the performance of the sector is therefore reflected in the performance of the whole economy. The development of agriculture is also important for poverty reduction since most of the vulnerable groups like pastoralists, the landless, and subsistence farmers, also depend on agriculture as their main source of livelihoods.

Growth in the sector is therefore expected to have a greater impact on a larger section of the population than any other sector. The development of the sector is therefore important for the development of the economy as a whole. This study was addressing the following research questions; what were the factors that influenced implementation of agricultural projects in arid and semi arid areas in Kenya? What were the measures that were taken to overcome the challenges? In methodology, the study adopted a descriptive survey. The target population for this study was the small scale farmers of Habaswein district in Kenya. The study employed stratified sampling technique to select the respondents of the study. This study utilized a questionnaire as the data collection tool. Data collected was analyzed through descriptive statistics with the help of SPSS.

The findings indicate that small scale farmers in arid and semi arid areas endeavor to excel in their farming practices for social economic sustainability regardless the challenges. It is concluded that if proper mechanisms are put in place in arid and semi arid areas, small scale farmers will realize increased productivity for local and international market consumption. It can be conclude that if the Government of Kenya puts in place appropriate farming technologies by encouraging Kenya Agricultural research Institute staff to go for further trainings in developed countries in terms of agriculture, Small scale farmers in arid and semi arid areas in Kenya will excel. Also if the Government of Kenya is in a position to introduce modern farming technology, adequate of inputs and subsidies in farm input costs (fertilizer, pesticides and seeds), small scale farmers in arid and semi arid areas will prosper in the changing farming environment globally and locally.

The study found out that quite a number of Factors influence implementation of agricultural projects in arid and semi arid areas in Kenya. Therefore, this study recommends that small scale farmers in arid and semi arid areas should embrace modern farming practices for them to survival in the dynamic farming environment. The study found out that little emphasize is put on modern farming technology by small scale farmers in arid and semi arid areas in Kenya hence poor agricultural productivity. Therefore, this study recommends that the government should recognize the importance of the small scale farmers in arid and semi arid areas by providing modern farming equipments to small scale farmers in arid and semi arid areas since their efforts contribute to food security initiatives.

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CHAPTER ONE: INTRODUCTION

1.1Introduction of the Study

This chapter outlines the background of the study, Kenyan agricultural sector, arid and semi-arid areas, Habaswein district, research problem, purpose of the study, research objectives, and research questions, significance of the study, delimitations, limitations, and assumptions of the study.

1.1.1 Background of the Study

Sustainable agriculture can be broadly defined as an agricultural system involving a combination of sustainable production practices in conjunction with the discontinuation or the reduced use of production practices that are potentially harmful to the environment (Barron et al 1999). More specifically, the Food and Agricultural Organization (FAO) argues that sustainable agriculture consists of five major attributes: it conserves resources (for example; land, water), and it is environmentally non-degrading, technically appropriate, and economically and socially acceptable (FAO 2008). In practice, sustainable agriculture uses fewer external off-farm inputs (for example; purchased fertilizers) and employs locally available natural resources, as well as purchased inputs, more efficiently (Lee 2005).

In most rural areas of the developing world small-scale farmers who cultivate a few hectares of land, small scale holders, are the basic units of agricultural production and are largely responsible for their own economic and social sustainability (Ministry of Agriculture, 2001 report). Regardless of state-level interests in larger-scale and more modern systems of production, small-scale farmers continue to comprise a substantial proportion of the population

and are responsible for much of the crop production in many developing countries (FAO 2008).

Farming system typologies are dictated by climate, production goals and culture with a farming system being described as a unit consisting of a human group (usually a household) and the resources it manages in its environment, involving the direct production of plant and/or animal products (BBS, 2006) . Over 80% of Kenya's total land surface is classified as Arid and Semi-Arid Land (ASAL), with some 8 - 10 million people, or approximately 30% of the Kenyan population. Around 60% of the ASAL inhabitants live below the poverty line (ALRMP Report, 2007), (subsisting on < one dollar a day) higher than the 50% of the country average and are adversely affected by land degradation, desertification and drought. Whilst the majority of the population is pastoralist and agro-pastoralists, farming communities have migrated into these dry lands from high and medium potential areas. This has influenced changes in land-use, subsistence economies and lifestyles.

The ASALs conjure up an image of barren unproductive lands, not worthy of development investments; and for many years these areas and their residents have been marginalized politically, socially and economically (FAO Report, 1993). However, there is substantial interest in oasis agriculture in these arid areas. Oasis agriculture is a unique phenomenon in northern Kenya that enables production within very harsh environments. Oases are also areas of dense human populations due to availability of water. Past development initiatives in ASALs have been characterized by: 1) inappropriate policies, 2) changes in traditional ways of life, 3) increasing pressure on the natural resource base, 4) security and conflict problems, and 5) poor provision of services. Analysis of the current farming systems and the underlying production constraints would form a basis of formulating appropriate management strategies for improved livelihoods in the ASALs of northern Kenya

The farming system describes what is currently being done by a group of farmers operating under certain common conditions. The system focuses on farm-household and rural community systems and their interactions with physical, socio-cultural and political environments forming the backbone of these farming systems. Farming Systems in northern Kenya can be categorized broadly following the Agro-Ecological Zones (AEZ). These describe the climate, soil characteristics, vegetation, land suitability and water resources (ALRMP Report, 2008).

In describing the climate of the area, temperature, rainfall, soil, topography and humidity have a direct relation to the farmer's situation. Temperature will affect the cropping pattern and type of livestock kept. Rainfall amount, distribution, reliability and intensity will determine the crops grown, livestock kept and soil treatment needed. Soil fertility and structure influences the cropping pattern and soil management practices. Topography attributes such as altitude, slope and soil conservation measures affect the cropping pattern the farmer will adopt while humidity will determine the pests, diseases and storage methods that the farmer will adopt. More specifically, this paper discusses the farm-household criteria based on resource base, resource utilization, production constraints and opportunities for improvement (ALRMP Report, 2008).

1.1.2 Kenyan Agricultural sector

Agriculture is the major contributor of the Kenyan economy. It is the leading economic sector, accounting for 25% of the gross domestic product (GDP) ALRMP (2008). The sector also accounts for 65 per cent of Kenya's total exports and provides more than 18 per cent of formal employment. Growth of the national economy is therefore highly correlated to growth and development in agriculture (KARI, 2008 report). Kenya's agriculture is mainly rain-fed and is entirely dependent on the bimodal rainfall in most parts of the country. A large proportion of the

country, accounting for more than 80 per cent, is semi-arid and arid with an annual rainfall average of 400 mm. Droughts are frequent and crops fail in one out of every three seasons. Kenya's agriculture is predominantly small-scale farming mainly in the high-potential areas ALRMP (2008). Production is carried out on farms averaging 0.2–3 ha, mostly on a commercial basis. This small-scale production accounts for 75 per cent of the total agricultural output and 70 per cent of marketed agricultural produce (Ministry of Agriculture Report, 2007).

1.1.3 Arid and semi-arid areas

Arid and semi-arid areas are defined as areas falling within the rainfall zones of 0-300 mm and 300-600 mm, respectively (FAO, 1987). Because of the short growing periods (1-74 and 75-119 growing days, respectively), these areas are not suitable for cultivation. Rainfall patterns are unpredictable and are subject to great fluctuations. One-year droughts are more frequent than multiyear droughts. The occurrence of drought is more frequent in the arid (lower rainfall) areas than in the semi-arid zones (KARI Report, 2008).

1.1.4 Habaswein District

Habaswein town falls under Wajir south constituency in Wajir County whose Population is 138,000 in 2009 census(disputed) but estimated real population by NGOs and other development agencies is 248,000. Wajir South is the largest constituency in size in the North Eastern Region and the second largest in the whole country. It has seasonal lakes, Seasonal rivers/streams and Agricultural valleys. The lakes are: Lake Bor, Lake Bissike, Lag Bogol, Lake Duup, Waratiris(stream),Abakfin,Ibrahim Ure,Shuub waraba,Injir,Lag Dima, Qote,Shimbirey and Quarintil. Economic activities of the population in the district are livestock keeping and small scale faming. It is evident that most of the small scale farmers face various challenges that affect their farming efforts in the region with regard to climate change (Ministry of Agriculture

Report, 2007).

1.2 Research Problem

Most farmers in semi-arid regions in Africa experience severe challenges with regard to climate change thus affecting their farming activities. Most communities living in arid and semi arid areas find it difficult to cope with situation of climate change. To increase food production based on sustainable agricultural initiatives by farmers in arid and semi arid areas has remained a major challenge in both developed and developing countries of the world. Farming projects in arid and semi arid areas have been encountering major challenges due various factors influencing the environment (ALRMP Report, 2008).

Related studies that have been carried out on factors that influence implementation of agricultural projects in arid and semi arid areas in Kenya clearly indicate that Small scale farmers in arid and semi arid areas of Kenya face several challenges when trying to adopt sustainable agricultural practices. Some of the challenges include; climate change, inadequate extension services, and use of outdated farming technology, pest and diseases, inadequate farm inputs, soil nutrient deterioration, poor infrastructure this list of challenges facing Kenyan agriculture and farmers is not exhaustive. They are however the major challenges that can be solved if effective extension and advisory services accorded to farmers especially small scale farmers.

A study carried out by Kamau et al (1989) on the drought impacts and responses in Central and Eastern Kenya indicated that there are several factors that influence implementation of agricultural projects in arid and semi arid areas in Kenya like climate change, inadequate

extension services and use of outdated farming technology. Another study carried out by Mortimore, et al (1991) on Environmental change and dryland management in Machakos District, Kenya, clearly indicate that small scale famers in arid and semi arid areas experience several challenges with regard to sustainable agriculture due to climate change influences.

However, the studies did not focus on factors that influence implementation of agricultural projects in arid and semi arid areas in Kenya. They were more general and did not focus Habaswein district as a case study. Arising from the findings of the above studies, it is evident that, there are many areas about factors that influence implementation of agricultural projects in arid and semi arid areas in Kenya that have been understudied. It is for this reason that the study sought to establish the factors that influence implementation of agricultural projects in arid and semi arid areas in Kenya.

1.6 The Purpose of the Study

The purpose of the study was to determine factors that influence implementation of agricultural projects in arid and semi arid areas in Kenya.

1.7 Research Objectives

i. To find out factors that influenced implementation of agricultural projects in arid and semi arid areas.

ii. To determine challenges faced by small scale farmers in arid and semi arid areas.

iii. To establish the measures that can be taken to overcome the challenges faced by farmers in arid and semi arid areas.

1.8 Research Questions

i. What are the factors that influenced implementation of agricultural projects in arid and semi arid areas?

ii. What are the challenges faced by small scale farmers in arid and semi arid areas?

iii. What are the measures that were taken to overcome the challenges faced by farmers in arid and semi arid areas?

1.9 Significance of the Study

NGO's supporting sustainable agriculture will find the findings of the study important as it will be to formulate appropriate strategies for sustainable agriculture in arid and semi arid areas in Kenya thus improved living standards of the population. Small scale farmers will find the study important to, as it will provide information on how they will adopt modern technologies to boost agricultural produce thus improved living standards of the population. The government will be able to understand how sustainable agriculture is essential in arid and semi arid areas thus develop strategies to overcome challenges experienced by small scale farmers in arid and semi arid areas. It will be in a position to formulate policies that are aimed at increasing productivity of agricultural produce thus food security. The development partners who are usually interested at helping the small scale farmers to prosper will have an understanding of a wide variety of factors that hinder their efforts hence sustainability and the extent to which the identified factors affect agricultural projects. The scholars and researchers who would like to debate or carry out more studies on sustainable agriculture to enhance the growth of small scale farmers will find the study important. The study will form a basis upon which further research on the same will be based. The findings will enable the researchers understand the

necessary resources which may be required in future related studies.

1.10 Delimitations

The topic of the study was driven by forces of the respondents since it added value to their life and enabled them to adapt appropriate strategies to overcome the challenges of climate change. The study relied on primary data sources to minimize biasness in the findings. The target population was small scale farmers in Habaswein district, Wajir County, Kenya. The scope of the study focused Habaswein district, Wajir County, Kenya since the district was the representative of the entire County. The study employed descriptive research methodology that was qualitative in nature due to opinions collected from respondents

1.11 Limitations

Time: The small scale farmers are usually very busy and therefore they may require a lot of time in order to fill in the questionnaires. I will ensure that I give them early so that they can get time to fill the questionnaire. Financial constraint: Financial resources are likely to affect the results of the study. Accommodation and stationary costs will delay the exercise but early preparation and support from well-wishers and development partners will make the study a reality. Fear of Workers: Getting accurate information from the respondents will be one of the major challenges since some of the farmers are threatened that the information may be used against them by the management in the terms of performance hence insecurity of their jobs. Lack of team spirit Most of the respondents may be unwilling to give the information due to negative perception of the study. Inadequate incentives will limit the study thus resulting to inaccurate information.

1.12 Assumptions of the study

It was the assumption of the researcher that the respondents of the study were willing to give accurate information as the instrument of data collection is valid and reliable. Ethical standards were observed by the researcher during data collection as information collected was treated with high confidentiality. Validity of research instrument was determined by the researcher through seeking opinions of experts in the field of study especially the researcher's supervisor and lecturers in the school of continuing and distance education, in the University of Nairobi. Reliability of the research instrument was enhanced through a pilot study that was done on 5 small scale farmers in Wajir South district-Kenya.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The chapter outlines farming in Arid and Semi arid areas in Kenya, Challenges faced by small scale farmers in Kenya and Kenya Adaptation to Climate Change in Arid Lands.

2.2 Farming in Arid and Semi arid areas in Kenya

For at least the past 8000 years, small-scale farmers in semi-arid environments have had to mitigate shortfalls in crop production due to variation in precipitation and stream flow (ALR M P Report 2007). To reduce their vulnerability to a shortfall in their food supply, small-scale farmers developed short-term strategies, including storage and community-scale sharing, to mitigate inter-annual variation in crop production, and long-term strategies, such as migration, to mitigate the effects of sustained droughts (BBS Report 2006). However lack of technical knowledge on farm management has led to rapid land degradation as evidenced by increased soil erosion, low productivity and loss of biodiversity ALRMP (2008).

Land use change from grazing land to agricultural production is the main cause of the increased land degradation; hence decline in soil quality, with a productivity index of 4%, 30% and 12% in the upper regions, middle level and low-lying areas, respectively (ALR M P Report, 2007). Conflicts over resources such as grazing areas and watering points are common across all zones. Farmers cultivate a variety of crops but the main crops are maize, sorghum, green grams, beans and cowpeas under rain-fed agriculture and horticultural crops such as mangoes, banana, tomato, onions, kale, capsicum, pawpaw and citrus (ALR M P Report, 2007). Crop rotation and fallowing are the leading management practices in the area for restoring and improving the productivity of the production systems while use of manure remains underutilized as a soil

fertility management practice (Sijali, et al 2008). There is huge potential for increased productivity especially in irrigated areas but this needs concerted effort in capacity building the emerging farming community (Sijali et al 2008).

Although the widely spread and commonly used dentition of sustainable agricultural development implies that present generations should use and take care of natural agricultural resources and the environment in a way that does not impoverish future generations (Tisdell, 1999), yet there is no consensus about a precise absolute and operationizable dentition of the term. While for some, sustainable agricultural development means the ability to induce persistence and continuous progress in agricultural production, for others it implies not damaging or degrading natural resources and for them the basic challenge is how to make better use of available physical and human resources and regenerative practices which optimally use locally available resources and natural processes such as nutrients recycling, build on biodiversity, regenerate and develop natural resources, and limit the use of external inputs of agro-chemicals, minerals and non-renewable energy (Ministry of Agriculture, 2007).

Thus, sustainable agriculture is not a simple package or model to be imposed, but a process for learning. KAPP (2006) argued that any system of food. The following farming objectives can be considered sustainable agriculture. A thorough incorporation of natural processes such as nutrient recycling, nitrogen fixation, and pest – predator relationships into agricultural production processes, so ensuring portable and efficient food production. 2. The full participation of farmers in rural areas in all processes of problem analysis, and technology development, adaptation and extension. 3. A greater productive use of local knowledge and practices, including innovative approaches not yet fully understood by scientists or widely adopted by farmers (Ministry of Agriculture Report, 2004).

Moreover, it has been argued that regenerative practices would significantly increase productivity in the rain fed, complex and resource poor areas in developing countries which have so far not benefited from high external inputs technologies and are usually heavily degraded (Downing, et al 1991). Consequently, policies proposed to achieve sustainable agricultural development may include measures to encourage various types of conservation farming such as agroforestry farming (Tisdell, 1999). (KARI Report, 2008) defined agroforestry as "a collective name for land use systems and practices in which woody perennials are deliberately integrated with crops and/or animals on the same land management unit. The integration can be either in a spatial mixture or in a temporal sequence (FAO 1993).

There are normally both ecological and economic interactions between woody and non-woody components in agroforestry. As the links and interactions between climate change, biodiversity loss, land and water degradation and their effect on ecosystems and human beings are apparent, the potential of agroforestry systems to mitigate and adapt to climate change, address land degradation and enhance biodiversity conservation is also clear (FAO 1993). While protection of natural habitats remains the core of conservation strategies, agroforestry practices designed to improve land quality and productivity also offer opportunities to create habitats for wild species in agricultural lands (Downing, et al 1991).

Furthermore, the multifunctional nature of agroforestry offers a range of opportunities sustaining ecosystem functions which includes the use of live fences(to protect farms), woodlots (to produce fuel wood), and nitrogen fixing trees (to improve soil fertility, soil organic matter and physical conditions) (Ajayi, 2007). Thus, by enhancing agroforestry, the ancient practice of integrating trees on farms, the goals of agricultural development(increased crop and livestock productivity) can be more effectively aligned with biodiversity conservation, and this is

considered one of the approaches that can be very useful and effective in making progress towards balancing environment and development needs (Ministry of Agriculture Report, 2004).

This is because of its ability to contribute to food security by restoring soil fertility for food crops and production of fruits and nuts, reduce soil erosion and rainfall runoff, reduce deforestation and pressure on woodlands by providing fuel wood grown on farms, reduce emissions and enhance sinks of green house gases, provide more diverse streams of income and reduce poverty (KAPP Report 2006). Hence, as a dynamic, ecologically-based natural resources management system, agroforestry integrates trees on farms, diverseness and sustains production for increased socioeconomic and environmental benefits and is cited as a potential win win land use system which provides key rehabilitation and other ecosystem services while it also improves production and generates income for land users (KAPP Report, 2006).

A recent study by Ajayi(2007) indicated that farmers in South Africa mentioned that agroforestry as a soil fertility improving technology has several advantages over minerals fertilizers. These includes: (1) It is cheaper and does not require direct cash expenses associated with mineral fertilizers; (2) its fertility effects last for more than one season; (3) it serves multiple purposes (fodder for livestock and fuel wood) in addition to improving soil fertility; (4) it improves biophysical functions (e.g., suppression of noxious weeds and softening of soils which facilitates easier weeding operation) and (5) provide opportunity for obtaining cash income from sale of tree products.

On the other hand, farmers mentioned some disadvantages such as incidence of bush trees, pests' problems, too much labor, long wait period, high mortality of tree seedlings, livestock browsing and it requires large land (Sijali, et al 2008). Literature about African agriculture

proved that application of tree-based renewable soil fertility replenishment technologies such as agroforestry in the traditional agricultural sector is more profitable than the conventional farmers' practice of continuous crop production without external fertilization, however, its adoption is affected by several factors such as the biophysical characteristics of the technology itself, the individual and household characteristics of the farmers, policies and the institutional context within which the technology is disseminated (Ogutu,1991).

Among the factors that were found to influence African farmers' tree- based renewable soil fertility replenishment technologies adoption decision are availability of information about the technology, the technology perceived relative advantage and usefulness, perceived complexity, compatibility with farmers' previous experience and knowledge, land size and tenure. (Driessen, 1992) indicated that while economic considerations and short-term profitability of renewable soil fertility replenishment technologies generally increase the probability of its adoption, economic models alone do not fully explain farmers' adoption behavior regarding these technologies and their adoption decisions appear to be guided by their households level of resource endowments and the prevailing social context such accustoms, obligations and beliefs which are highly affected by factors such as farmers' education, age, cosmopolitans and family size (Sijali, et al 2008).

2.3 Challenges faced by small scale farmers in Kenya

Seventy percent of Kenya's population is involved in Agriculture either directly or indirectly. As in many other sub-Saharan countries, a large majority of these are small scale farmers who rely on rain-fed agriculture. This is a severe limiting factor together with other factors such as poor soils, pests, diseases and recurrent drought. According to KAPP (2006) there has been a limited investment in irrigation and there is a lack of affordable technology to improve soil

fertility, for pest and disease control, weed management and the introduction of drought tolerant crop varieties. On top of all this, farmers have limited access to capital and infrastructure, including roads, railways, airports and sea ports thus causing high costs of transport (Ministry of Agriculture Report 2007).

In Kenya specifically, agriculture currently contributes to over 60% of the country's GDP through exports of tea, coffee and horticultural products (Ministry of Agriculture Report 2007). Traditional crop products have been cereals like maize, wheat, millet and sorghum with tea and coffee as cash crops. Over the recent past in Kenya, there has been a move towards high value agricultural products (HVAP) since they have a higher market value than traditional products (Ministry of Agriculture Report 2001). These are products with high monetary value with emerging and expanding markets worldwide and include vegetables, fruits, flowers, houseplants, foliage, condiments, spices as well as high value livestock and fisheries products such as milk, beef, poultry, eggs and fish (Ministry of Agriculture, 2007). They are grown mainly for cash value in the domestic and export markets.

A unique feature of Kenya (unlike other sub-Saharan countries) is that all types of farmers including poor, rich, large scale and smallholder farmers, do participate in HVAP (Ministry of Agriculture Report 2001). Small holder farmers for example produce 60% of all exported vegetables and fruits. These products, together with the traditional ones, have had a huge impact on the country's economy through income flow into rural economies, increased market efficiencies, strengthened domestic supply chains, provision of employment opportunities and institutional development (Downing, et al 1991).

However, in the face of market liberalization in the agricultural sector, its overall performance has not been encouraging with stagnation and even a falling of agricultural incomes (Ministry of Agriculture Report 2001). Much agricultural policy research and advocacy work remains with the involvement of all stakeholders, so that everyone involved in agriculture will be better off in the liberalized environment. Kenyan agriculture will hence be able to be efficient enough to compete at world prices or at the levels of protection that the domestic consumers or the world trade organization (Hill, et al 1991).

2.4 Kenya Adaptation to Climate Change in Arid Lands

As the consensus on climate change grows, and its impacts become apparent in the frequency and severity of climate extremes, efforts to promote development and enhance livelihoods amongst populations that are particularly vulnerable to climate based hazards must explicitly incorporate a climate change perspective in their operations (ALR M P Report 2007). This is indeed the justification for the proposed Kenya Adaptation to Climate Change in the Arid Lands (KACCAL) project. A joint initiative of the World Bank and the GoK, KACCAL aims to assist Kenya adapt to expected changes in climatic conditions that otherwise threaten the sustainability of rural livelihoods in its ASAL areas (ALR M P Report 2007).

As envisioned, KACCAL activities will be implemented through the ALRMP. Despite ALRMP's successes, climate change related risks place a significant strain on its capacity to effectively carry out its mandate. As such, KACCAL aims to complement ALRMP efforts by providing the necessary resources and capacity to realign ALRMP activities to more effectively handle the additional set of challenges that climate change poses for development efforts in the ASAL. KACCAL's focus is twofold (ALRMP, 2008).

First, it aims to improve the ability to reduce the near-term vulnerability to current climate variability and trends in conjunction with the ALRMP (ALR M P Report 2007). Secondly, it aims to strengthen the medium- to long-term ability to address climate change impacts related to increased climatic variability and higher temperature, associated with changes of magnitude and frequency of extremes (ALR M P Report 2007). In an effort to ensure that KACCAL activities are effectively targeted and designed to meet their stated objectives, several preparatory studies have been commissioned to carefully examine the issues, critically review the capacity, capabilities and needs of the key stakeholders and offer a menu of context-specific recommendations to guide KACCAL's implementation (ALR M P Report 2008).

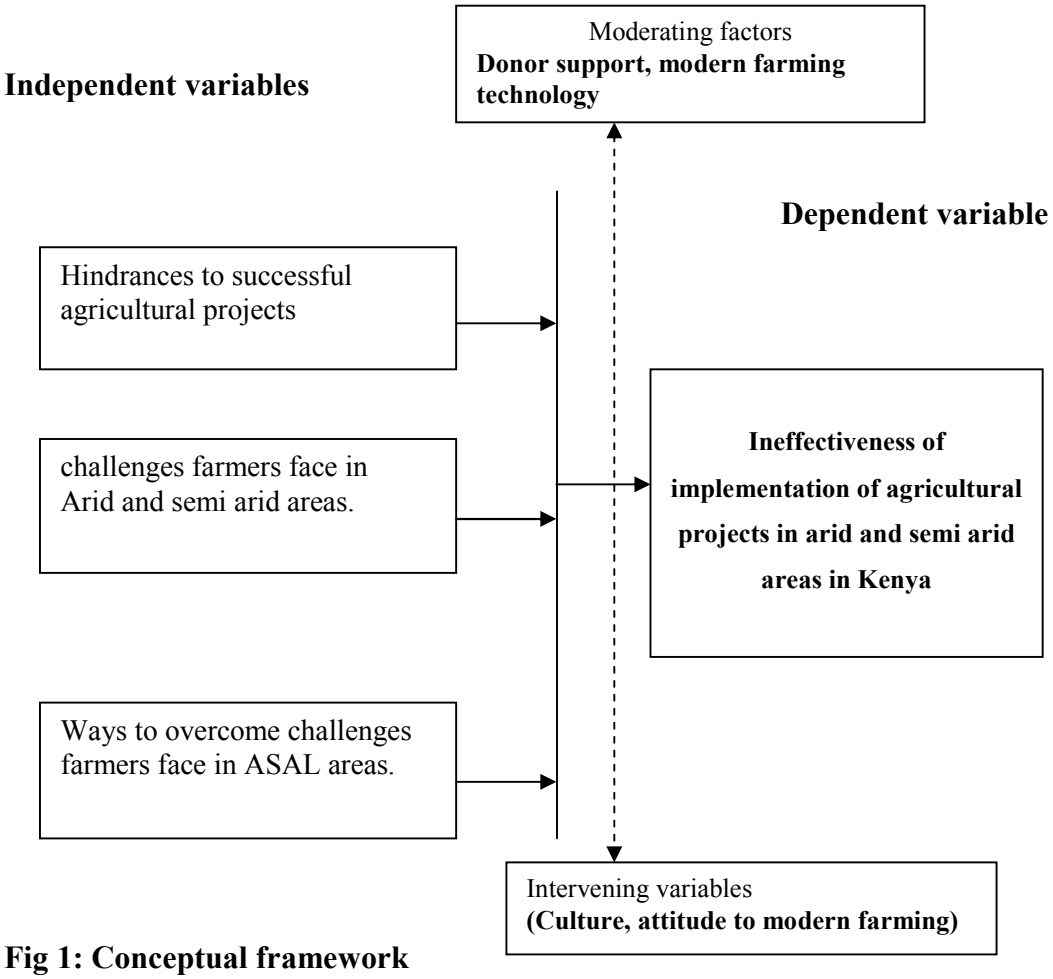

Fig 1: Conceptual framework

Ineffectiveness of implementation of agricultural projects in arid and semi arid areas largely depends on the factors influencing successful implementation of agricultural projects in ASAL areas, the challenges faced by farmers in ASAL areas and the measures to overcome the challenges faced by the farmers. Ineffectiveness of implementation of agricultural projects is also affected by other variables which include the moderating and intervening variables.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlined the research design and methodology that was used in the study. It described the population to be studied and the sampling design that was used. It also discussed the data collection and analysis techniques. The sample served as a full representation of the entire population to ensure that the study is neither biased nor unsuitable.

3.2 Research Design

A research design was a framework that guided the researcher in studying a research problem. It guides a researcher to know what to do in the whole of research process. The researcher used descriptive research design to determine factors that influenced implementation of agricultural projects in arid and semi arid areas in Kenya.

3.4 Target Population

The target population in statistics is the specific population about which information is desired. According to Ngechu (2004), a population is a well-defined or set of people, services, elements, and events, group of things or households that are being investigated. The target population for this study was 60 small scale farmers in Habaswein district Garissa county, Kenya. The researcher selected the 60 respondents in order to increase the accuracy of the research findings.

3.5 Sample and Sampling Procedure

The study used stratified sampling technique by taking 60% of the total population in coming up with a sample of 40 small scale farmers in Habaswein district-Kenya. The 40 respondents were the representative of the entire population. The researcher selected the 40 respondents as a

sample of the study in order to increase the accuracy of the research findings. Stratified sampling technique was chosen because it exudes the advantages of focusing on important subpopulations and ignored irrelevant ones; it allowed the use of different sampling techniques for different subpopulations and improved the accuracy of estimation.

Farmers	Target population	Sample
Farmers	60	40
Total	60	40

3.6 Data Collection

The study relied mostly on primary data sources and Primary data was collected using semi-structured questionnaires with both close-ended and open-ended questions. Small scale farmers in Habaswein district- were the respondents in the study.

3.7 Validity and Reliability of the Research Instrument

Validity of research instrument was determined by the researcher which sought opinions of experts in the field of study especially the researcher's supervisor and lecturers in the school of continuing and distance education in the University of Nairobi. This was facilitated the necessary revision of the research instrument. Reliability of the research instrument was enhanced through a pilot study that was done on 5 small scale farmers in Wajir district-Kenya. The pilot study enabled the researcher to be familiar with research and its administration

procedure as well as identifying items that require modification.

3.8 Data Analysis and Presentation

The data was collected and summarized, edited, coded and classified into various categories according to the answers given by the respondents. The data was then analyzed using simple descriptive statistics including ranges, percentages, frequencies and mode. Cross tabulations was used to find out the relationship between the factors that influenced project implementation in arid and semi arid areas in Kenya. The data collected and analyzed was presented in the form of tables, graphs, and bar charts additionally; frequencies and percentages was used to determine the factors that influenced implementation of agricultural projects in arid and semi arid areas in Kenya.

3.9 Ethical Considerations

3.9.1 Confidentiality

All information given by the respondents was treated with high confidentiality. The information was collected from respondents without discrimination

3.9.2 Language

Formal language was used during data collection to avoid biasness during and after data analysis.

3.9.3 Permission

The researcher asked permission from relevant authorities before conducting the study. Authorities included; local leaders and from Kenyatta University.

3.9.4 Objectivity

The objective of the study was clearly spelt out to the respondents before data collection for the purpose of transparency.

3.10 Operationalization of variables

OBJECTIVES	VARIABLES	INDICATORS	MEASURING SCALE
To find out factors that influenced implementation of agricultural projects in arid and semi arid areas in Kenya.	- Climate change - Inadequate extension services - Outdated farming technology - Pest and diseases - Poor infrastructure - Inadequate farm inputs - Soil nutrient deterioration	- Use of outdated farming technology - Inadequate of inputs - Lack of Government support on small scale farmers - High farm input costs (fertilizer, pesticides and seeds) - Insufficient rainfall - Insufficient irrigation - Overreliance on subsistence farming	Nominal
To determine challenges faced by small scale farmers in arid and semi arid areas in Kenya.	- Climate change - Inadequate extension services - Outdated farming technology - Pest and diseases - Poor infrastructure - Inadequate farm inputs Soil nutrient deterioration	- Inadequate extensional staff - Inadequate NGO support - Lack of research - Lack of information by the farmers on how to control crop diseases - Lack of storage facilities - Lack information on the right type of farm inputs - Poor infrastructure - Subdivision of land to uneconomically small units - Spoilage of perishable commodities during transportation - Soil nutrient deterioration	Nominal
To establish the measures that can be taken to overcome the challenges faced by farmers in arid and semi arid areas in Kenya.	- Climate change - Inadequate extension services - Outdated farming technology - Pest and diseases - Poor infrastructure - Inadequate farm inputs - Soil nutrient deterioration	- Use of modern farming technology - Adequate of inputs - Government support on small scale farmers - High farm input costs (fertilizer, pesticides and seeds) - Sufficient rainfall - Sufficient irrigation - Minimal reliance on subsistence farming - Adequate extensional staff - Inadequate NGO support - Adequate farming research - Adequate information by the farmers on how to control crop diseases - Provision storage facilities - Availing information on the right type of farm inputs - Improved infrastructure - Division of land to economically units - Preservation of commodities during transportation - Soil nutrient improvement	Nominal

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents the analysis of the data collected from the Respondent and discusses the research findings on factors that influence implementation of agricultural projects in arid and semi arid areas in Kenya. The Case of farmers in Habaswein district, Wajir County, Kenya. All completed questionnaires were edited for accuracy, uniformity, consistency and completeness. The response rate of 40 respondents was achieved from the total target of 60 respondents. Summaries of data findings together with their possible interpretations have been presented by use of mean, percentages, frequencies, variances, standard deviation, tables, pie charts and graphs.

4.2 Demographic profile of the respondents

As indicated from the Table 4.1, 40% of the respondents were aged between 21-30, 30% of them were aged between 31-40years. The other 18 % were in the age bracket of 41-50 years, 12% were 51 years and above. 83% of the respondents interviewed were Male while 17% were female respondents. 66% of the respondents interviewed were married Male, 21% were single Male and Female respondents and 17% of the respondents interviewed were widowed. It was evident that 8% of the respondents never attended school. 13% of the respondents have acquired primary level education. 38% of the respondents interviewed have attained the O-level of academics while 8% of the respondents have attained the A-level of education. 21% of the respondents were diplomas holders. 8% of the respondents have degrees and 4% have post graduate qualifications and were small scale farmers.

4.3 Period of practicing small scale farming

Table 4.1 Period of practicing small scale farming.

Period	Frequency	Percentages
Below 1 year	11	29
2-5 years	13	38
6-10 years	7	17
11-15 years	2	4
16-19 years	5	8
20 and above years	2	4
Total	40	100

As indicated from the Table 4.3, 29% of the respondents interviewed have been practicing small scale farming for a period less than 1 year. 38% of the respondents have been practicing small scale farming between 2-5. 17% of the respondents have been practicing small scale farming between 11-15. 8 % of the respondents have been practicing small scale farming between 16-19 years and 4% have been practicing small scale farming for over 20 years respectively.

4.4 Factors that influence implementation of agricultural projects in arid and semi arid areas in Kenya

The respondents were first asked to rate the extent to which the following factors influenced the implementation of agricultural projects in arid and semi arid areas in Kenya. They rated them on a scale of 5 to 1 where 5= to a very large extent and 1= not at all. These ratings are presented in Table 4.6:

Table 4.2 Factors that influence implementation of agricultural projects in arid and semi arid areas in Kenya

Factors that influence implementation of agricultural projects in arid and semi arid areas in Kenya	N	To a Very Large Extent [5]	To a Large Extent [4]	To a moderate Extent [3]	To a small Extent [2]	Not At all [1]	Total (%)	Mean Score
Use of outdated farming technology	40	0.00	26.8	29.3	43.9	0.00	100	3.98
Inadequate of inputs	40	7.3	36.6	14.6	36.6	4.9	100	3.90
Lack of Government support on small scale farmers	40	2.4	14.6	29.3	51.2	2.4	100	3.73
High farm input costs (fertilizer, pesticides and seeds)	40	2.4	4.9	41.5	43.9	7.3	100	3.49
Insufficient rainfall	40	2.4	4.9	43.9	43.9	4.7	100	3.49
Insufficient irrigation	40	2.4	7.3	46.3	34.1	9.8	100	3.49
Overreliance on subsistence farming	40	2.4	7.3	48.8	34.1	34.1	100	3.39
Inadequate extensional staff	40	2.4	14.6	29.3	51.2	2.4	100	3.31
Inadequate NGO support	40	2.4	4.9	41.5	43.9	7.3	100	3.31
Lack of research	40	2.4	4.9	43.9	43.9	4.7	100	3.31
Lack of information by the farmers on how to control crop diseases	40	2.4	4.9	41.5	43.9	7.3	100	3.31
Lack of storage facilities	40	2.4	4.9	43.9	43.9	4.7	100	3.23
Lack information on the right type of farm inputs	40	2.4	7.3	46.3	34.1	9.8	100	3.23
Poor infrastructure	40	2.4	7.3	48.8	34.1	34.1	100	3.18
Subdivision of land to uneconomically small units	40	7.3	36.6	14.6	36.6	4.9	100	3.16
Spoilage of perishable commodities during transportation	40	2.4	14.6	29.3	51.2	2.4	100	3.16
Soil nutrient deterioration	40	2.4	4.9	41.5	43.9	7.3	100	3.9
Total	**40**							

As shown in Table 4.2, respondents indicated that use of outdated farming technology influenced implementation of agricultural projects in arid and semi arid areas in Kenya negatively due to lack of new farming methods like developed countries with a mean of (3.98). Lack of Government support on small scale farmers was ranked second with a mean of (3.90) due to inadequate funds allocates to support small scale farming activities in Habaswein district. High farm input costs (fertilizer, pesticides and seeds). Insufficient rainfall, insufficient irrigation and overreliance on subsistence farming were ranked third with a mean of (3.49) since they contributed to low productivity of agricultural outputs. Inadequate extensional staff, Inadequate NGO support, lack of research and lack of information by the farmers on how to control crop diseases were ranked fourth with a mean of (3.31) due to less effort by relevant stakeholders to support modern farming practices by giving funds to support small scale farming initiatives. Lack of storage facilities and lack information on the right type of farm inputs were ranked fifth with a mean of (3.23). Most of the respondents said that the most of the farm outputs got destroyed due to poor storage practices and lack of the right farm equipments affected small scale farming practices. Poor infrastructure was ranked sixth with a mean of (3.18). Respondents indicated that farm produce get destroyed due to poor roads to transport their produce to the market. Subdivision of land to uneconomically small units was ranked seventh with a mean of (3.16). This was due to most of small scale farmers were driven by ancestral values that that dictated that every individual to own a piece of land. Spoilage of perishable commodities during transportation was ranked eighth with a mean of (3.16). Respondents indicated that they experienced challenges of storage of perishable produce due to inadequate technology of storage. Soil nutrient deterioration was ranked as a factor that undermined small scale farming practices with a mean of (3.9) due to inadequate knowledge to

small scale farmers on crop rotation to improve soil productivity.

4.5 Rate the ways of overcoming Challenges faced by small scale farmers in arid and semi arid areas in Kenya during implementation of agricultural projects in arid and semi arid areas in Kenya

The respondents were first asked to rate the Challenges faced by small scale farmers in arid and semi arid areas in Kenya during implementation of agricultural projects in arid and semi arid areas in Kenya. They rated them on a scale of 5 to 1 where 5= to a very large extent and 1= not at all. These ratings are presented in Table 4.3:

Table 4.3 Ways of overcoming Challenges faced by small scale farmers in arid and semi arid areas in Kenya during implementation of agricultural projects in arid and semi arid areas in Kenya

Ways of overcoming challenges	N	To a Very Large Extent [5]	To a Large Extent [4]	To a moderate Extent [3]	To a small Extent [2]	Not At all [1]	Total (%)	Mean Score
Use of modern farming technology	40	2.4	14.6	29.3	51.2	2.4	100	3.98
Adequate of inputs	40	2.4	4.9	41.5	43.9	7.3	100	3.90
Government support on small scale farmers	40	2.4	4.9	43.9	43.9	4.7	100	3.73
High farm input costs (fertilizer, pesticides and seeds)	40	2.4	4.9	41.5	43.9	7.3	100	3.49
Sufficient rainfall	40	2.4	4.9	43.9	43.9	4.7	100	3.49
Sufficient irrigation	40	2.4	7.3	46.3	34.1	9.8	100	3.49
Minimal reliance on subsistence farming	40	2.4	7.3	48.8	34.1	34.1	100	3.39
Adequate extensional staff	40	0.00	26.8	29.3	43.9	0.00	100	3.31
Adequate NGO support	40	7.3	36.6	14.6	36.6	4.9	100	3.31

Adequate farming research	40	2.4	14.6	29.3	51.2	2.4	100	3.31
Adequate information by the farmers on how to control crop diseases	40	2.4	4.9	41.5	43.9	7.3	100	3.31
Provision storage facilities	40	2.4	14.6	29.3	51.2	2.4	100	3.23
Availing information on the right type of farm inputs	40	2.4	4.9	41.5	43.9	7.3	100	3.23
Improved infrastructure	40	2.4	7.3	48.8	34.1	34.1	100	3.18
Division of land to economically units	40	7.3	36.6	14.6	36.6	4.9	100	3.16
Preservation of commodities during transportation	40	2.4	4.9	43.9	43.9	4.7	100	3.16
Soil nutrient improvement	40	2.4	7.3	46.3	34.1	9.8	100	3.9
Total	**40**							

As shown in Table 4.3, respondents indicated that use of modern farming technology will influence implementation of agricultural projects in arid and semi arid areas in Kenya positively due to new farming methods that will increase productivity of farm produce of farm like in developed countries with a mean of (3.98). Government support on small scale farmers ranked second with a mean of (3.90). Adequate funds allocated to support small scale farming activities in Habaswen district will promote small scale farming thus improved productivity. Subsidized farm input costs (fertilizer, pesticides and seeds). Sufficient rainfall, sufficient irrigation and minimal reliance on subsistence farming were ranked third with a mean of (3.49) since they will contribute to high productivity of agricultural outputs. Adequate extensional staff, adequate NGO support, comprehensive research and adequate information by the farmers on how to control crop diseases were ranked fourth with a mean of (3.31). Respondents indicated that new knowledge of extensional staff and NGO support of small scale farmers will enhance modern farming practices. Provision of storage facilities and availing information on the right type of farm inputs were ranked fifth with a mean of (3.23). Most of the respondents said that most of

the farm outputs will not get destroyed if good storage practices and provision of the right farm equipments to small scale farmers were provided. Improved infrastructure was ranked sixth with a mean of (3.18). Respondents indicated that farm produce will not get destroyed if the Government was to improve roads conditions and open new markets abroad to market the Kenyan produce rather than focusing on the local markets only. Division of land into economical units was ranked seventh with a mean of (3.16). Introduction of preservation equipments of farm inputs during transportation was ranked eighth with a mean of (3.16). Respondents indicated that they will not experience challenges of storage of perishable produce if adequate technology of storage was introduced. Soil nutrient improvement was ranked as a factor that will enhance small scale farming practices with a mean of (3.9) due to adequate knowledge to small scale farmers on crop rotation by extensional staff of (KARI).

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1Introduction

This chapter summarizes the major findings of this study. This study sought to find out factors that influence implementation of agricultural projects in arid and semi arid areas in Kenya. The case of farmers in Habaswein district, Wajir County, Kenya. In addition, this chapter provides a direction for further studies and also gives some recommendations for policy making by the relevant authorities. Questionnaires were used to gather primary data. The questionnaires comprised of closed ended questions and were strictly administered by the researcher.

5.2 Summary

This study sought to establish factors that influence implementation of agricultural projects in arid and semi arid areas in Kenya. The Case of farmers in Habaswein district, Wajir County, Kenya. The development of agriculture is also important for poverty reduction since most of the vulnerable groups like pastoralists, the landless, and subsistence farmers, also depend on agriculture as their main source of livelihoods. Growth in the sector is therefore expected to have a greater impact on a larger section of the population than any other sector. The development of the sector is therefore important for the development of the economy as a whole

It was also evident from this study that many are the challenges faced by small scale farmers in arid and semi arid areas in Kenya and they included; inadequate of inputs, lack of government support on small scale farmers. high farm input costs (fertilizer, pesticides and seeds) insufficient rainfall, insufficient irrigation, overreliance on subsistence farming, inadequate extensional staff, inadequate Non Governmental Organizational support, lack of research, lack of information by the farmers on how to control crop diseases, lack of storage facilities, lack

information on the right type of farm inputs, poor infrastructure, subdivision of land to uneconomically small units, spoilage of perishable commodities during transportation and soil nutrient deterioration.

It was also evident from this study that there are many measures that could be implemented to minimize the challenges experienced during implementation of agricultural projects in arid and semi arid areas in Kenya. Some of the measures suggested by respondents were; use of modern farming technology, adequate farm inputs, government support on small scale farmers, subsidized farm input costs (fertilizer, pesticides and seeds), sufficient rainfall through agroforestry, sufficient irrigation, minimal reliance on subsistence farming, adequate extensional staff with requisite skills, adequate NGO and donor support, adequate farming research, adequate information by the farmers on how to control crop diseases, provision storage facilities, availing information on the right type of farm inputs, improved infrastructure, division of land to economically arable units, preservation of commodities during harvesting and soil nutrient improvement

5.3 Conclusions

The findings indicate that small scale farmers in arid and semi arid areas endeavor to excel in their farming practices for social economic sustainability regardless the challenges. It is concluded that if proper mechanisms are put in place in arid and semi arid areas, small scale farmers will realize increased productivity for local and international market consumption. It can be conclude that if the Government of Kenya puts in place appropriate farming technologies by encouraging Kenya Agricultural research Institute staff to go for further trainings in developed countries in terms of agriculture, Small scale farmers in arid and semi arid areas in Kenya will excel. Also if the Government of Kenya is in a position to introduce modern farming

technology, adequate of inputs and subsidies in farm input costs (fertilizer, pesticides and seeds), small scale farmers in arid and semi arid areas will prosper in the changing farming environment globally and locally.

5.4 Recommendations

The study found out that quite a number of Factors influence implementation of agricultural projects in arid and semi arid areas in Kenya. Therefore, this study recommends that small scale farmers in arid and semi arid areas should embrace modern farming practices for them to survival in the dynamic farming environment. The study found out that little emphasize is put on modern farming technology by small scale farmers in arid and semi arid areas in Kenya hence poor agricultural productivity. Therefore, this study recommends that the government should recognize the importance of the small scale farmers in arid and semi arid areas by providing modern farming equipments to small scale farmers in arid and semi arid areas since their efforts contribute to food security initiatives.

The study found out that most of the small scale farmers in arid and semi arid areas encounter challenges of lack of government support on small scale farmers. high farm input costs (fertilizer, pesticides and seeds) inadequate extensional staff, lack of research, lack of information by the farmers on how to control crop diseases, lack of storage facilities, poor infrastructure and spoilage of perishable commodities during transportation. Therefore the study recommends that the Government should provide adequate trainings to extensional staff that guide small scale farmers on farming techniques. The Government should allocate enough resources on agricultural research practices that promote high productivity. The Government should create opportunities that empower small scale farmers in arid and semi arid areas to access information on modern farming practices. We can borrow some experiences in

agriculture development from China for example who despite having a huge population and also being affected by the impact of climate change the still remain food secure. Technology transfer can be done in form of; seed technology, irrigation technology, mechanization of agriculture and agro processing. Also devolved Governments should improve infrastructural facilities like roads and communication networks in order to promote farming practices of small scale farmers in arid and semi arid areas in Kenya.

5.5 Limitations of the study

The small scale farmers in arid and semi arid areas were usually very busy and therefore they required a lot of time in order to fill in the questionnaires. The challenge was overcome by giving the respondents the questionnaires at the right time. Financial constraint: Inadequate financial resources affected the results of the study. Accommodation and stationary costs delayed the exercise but early preparation and support from well-wishers and development partners made the study a reality. Getting accurate information from the respondents was one of the major challenges since some of the respondents were threatened that the information may be used against them by the researcher. The challenge was minimized by assuring the respondents of confidentiality of the information they gave. Most of the respondents were unwilling to give the information due to negative perception of the study. The challenge was minimized by giving incentives and clear information given about the study in order to get positive response and accurate information. The location in distance and terrain while trespassing the Habaswein district proved to be a bone of contention coupled with dusty grounds which posed a danger to personal health as far as common colds are concerned.

5.6 Suggestions for Further Research

Future studies should explore the reasons behind factors that influence implementation of agricultural projects in arid and semi arid areas in Kenya. Researchers should go ahead and establish the reasons behind the high failure of agricultural projects in arid and semi arid areas in Kenya and provide these small scale farmers with solutions including water saving and augmentation techniques tillage and planting methods, soil enhancing methods and maximization of fertilizer usage through soil testing application techniques. Future studies will minimize challenges experienced by small scale farmers in arid and semi arid areas in Kenya.

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APPENDICES

Appendix I: Transmittal Letter

EDWIN N GITAU
P.O.Box 877-00502
NAIROBI
04/01/2013

TO WHOM IT MAY CONCERN

Dear Sir/Madam

REF: PROJECT PLANNING AND MANAGEMENT RESEARCH STUDY

I am a student pursuing a Masters degree in Project Planning and Management at the University of Nairobi. In partial fulfillment of the requirement for the award of the graduate degree, I am required to carry out a research study. The topic of my research "Factors that influence implementation of agricultural projects in arid and semi arid areas in Kenya. The Case of farmers in Habaswein District Wajir County, Kenya" The choice is based on the importance and values the study findings will add to the understudied problem of agricultural challenges experienced by small scale farmers in arid and semi arid areas in Kenya. I kindly request your assistance by availing time to respond to the questionnaire.

A copy of the final report will be made available to you at your request. Your assistance will be highly appreciated. Thank you in advance.

Edwin Ndichu Gitau

Tel No.0722 963431

Appendix II: Questionnaire for Farmers in Habaswein district Wajir County, Kenya

SECTION: A PERSONAL BACKGROUND

Please supply the required data by filling in the blanks where space is provided or by ticking [√**]** against the most appropriate answer.

I respondents name…….. [Optional]

1. **Age.**
   - 21-30 years [ ]
   - 31-40 years [ ]
   - 41-50 years [ ]
   - 51 and above years [ ]

2. **Gender.**
   - Male [ ]
   - Female [ ]

3. **Marital Status.**
   - Married [ ]
   - Single [ ]
   - Widowed [ ]
   - Other

4. **Academic level.**
   - Never attended school [ ]
   - Primary level [ ]
   - 0-Level [ ]
   - A-Level [ ]
   - Diploma [ ]
   - Degree [ ]
   - Postgraduate [ ]

5. **How long have you been practicing small scale farming?**
   - Below 1year [ ]
   - 2-5 years [ ]
   - 6-10 years [ ]
   - 11-15 years [ ]

- 16-19 years [ ]
- 20 and above years [ ]

SECTION: B

6. Rate the extent to which the following influence implementation of agricultural projects in arid and semi arid areas in Kenya

Factors that influence implementation of agricultural projects in arid and semi arid areas in Kenya	**Very Great Extent [5]**	**Great Extent [4]**	**Moderate Extent [3]**	**Little Extent [2]**	**No extent [1]**
Use of outdated farming technology					
Inadequate of inputs					
Soil nutrient deterioration					
Poor infrastructure					
Insufficient rainfall					
insufficient irrigation					
Overreliance on subsistence farming					
Inadequate extensional staff					
Inadequate NGO support					
Lack of research					
Lack of information by the farmers on how to control these diseases					
Lack of storage facilities					
Lack information on the right type of farm inputs					
High farm input costs (fertilizer, pesticides and seeds)					
subdivision of land to uneconomically small units					
Spoilage of perishable commodities during transportation					
Lack of Government support on small scale farmers					

SECTION: C

7. Rate the extent to which you believe the following measures will minimize the challenges experienced during implementation of agricultural projects in arid and semi arid areas in Kenya

Measures to minimize the challenges	**Very Great Extent [5]**	**Great Extent [4]**	**Moderate Extent [3]**	**Little Extent [2]**	**N[o extent [1]**
Use of modern farming technology					
Adequate of inputs					
Soil nutrient improvement					
Improved infrastructure					
Sufficient rainfall					
Sufficient irrigation					
Adequate extensional staff					
Adequate NGO support					
Adequate farming research					
Adequate of information by the farmers on how to control these diseases					
Provision of storage facilities					
Availing information on the right type of farm inputs					
Reduced farm input costs (fertilizer, pesticides and seeds)					
Preservation of commodities during transportation					
Government support on small scale farmers (Subsidies)					

Appendix III Map of Habaswein District

HABASWEIN
DISTRICT, KENYA
GPS COORDINATES
39.49299, 1.01685

h