SELECTED SOCIO-ECONOMIC FACTORS INFLUENCING ACCESS TO AGRICULTURAL EXTENSION SERVICES AMONG PASTORALISTS IN WAJIR COUNTY, KENYA

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DECLARATION AND RECOMMENDATION

Declaration

This thesis is my original work and has not been submitted for the award of a degree in this or any other university.

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Recommendation

This thesis has been submitted with our approval as university supervisors.

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DEDICATION

To my mum Elizabeth, children; Victoria Chure, Victor Indombera and my wife Naomi Muhonja Asige.

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ABSTRACT

Agricultural extension services play an important role in boosting agricultural productivity worldwide. Despite concerted efforts by pastoralists in Wajir County to access agricultural extension services delivered by agricultural public service providers, Non-Governmental Organizations (NGOs) and private extension agents, the access to these services is inadequate. This has led to low levels of agricultural productivity, ultimately leading to high levels of poverty and food insecurity in the County. This may be due to several factors among them, socio-economic factors. This study examined the influence of selected socio-economic factors on access to agricultural extension services among the pastoralists in Wajir County. The study adopted descriptive survey research design. Target population was 52,478 household heads in Wajir East and Wajir West Sub-County in the County. Simple random sampling was used to select a sample size of 120 household heads who were proportionately distributed among the two Sub-Counties in Wajir County. Data was collected by a questionnaire with both closed and open-ended questions. The questionnaire was pilot tested on 30 households' heads in Wajir South Sub-County and an alpha Cronbach's coefficient of 0.80 was obtained. Data analysis was tested by inferential and descriptive statistics. The statistical procedure and service solution (SPSS) version 20 was used for analysis. Hypotheses were tested using Pearson correlation, multiple and linear regression. All tests were computed at $\alpha=0.05$. The findings showed that 50 per cent of the respondents from both Sub-Counties interacted with agricultural extension agents. Insecurity in the two Sub-Counties did not show a statistically significant influence on access to agricultural extension services by the pastoralists, $p>0.05$. There was a statistically significant influence of cultural and economic factors on access to agricultural extension services by the pastoralists in Wajir County, $p<0.05$. The findings may inform policy makers on formulating and implementation of policies that may improve accessibility to agricultural extension services by pastoralists in Wajir County. During the formulation and implementation of the policies on agricultural extension services dissemination, demographic factors, cultural factors and economic factors of the pastoralists should be considered.

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ABBREVIATIONS AND ACRONYMS

ADESO	African Development Solutions
ALDEF	Arid Land Development Frontiers
ASAL	Arid and Semi-arid Land
FAO	Food and Agriculture Organization
GoK	Government of Kenya
KAPAP	Kenya Agricultural Productivity and Agri-business Programme
KENFAP	Kenya Federation of Agricultural Producers
KNBS	Kenya National Bureau of Statistics
KFSSG	Kenya Food Security Steering Group
MDGs	Millennium Development Goals
MoA	Ministry of Agriculture
NALEP	National Agriculture and Livestock Extension Programme
NCST	National Council of Science and Technology
NGO	Non- Governmental Organization
NEP	North Eastern Province of Kenya
PAES	Public Agricultural Extension Services
SRA	Strategy to Revitalize Agriculture
T&V	Training and Visits
UNOCHA	United Nation Office for the Coordination and Humanitarian Affairs
WASDA	Wajir South Development Authority
WIBD	Wael International Business and Development Consultant

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Agricultural extension services play an important function in boosting agricultural productivity worldwide (Bernet, Ortiz, Estrada, Quiroz & Swinton, 2001). Agricultural extension is the most important source of information to farmers in most African countries (Agbamu, 2002). Agriculture is key to achieving the Millennium Development Goals (MDGs), since it directly influences the processes of economic growth, poverty alleviation and environmental sustainability (World Bank, 2008).

In sub-Saharan Africa, the focus of agriculture extension in post-independence period is to increase agricultural production and spread the benefits of improved farming techniques more widely. The goals of extension include transferring of knowledge from researchers to farmers, advising farmers in their decision making and educating farmers on how to make better decisions, enabling farmers to clarify their own goals and possibilities, and stimulating desirable agricultural developments (Van der Ban & Hawkins, 1996). Agwu, Dimelu and Madukwe (2008) pointed out that, for a variety of reasons, the performance and output of national agricultural research and extension system in West and Central Africa has not been commensurate with the size, scope and level of investment in the system. This is evidenced by farmers' poor productivity, incessant and intractable food shortage and the accompanying high food prices.

Government of Kenya (2011) reported that the mission of extension services is to provide research based information, educational programs and technology on farmers' needs to enable them make informed decisions about their economic, social and cultural well-being. The limited impact of extension within the pastoral sector is widely recognized (De Haan, 1993). In arid areas, extension work has been found to yield positive returns, which may not necessarily be ranked on a scale of monetary economics, but rather by the extent to which they improve the living situations of the local people (Oba, 1992).

The declining effectiveness of the public extension service has been identified as one among the factors impeding agricultural growth in Kenya. In this regard, the strategy to revitalize agriculture (SRA) suggested reforms of extension system to create more effective linkages between research, extension and farmers who are the ultimate beneficiaries (GoK, 2005a).

In Kenya Vision 2030 development framework among the three pillars, the economic pillar is aimed at achieving an average Gross Domestic Product (GDP) growth rate of 10 per cent per annum. Within this pillar, agriculture has been identified as one with the greatest potential for transformation. Kenya will raise incomes in agriculture, livestock and fisheries by processing and thereby adding value to the products before they reach the market (GoK, 2005b).

The major agricultural extension services accessed by the pastoralists in Wajir County include; Livestock husbandry services, animal health services, crop husbandry services, natural resource management services (GoK,2002). Pastoralism is key agricultural production system in dry lands (Leff, 2009). As dry lands constitute nearly half of the land area of Sub-Saharan Africa, pastoralism is of particular importance for the continent and in some countries; pastoralists even represent the majority of the population. With limited access to water, competing rights to land, and increased access to small arms, fatal inter-tribal conflict arises when pastoralists from one tribe enter the territory of another (Leff, 2009).

General lack of formal education and high levels of illiteracy among pastoralists may cause barriers to communication with other communities (Akabwai, 1993). Extension workers need to be well acquainted with the values, beliefs, and social cultural environment of the farming community, including the structural composition, group dynamics and power structure (Campbell & Barker, 1997).

This study examined the influence of selected socio-economic factors on access to agricultural extension services among the pastoralists in Wajir County. The selected factors predominantly in the county included; security situation, cultural factors and demographic characteristics.

The main agents of agricultural extension services in Kenya are government institutions comprising the Ministry of Agriculture, Livestock and Fisheries. Most of the departments responsible for extension have nationwide representation, with the Ministry of Agriculture and Livestock extending their extension network to the locational level. Each of these has its own delivery systems and structures and their coverage vary from region to region depending on thematic focus and geographical area of operation (MoA, 2002).

This study was carried out in Wajir County located in north-eastern region of Kenya, and covers an area of 56,685.9 Sq. Km. It is an arid area in ecological zone V-VI receiving an average of 240mm rainfall annually. The County has an estimated population of 661,941 (KNBS, 2009). Pastoralism is the main source of livelihood among the households in Wajir County. Pastoralism is a major economic production strategy in which people raise herds of animals, mostly in arid and semi-arid lands ASALs (KNBS, 2010). ASALs cover about 80 per cent of Kenya's landmass and support about a third of the country's human population and 70 per cent of the national livestock herd (KNBS, 2010). An estimated 13 million cattle, 25 million goats, 14.9 million sheep, 1.7 million donkeys and 2.9 million camels are found in Kenya's ASALs (KNBS, 2010). According to KNBS (2009) Wajir has an estimated livestock as follows: Cattle 794,552, Sheep 1,406,883, Goats 1,866,226, and Camel 533,651. However, drought, livestock diseases and pests adversely affect livestock development in the County. Despite efforts of increasing crop productivity in the County, over reliance on relief food, inaccessibility of markets especially by farmers, costly farm inputs and unreliable rains have been a hindrance in achieving food security (GoK, 2002).

1.2 Statement of the Problem

Despite concerted efforts by the pastoralists in Wajir County to access agricultural extension services provided by public services, Non-Governmental Organizations (NGOs) and private extension agents, access to these services by the pastoralists is inadequate. This has led to low levels of agricultural productivity, consequently leading to high levels of poverty and food insecurity in Wajir County. Inadequate access to the agricultural extension services may be due to several factors among them are socio-economic factors. However, it is not clear which socio-economic factors influence the access to agricultural extension services by pastoralists provided by agricultural extension service agents. Therefore, this study was designed to examine the influence of socio-economic factors on access to agricultural extension services among the pastoralists in Wajir County.

1.3 Purpose of the Study

The purpose of the study was to examine the influence of selected socio economic factors on access to agricultural extension services among the pastoralist in Wajir County. The main aim was to improve the access of agricultural extension services thus increasing agricultural productivity, incomes and food security among the pastoralists in Wajir County.

1.4 Objectives of the Study

The following objectives were used to guide the study

i. To determine influence of security situation on access to agricultural extension services among the pastoralists in Wajir County.
ii. To determine influence of cultural factors on access to agricultural extension services among the pastoralists in Wajir County.
iii. To determine the extent to which economic factors among pastoralists' influences the access to agricultural extension services in Wajir County.
iv. To examine the frequency of access to agricultural extension services in among the pastoralists in Wajir County.

1.5 Hypotheses of the Study

The study was guided by the following specific hypotheses:

H_{01}: The security situation (livestock rustling, conflict over grazing land and conflict over boundary) have no statistically significant influence on access to agricultural extension services among pastoralists in Wajir County.

H_{02}: The cultural factors (language, pastoral-nomadic way of life, gender roles, religion) have no statistically significant influence on access to agricultural extension services among pastoralists in Wajir County.

H_{03}: Economic factors have no statistically significant influence on access to agricultural extension services among pastoralists in Wajir County.

1.6 Research Question

The study was also guided by the following research question.

i. How frequently do pastoralists access agricultural extension services in Wajir County?

1.7 Significance of the Study

The findings may provide an in-depth understanding of socio-economic factors (nature of security situation, cultural and economic factors) influencing access to agricultural extension services among the pastoralists in Wajir County. The findings may form a basis for improvement on accessibility to agricultural extension services among pastoralists in Wajir County, thus improving agricultural productivity, incomes and food security.

The study's findings may also inform all the stakeholders in the agricultural sector especially policy makers in formulating and implementing policies that would enhance accessibility of agricultural extension services to the pastoralist communities. The pastoralists may access timely and quality agricultural extension services, thus improving agricultural productivity. This could translate to improved increased food security hence reduction in poverty levels.

1.8 Scope of the Study

The study was confined to selected socio-economic factors influencing access to agricultural extension services among the pastoralists in Wajir County. The selected socio-economic factors were; demographic characteristic (age, level of education, Household size), nature of security situation (livestock rustling, conflict over grazing land and water, conflict over boundaries), cultural factors (language, pastoral-nomadic way of life, gender roles, religion) and economic factors (income) of the household head. The agricultural extension services accessed included; livestock husbandry services, animal health services, crop husbandry services, natural resource management services.

1.9 Limitation of the Study

i. The study area was vast with some areas inaccessible. This posed a challenge especially in reaching all the targeted respondents. Therefore, questionnaires were posted to the household heads to be filled.

ii. The study involved sampling pastoralists' opinion; self-reported information and experiences that varied from time to time, place to place. This was addressed by having a large sample size of the respondents.

iii. Most pastoralist do not keep records, therefore, responses were derived from recall. The researcher overcame the limitation by probing the respondents further and corroborating information through the local extension staff.

1.10 Assumptions of the Study

The study was guided by the following;

i. The respondents would co-operate by responding positively and truthfully to the questionnaire and that there were uniform socio-economic factors across the study area.

ii. Pastoralists were accessing agricultural extension services uniformly despite the prevailing socio-economic factors in the Wajir County.

iii. Institutional structures for the delivery of agricultural extension services by various agents are in place for all household in the study area.

1.11 Definition of Terms

Agricultural extension: refers to the provision of agricultural advice and information to crop and livestock procedures (FAO, 2010). In this study, agricultural extension included entire set of organizations that support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills, and technologies to improve their livelihoods and well-being.

Cultural factors: According to Helman, (1990), culture encompasses the set of beliefs, moral values, traditions, language and laws (or common behaviour) held in common by a nation, a community, or other defined group of people. In the context of this study, cultural factors included language**,** pastoral way of life**,** gender roles and religion in the pastoral set up.

Security: The origins of the term 'security' derive from the Latin 'sine cura', meaning a state of living without care and concern (Ole, Hunter & Xi, 2008). In the study, nature of security situation included; livestock rustling**,** conflict over grazing land and water, conflict over boundaries.

Socio-economic factors: According to Merriam-Webster's Collegiate Dictionary (2012), socio-economic factors are the social and economic experiences and realities that help mould one's personality, attitudes, and lifestyle. The study considered the following socio-economic factors; security, demographic characteristics, cultural factors and economic factor (source of income).

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter explores and summaries literature related to this study. The first section is a review of studies carried out by other scholars in the field of agricultural extension. The objective of this section is to identify knowledge gaps in socio-economic factors and the access to extension service among pastoralists. The literature review is discussed under sub-titles of security situations (livestock rustling, conflict over grazing land and conflict over boundary), cultural factors (language, pastoral-nomadic way of life, gender roles, religion) economic factors (income) and demographic characteristics among pastoralists and how they influence access to agricultural extension services. The second part is a presentation of theoretical framework that provides links between the literature, objectives and hypotheses of the study. Conceptual framework shows relationships and interaction of the variables in the study.

2.2 Agricultural Extension Services among the Pastoralists

In global context, the agricultural services are facing new challenges regarding increasing demand for food; declining cultivated area and fiscal constraints in the public sector. International organizations and donor agents have suggested the governments of developing countries to reform and modify their existing public sector structures with purpose-specific and need-specific approach (Rivera, 2001). Agricultural extension is considered to be an important service in increasing agricultural productivity and attaining sustainable development (Kibett, Omunyin & Muchiri, 2005).

Agriculture plays an important role in both poverty reduction and economic growth and remains the main source of income for around 2.5 billion people in the developing world. Pastoralism contributes approximately 12 per cent to the country's gross domestic product (FAO, 2005), with the livestock sector providing an estimated 90 per cent of all employment opportunities and more than 95 per cent of household incomes in ASALs (Kaimba, Njehia & Guliye, 2011).

Observations show that in developing countries, there is a gap between agricultural performance and available research information. This has been attributed to poor extension services delivery as well as limited interaction between technology developers (researchers)

and extension staff (Kimaro, Mukandiwa & Mario, 2010). Poor communication between actors in extension services delivery particularly the government, NGOs, private sector (agri-business) and farmers has also been shown to hinder flow of developed technologies to farming communities (Kimaro et al., 2010).

Agricultural extension is the most important source of information to farmers in most African countries (Agbamu, 2002). Agricultural extension services play significant role in affecting farmers' adoption of innovations (Van den Ban & Hawkins, 1998). Agricultural extension programmes are very diverse from an international perspective as most are managed as public sector agents and some Non-Governmental Organizations (NGOs) while many private firms and private organizations conduct extension programs (Oladele & Tekena, 2010). Anderson (2007) defines the terms agricultural extension and advisory services as the entire set of organizations that support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills and technologies to improve their livelihoods.

Public agricultural extension service including veterinary service has for a long time been inadequate in former North Eastern Province (NEP) as it is the case in many arid and semi-arid areas (ASALs) of Kenya. More than 75 per cent of Kenya's livestock are in the ASALs, which are served by less than 10 per cent of livestock service staff. This is mostly because the ASALs are considered hardship posts and few veterinary staff prefers to work there (Young, Kajume & Wanyama, 2003).

Due to inadequate or lack of animal health services in ASALs, various private service delivery initiatives, including community-based animal health service delivery systems facilitated by various non-governmental extensions, have emerged as an alternative option (Okwiri, Kajume & Odondi, 2001; Riviere - Cinnamond & Eregae, 2003). Even with a combination of private and public extension providers, extension delivery in the pastoral areas is still challenging because of situations such as insecurity, poor infrastructure, low cash economy, high cost of service delivery, vastness of the areas, and lack of veterinary personnel among others (Okwiri et al., 2001).

2.3 Access to Agricultural Extension Service

Access to agricultural education and extension creates awareness on new agricultural technologies among farmers and thus increases the ability to adopt the new agricultural

technologies (Onemolease & Alakpa, 2009). 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 & Anderson, 2009).

The Public Agricultural Extension Services (PAES) in Africa have played and continue to play key roles in agricultural development, in the diffusion of innovations, as a medium for exchange of experiences with farmers and as a direct link between farmers and the government (GoK,2006). The main agents of agricultural extension in Kenya are government institutions. Agricultural extension services are provided by NGOs, farmer organizations such as Kenya Federation of Agriculture Producers KENFAP (GoK, 2006). Currently, the Kenya Government is implementing the National Agricultural Extension Policy (NAEP) which was put in place in 2001 and advocates demand-driven extension services and participation of other players in the delivery system (GoK, 2004).

County Government of Wajir provides agricultural extension services through department of agriculture, livestock and fisheries. However, the national government still implements various programmes like, Agricultural Sector Development Support Programme (ASDSP), Kenya Agricultural Productivity and Agri-Business Programme (KAPAP). Other organizations partnering with the government in provision of agricultural extension services include: Non-governmental organizations (NGOs), like Arid Lands Development Focus Kenya (ALDEF-Kenya), Wajir South Development Authority (WASDA), Save the Children, Islamic relief, Red Cross, Mercy Corp and African Development Solutions (ADESO),

2.3.1 Interaction of Pastoralists with the Agricultural Extension Agents

Agricultural development depends among others, on the interaction between farmers, extension agents and researchers (Reij & Bayer, 2001). Similarly, in Kenya, the role of non-state agents is limited in scope and the bulk of extension service is provided by public sector (Kumba, 2003). Together with research, extension services have been the Kenyan government's main vehicle for stimulating agricultural production and agricultural extension is the Ministry of Agriculture's major activity. However, the ratio of extension worker to smallholder families is low (1:450). The number of farm visits achieved per worker was very

low and these tended to be concentrated heavily on farmers who were already progressive (David, Collier & Jan, 1993).

2.4 Security Situation among the Pastoralists

Pastoralists reside in over 21 countries across the African continent. Many of these communities are affected by conflicts, while the Sahel region and East Africa show sustained levels of inter-pastoral violent conflicts with associated potential impacts on their livelihoods (Bevan, 2007). Conflict resolution and cross-border harmonization is an integral component of the group's aim of reducing vulnerability among poor people especially the pastoral communities in the greater horn of Africa (Pkalya, Adan, & Masinde, 2003).

Tensions and violent conflict have long affected pastoral areas. In the Horn of Africa, pastoralists are involved in violent conflict at different levels, ranging from cattle rustling, conflicts over natural resources and political rebellion and secessionist movements. Pastoral groups move over larger tracts of land in search of available grazing and water sources (Markakis, 2004). This movement often leads to fierce competition over scarce resources, and in many cases, it becomes a source of tension or overt conflict between different communities, both nomadic and settled (Markakis, 2004). Conflicts involving pastoralists associated with resource competition, livestock rustling, and wide availability of small arms are widespread and of increasing concern (Mkutu, 2001).

According to the United Nation Office for the Coordination and Humanitarian Affairs UNOCHA (2014) inter-communal conflict between the Garre and Degodia clans had left over 60 people dead and more than 75,000 people displaced in Wajir and Mandera counties and indirectly affected an additional 60,000 people in Wajir County since May 2014. Fifty (50) houses were burnt in Wajir County.

2.4.1 Livestock rustling

Conflicts involving pastoralists associated with resource competition, cattle rustling and wide availability of small arms are widespread and of increasing concern (Pkalya, Adan, & Masinde, 2003). Pastoral conflict takes different forms, local-level conflict over natural resources, of which livestock is one specific form, are endemic in Africa’s pastoral and agro-pastoral systems (Hendrickson, Armon & Mearns, 1998). Livestock rustling, involves forceful acquisition of livestock (mainly cattle, goats sheep and camel) and is quite common

amongst pastoralists in the ASALs of Kenya (Hendrickson, Armon & Mearns, 1996). Nunow (2000) states that among the Somali people livestock rustling are conducted after a dry season to recover livestock lost during the dry spell.

Traditionally, cattle rustling often involved small-scale violence and theft of the best livestock or replacement of animals lost through drought or disease. Loss of human lives was rare, and when this occurred, compensation in the form of cattle was paid by the killers' families to the victims or their families in case of death (Hendrickson et al,. 1996). However, in recent years, due to proliferation of small arms and commercialization of cattle rustling, there is an emergence of large-scale violent cattle rustling between neighboring pastoral communities in Kenya (Hendrickson et al,. 1996).

Kipngeno and Saitoti (2014) reported that, more than 100 heavily armed raiders, believed to be from Pokot community, attacked Nachola village in Baragoi and drove away 100 cattle and killed three people. The rustlers moved towards Baringo East. There is an emergence of commercialized cattle rustling where wealthy businessmen, politicians, traders or local people pursuing economic objectives finance raids among the pastoral communities. This greatly interferes with the future and assets of the pastoralists (Doss, McPeak & Barrett, 2008).

Consequently, pastoral communities arm themselves for protection against hostile groups (Doss et al., 2008). The threats caused by the increasing numbers of human deaths and livestock losses due to cattle rusting and other organized raids probably influences the pastoralists' mobility and their migratory decisions as well as herd size, thereby undermining their asset base and livelihood sources. Thus, besides lack of pasture and water, pastoralist migration could also be influenced by the perceived threats of cattle rusting and the insecurity generated by it (Doss et al., 2008).

Cattle rustling, which is embedded in traditional and cultural practices of pastoralists communities, is one of the main causes of conflict in this part of Kenya. There are deep-rooted values associated with cattle rustling. Among the pastoralist communities, cattle rustling is undertaken to prove that young men are ready for manhood, as well as to acquire bride price (Buchanan-Smith & Lind, 2005).

2.4.2 Conflict over grazing land and water

According to Dietz (1987) pasture and water conflicts have long been part of the socio-cultural pattern of the pastoral communities in Kenya. Over time however, pasture and water around the settled areas steadily decreases, leading to emaciation and loss of livestock. Traditionally, whenever scarcity of pasture and water or disease depleted a community's livestock, it often sought to replenish numbers through rustling.

Nomadic pastoral groups migrate along established routes throughout the year in search of water and pasture for their livestock. Access to pasture and water is critical for these communities (Pragya, 2012). Pragya further noted that, pastoralist communities across the Horn of Africa frequently cross national borders in search of pasture and water. Reduced access to grazing areas and water resources occasioned by climate change has disrupted migratory patterns. Drought coping mechanisms of local pastoral communities act as conflict drivers.

According to Kalya, Adan, and Masinde (2003) pasture and water conflicts have long been part of the socio-cultural pattern of the pastoral communities in Kenya. Pastoralists derive their livelihoods mainly from natural resources – pasture, water, natural vegetation and livestock (Kalya, et al., 2003). However, reduced access to these resources, in particular, land and water, has increasingly put pastoralists under intense pressure. As a result, they are increasingly finding themselves fighting for their survival. Resources (grazing land and water) account for a sizeable share in fuelling conflict. Most of the conflicts have their root causes to natural resources, namely pasture, water and land which have hitherto been politically capitalized outside the Sub-County (Kalya, et al., 2003).

According to report by Schilling**,** Opiyo and Scheffran (2012) watering points are a source of conflict particularly during dry periods. Similarly, competition over scarce grazing fields, water resources and pasture has escalated inter-ethnic animosity, often resulting in armed conflicts, which are predatory in nature and much more destructive (Kaimba, et al., 2011). The lands are traditional tribal grazing areas, such that migration in search of pasture and water by one tribe into areas that belong to other tribes often causes conflict between pastoralists. Besides, livestock movements into grazing lands and watering points that stretch into crop-growing areas also cause conflicts (Kaimba, et al., 2011). Pastoralist clans that share grazing lands and watering points would frequently discuss and reach an agreement on

how best to use the scarce resources (Pragya, 2012). Community policing including regular surveillance of grazing lands and watering holes should be facilitated in order to avoid any conflict (Pragya, 2012). In pastoral populations, conflict may lead to loss of access to pastures and water, resulting in loss of livestock, income and access to food (FAO, 1996).

Pasture and water conflicts have long been part of the socio-cultural pattern of the pastoral communities in Kenya. The lands are traditional tribal grazing areas, such that migration in search of pasture and water by one tribe into areas that belong to other tribes often causes conflict between pastoralists. Besides, livestock movements into grazing lands and watering points that stretch into crop-growing areas also cause conflicts (Kaimba, et al., 2011). Water points are also degraded by not being used. The shrinkage in grazing and water availability due to insecurity causes abnormal concentrations of animals in safe areas, thus also leading to ecological degradation and increasing the risk of new disputes (Hassan, 1997)

2.4.3 Conflict over boundaries

The existence of fixed boundaries created by colonial administration limited the mobility of pastoral communities. Therefore, the pastoralist way of life, which is based on movement, was seriously affected by the boundaries and border disputes became the cause of many conflicts in the sub-region (Abdulahi, 2005). Provincial administrative boundaries and tribal grazing reserve areas were designed to limit the scope of pastoralist movement. Moreover, pastoralists were threatened with heavy fines and confiscation of their livestock if they did not stay within the area allotted to their group. However, pastoralists had never recognized borders and administrative boundaries and therefore challenged the newly established states in the Horn of Africa. As a result, the opposition to administrative boundaries and the limitations imposed on border crossings became a frequent cause of conflict (Abdulahi, 2005).

According to a study by UNOCHA (2008) as pastoral mobility has traditionally been without regards to national boundaries and borders, cross border conflict has emerged as one of the challenges to pastoralism today. These trans-boundary conflicts are especially high in areas where the pressure on available natural resources is intense.

Conflict is rampant in pastoral areas. Such conflict stems not only from competition over pastoral resources, but also from borders and boundaries established without taking into

account the needs of pastoralism, from weakening of customary conflict prevention and resolution mechanisms, from curtailing mobility and from a proliferation of small arms (UNOCHA, 2008). Pastoralists often have difficulties with state borders which have been historically drawn without consideration of pastoral needs and historical use. Movement sometimes extends beyond multiple state borders. On the negative side, mobility may facilitate the spread of animal and human diseases. It may also spread conflicts across national borders (UNOCHA, 2008).

The inter-regional and cross-border movements often lead to conflicts over water and pasture. Consequently, a large number of households are frequently displaced from their original settlements due to conflicts arising from cattle rustling and inter-clan disputes. The former North Rift Valley and North Eastern Kenya are some of the most underdeveloped, poverty ridden and most marginalized areas of Kenya (Mwaura, 2005).

Boundaries, as physical indicators of rights, are often the loci of intense conflict (Himmelfarb, 2006). According to Shanguhyia (2008) there being no fixed boundaries over resources, communities frequently had conflict over pastures and watering points. In the report by Odhiambo (2012) the relations between the Borana and the Garre have been characterized by conflict, caused largely by disputes over regional borders.

2.5 Cultural Factors

In many countries, socio-cultural factors are leading constraints to the effectiveness of extension. Language differences and illiteracy can impede the communication of improved technology unless they are taken into account (Peterson, 1997). The division of labour between the sexes differs along cultural lines and influences the nature of farming systems in different regions. In many countries, the men are employed off-farm, leaving the farm operations to women. In extension organizations, under representation of women on the extension force means that the production responsibilities and needs of women at the farm level may not be adequately addressed (Peterson, 1997). According to Kimaro, et al. (2010) understanding the history and culture of the community helps in the success of veterinary extensions and other agricultural related extension services.

2.5.1 Language

Extension messages should reach all farmers irrespective of their mother tongue or ethnic language (Oladele, 2006). Participatory communication techniques can support agricultural extension efforts especially using local languages and rural radio to communicate directly with farmers and listeners' groups. Governments and donors should invest in up-to-date socio-linguistic analyses of the numbers and geographical dispersal of minority languages with a view to improving information services such as government public service information, broadcasting and research networks (Chapman, Blench, Kranjac-Berisavljevic' & Zakariah, 2003).

Oladele (2005) reported farmers' perspective on factors that will enhance agent's acceptability if they were to be advised on farming. Majority of the farmers considered same language with agent as the most critical as they will understand the agents first hand rather than through an interpreter. Adisa and Okunade (2005) listed some constraints which limit women's access to extension services. He noted that in the third world women are less likely than men to speak the national official language and extension services are often not offered in the local language.

2.5.2 Pastoral- Nomadic Way of Life

Nomadic pastoralism is an ancient form of livelihood. It is said to be the most efficient use of the dry lands such as Arid and Semi-Arid Lands (ASAL) of Kenya. The ASAL constitutes about 84 per cent of the total land and populated by about 20 per cent of Kenya's population (GoK, 2007). Pastoralism is practiced in 75 per cent of ASAL (Mugo, Ogwenyi & Ruto, 2009; Krätli, 2001). According to Guliye, Noor, Bebe and Kosgey, (2007) livestock plays multiple roles in the lifestyle of pastoralists in Kenya, notably as livelihood sources, socio-cultural and religious functions, and asset and security against risks. For example, livestock is the main source of food by providing milk and meat, the basis of traditional social relations like payment of dowry during marriage or compensation of injured parties in tribal feuds, symbol of prosperity and prestige, store of wealth, and security against drought, disease and other calamities. Nomadic pastoral communities that rely primarily on their livestock as a source of livelihoods largely populate these regions.

2.5.3 Gender and access to agricultural extension services

Gender could be defined as the rules, norms, customs and practices by which biological differences between males and females are translated into socially constructed differences between men and women, boys and girls (Kabeer, 2003). Despite the significant roles women play in agriculture and food security in many developing countries, they continue to have a poorer command over a range of productive resources, including education, land, information, and financial resources (World Bank, 2001; Odame, Hafkin, Wesseler, & Boto, 2002).

In developing countries, an important proportion of farm work continues to be done by women but only 17 per cent of agricultural extension agents are women (Bahal, 2004). By giving stronger recognition to the role of women in agriculture, increasing the number of female students in agricultural schools and colleges and increasing resource allocation to women farmers, it may be possible to raise the proportion of women extension staff to 20 per cent (Bahal, 2004). Some countries have succeeded in increasing access by women to agriculture extension services. The Indian women dairy farmer has been credited with raising the country's milk production levels to among the highest in the world (Herath, 2008).

Adisa and Okunade (2005) listed some constraints which limit women's access to extension services. First, in many places, cultural restrictions prevent male extension officers from meeting with women farmers. Secondly domestic responsibilities sometimes limit women's mobility and making it harder for them to attend courses away from home.

2.5.4 Religion

The pastoral communities have strong ties with indigenous and religious institutions (Kassa & Temesgen, 2011). Long and Swortzel (2007) noted that the mission of extension services is to provide research based information, educational programs and technology on farmers' needs and enabling them to make informed decisions about their economic, social and cultural well-being.

Almost all the pastoralists in Wajir County were Muslims. According to KNBS (2009), Kenya has a population of about 4,305,016 Muslims; of this 655,034 are from Wajir County accounting for about 15 per cent of Muslims in the entire country, and about 97 per cent in Wajir County. In the FAO (2003) report, Islam is an almost exclusively dominant religion

among pastoralists. Kassa and Temesgen, (2011), state that the pastoral communities have strong ties with indigenous and religious institutions.

2.6 Economic Status of the Pastoralists

Pastoralism is an adaptation to marginal environments, characterized by climatic uncertainty and low-grade resources. It has considerable economic value and latent potential in the dry lands, and is central to the livelihoods and wellbeing of millions of the world's poor, but the state of knowledge regarding this sector of the economy is weak (Hatfield & Davies, 2006). In the sub-Saharan African countries, the pressure to change has been exacerbated by the economic structural adjustment programmes that have rendered the traditional extension systems inappropriate (Semana, 1987). It is estimated that the livestock sector provides almost 90 per cent of employment and more than 95 per cent of family incomes in Kenya's ASALs (FAO, 2004). Though according to GoK, (2006) the economic contribution to Kenya, of the ASAL is significant, contributing about 50-70 per cent of the total livestock production. It seems that the extension agents deliberately position themselves to serve the economically well-off households (Carr-Hill & Ondijo, 2011).

2.7 Demographic Characteristics

There are nearly 200 million pastoralists in the world generating income where conventional farming is limited or not possible. However, pastoral communities are marginalized and generally not given due consideration in wider socio-political analysis (Blench, 2001).

Arid and semi-arid lands that pastoralists occupy in Kenya constitute 84 per cent of total land mass in Kenya (Ibrahim, Oanda & Ogachi, 2011). The extent of aridity, coupled with demographic structures, shapes the economic mainstay of these lands; which is nomadic pastoralism. It is estimated that the ASALs are home to 20 per cent of Kenya's total population, which translates to round 8.75 million people. ASALs have low population density of eight persons per square kilometre (Ibrahim et al., 2011).

2.7.1 Age of the pastoralists

Extension officers must also be able to recognize the need to come up with extension outreach programmes, which are specifically made for different age groups in the farming community (Kimaro, et al., 2010). Depending on who is targeted by these public service providers, attitudes towards farming and skills are likely to vary across individual farms.

Farmer characteristics such as farmer's age, farming experience, access to extension services, marital status, and education level affect farm productivity (Seyoum, Battese, & Fleming, 1998). The effect of age on adoption of new agricultural technologies is inconsistent, as farmers get older; they tend to intensify adoption of new technologies in their farms because of more years of experience, higher accumulation of capital and large household sizes (Ashenafi, 2007). According to Kenya Inter Rapid Assessment KIRA (2014) the county's age distribution is 51.8% between 0-14 years, 45.9% (15–64 years) and 2.2% are above 65 years old.

2.7.2 Level of education of the pastoralists

Even when information is available, rural poor may be unable to use it because of illiteracy while almost half (49.3%) of adult in the least- developed countries are unable to read and write (David, Hondrale, Mascarifias, Saz, Vargas & Carambas, 2002). Small-scale farmers may find it more expensive to acquire knowledge hence public extension can equalize access to new methods. However, the agricultural extension agents that follow the nomads may have language barriers, as most pastoralists do not speak Kiswahili due to high rates of illiteracy (Kilele, 2007). According to the findings of the 2006 Kenya National Adult Literacy Survey, the national average literacy level is at 61.5 per cent while that of former North Eastern Province (NEP) is only 8.0 per cent (Kilele, 2007). In addition, the former province has the lowest primary and secondary school enrolment in the country. General lack of formal education and high levels of illiteracy among pastoralists may cause barriers to communication with outsiders (Akabwai, 1993).

The educational level of the household favourably influences farmers' access to extension information. The applied elite bias was a central critic of previous (supply- drive) extension programme based on Training and Visits (T&V). These biases imply a poorly targeted system whereby less educated farmers who are likely to benefit the most from extension advice are largely ignored (Barrett, Andrew & Omiti, 2007). Agricultural extension assists farm people, through educational procedures, in improving farming methods and technologies, increasing production efficiency and income, bettering their levels of living and lifting the social and educational standards of rural life (FAO, 2010).

Better-educated farmers are probably more confident, more innovative and more precise in the communication of their problems. It is notable that just as higher levels of education are

now widely regarded as a particularly potent route whereby levels of birth rate and death rate may be reduced in developing countries, so there seems to be increasing recognition among agricultural experts that expansion of rural education is a key way through which the future productivity of farmers and their fields, can be raised (Dyson, 1996). Dyson further posits that the adoption and development of more efficient and productive methods of food cultivation should be greatly facilitated as levels of education among farmers.

Some extension efforts attempt to overcome this by producing extension materials for radio and television, but again the poorest of the poor often lack access to electronic media. Not only do the rural poor fail to gain information about new technologies, they also risk, through illiteracy, the improper use of existing technologies (David, et al., 2002).

2.7.3 Household size

As a household size increases, the demand for food and other needs increases and hence pressure to produce more for family consumption which could lead to agricultural information seeking and use (Koskei, Langat, Koskei, & Oyugi, 2013). A higher number of family members lead to increased exposure to information (Kacharo, 2007). Farmers with better education have the ability to access information and adopt innovations. Moreover, such farmers are expected to have small household size (Tesama, 2006). Most agents have been men, except in the field of home economics, and have provided services mainly to heads of household, regardless of gender (Buchy & Basaznew, 2005).

2.8 Theoretical Framework

The theoretical framework for this study was based on the model of variables affecting the contributions of local organizations to rural development by Esman and Uphoff (1984). This model identifies a number of intra-organizational and extra-organizational variables and exogenous factors that were hypothesized to affect the contributions of local organizations to rural development. The intra-organizational elements included functional and structural variables such as provision of services (agricultural extension services) and size of the organization respectively. On the other hand, the extra organizational variables included performance (such as growth of income), participation for instance resource contribution, environmental variables and societal norms.

Exogenous factors include government policies, new technology and foreign assistance. The model is bases for the level of local organizations performance on the structure of the organization, the environment within which it operates the kind and extent of members' participation and the extent to which the development possibilities can be facilitated by government or private agents. Esman and Uphoff (1984) emphasize the role that participation in these organizations plays in "development from below" and suggest that great attention be given to the design and governments, voluntary agents, and international donors can significantly influence structure of local organizations. The model indicates that intra-organizational and extra-organizational variables, environmental variables and exogenous factors interact to influence the level of performance of the group, as shown in Figure 1.

The outcome of this interaction may be seen in terms of improved access to agricultural extension services, consequently, increase in agricultural production, income and food security of the pastoralists communities of Wajir County. In this study there is an interaction between independent variables (socio-economic factors) and dependent variables (the agricultural extension services) among the pastoralists in the County.

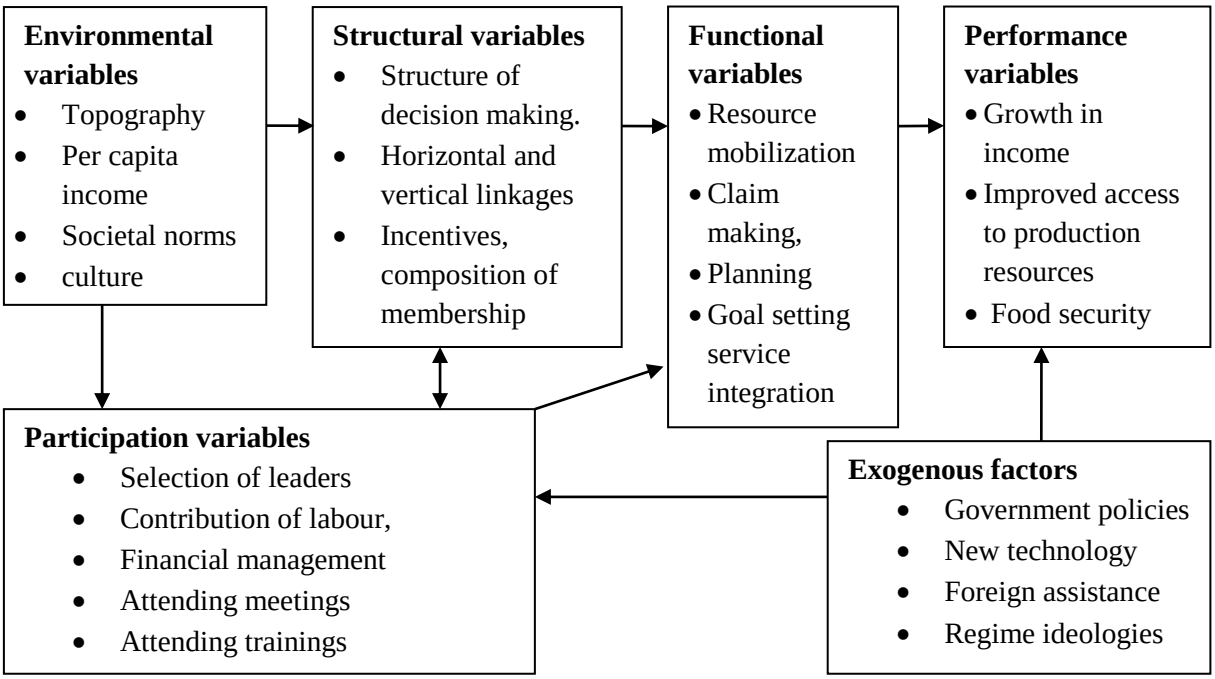

Figure 1

The model of variables affecting the Contributions of Local Organizations to Rural Development.

Source: Esman & Uphoff, (1984).

2.9 Conceptual Framework

The conceptual framework of the study had two main variables, socio-economic factors (independent), and agricultural extension services accessed (dependent). The selected independent variables were broken into sub-variables namely security, cultural factors, economic factors and the interaction between the pastoralists and agricultural extension services providers. The intervening variables that could exist between the socio-economic factors and agricultural extension service accessed were the demographic characteristics. The interaction between independent, dependent and intervening variables is shown in Figure 2.

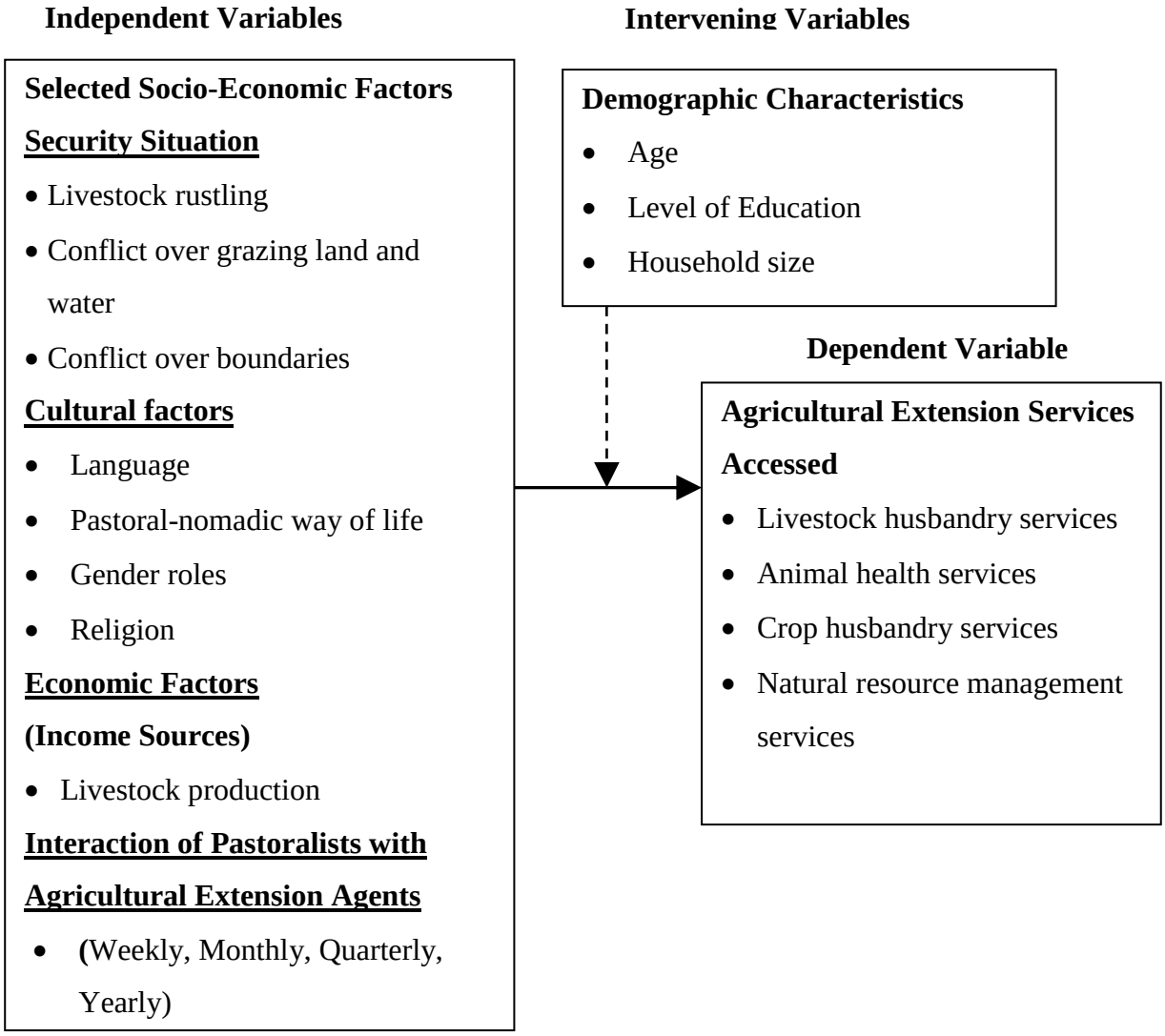

Figure 2

Relationship between Selected Socio-Economic Factors, Demographic Characteristic and Access to Agricultural Extension Services

The study was limited to Wajir County and focused on the influence of selected socio-economic factors influencing access to agricultural extension services among the pastoralists. The socio-economic factors included security situation, cultural factors and demographic characteristics of pastoralists. The agricultural extension services included; livestock husbandry services, animal health services, crop husbandry services and natural resource management services. Public, NGOs and private agricultural extension agents, provides the agricultural extension services. The study collected data from pastoralists accessing these agricultural extension services in Wajir County.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides the methodology used to achieve the objectives of the study. It presents the research design, location of the study, target population, sampling procedures and sample size, instrumentation, validity, reliability, data collection, data organization and analysis. Justification for the choice of specific techniques used in the study was also presented.

3.2 Research Design

The study utilized a descriptive survey design. According to Wiersma (1985) a survey involves studying a situation as it is in an attempt to explain why the situation is the way it is. This design allowed for description of activities, objects and persons. Further, the design type offered description and explanations; it also identified and predicted relationships in and between the variables of the study (Mugenda & Mugenda, 1999).

3.3 Location of the Study

The study area covered Wajir East and Wajir West Sub-Counties which are two of the eight Sub-Counties in the Wajir County. Wajir County is the largest County in the North Eastern part of Kenya. Its maximum width (East - West) is 226 km while the maximum length (North - South) is 350 km. The County has an estimated area of 56,685.9 Sq. Km of which 30 per cent is arable. The County borders the Republic of Somalia to the East, Garissa County to the South, Isiolo County to the Southwest, Marsabit County to the West, Moyale County to the Northwest, Republic of Ethiopia to the North and Mandera County to the Northeast. Wajir town is the major economic hub and is about 720 km from the Capital city of Kenya, Nairobi.

The population predominantly depends on livestock rearing as the main source of livelihood and practice pastoral nomadism (GoK, 2002). The County consists of four livelihood zones: North, primarily agro-pastoral; East and south, primarily pastoralism and some agro-pastoral; West, mainly pastoralism. In Wajir East, there is also an active gum arabic trade (GoK, 2002). The study areas were selected because of their fair representation of both agro-pastoralism and pastoralism livelihood zones in North-Eastern Kenya. They also represent both rural and peri-urban settings. Therefore, the findings would easily be predicted for other parts of the County with a similar setting.

3.4 Target Population

The study targeted household heads in Wajir West and Wajir East Sub-Counties. The Kenya population census of 2009 provided a total listing of 88,574 households with a population of 661,941 persons (363,766 male and 298,175 female) in the entire Wajir County. The target household population of the two sub counties studied was 52,478 households (i.e. Wajir West 21,375 and Wajir East 31,103). According to KIRA (2014) the rate of poverty (adult equivalent poverty head count) is 84.0 per cent higher than the national rate of 47.2 per cent.

The households in both Sub-Counties engaged in pastoral and agro-pastoral activities, livestock rearing and crop production. There is also diversification into other alternative sources of livelihoods which include retailing, collection of gums and resins and paid employment. Wajir County has an illiteracy of 76 per cent (KNBS, 2013).

3.5 Sampling Procedures and Sample Size

Simple random sampling was used to select the household heads in the study. The decision on sampling procedure originated from the fact that pastoral and agro-pastoral communities in the study area derived their income from the same sources (mostly livestock and crops cultivation production); they also access agricultural extension services from the same service providers. Accordingly, there were no major differences regarding their economic activities and access to agricultural extension services thus, the population was considered to be homogenous. In order to get a representative sample from a population, Kathuri and Pals (1993) recommend that when a survey targets a major sub-group, at least 100 cases should be investigated. The researcher used proportions to select a total of 120 household heads from the Sub-Counties. The selection of respondents from each sub county was done using simple randomization. Table 1 shows a summary of the distribution of the samples.

Table 1
Sub-sample Sizes, n=120

Sub-County	Households	Sub-sample Size
Wajir West	21,375	48
Wajir East	31,103	72
Total	**52,478**	**120**

3.6 Instrumentation

Data was collected using a structured questionnaire (Appendix A). This was developed with the advice from the University supervisors. The items were developed based on the research objectives, hypotheses, research question and related literature.

The questionnaire was divided into six sections. Section A collected data on general information of the respondents. Section B focused on security situation influencing access to agricultural extension services. Section C addressed cultural factors influencing access to agricultural extension service. Section D collected data on economic factors influencing access to agricultural extension services. Section E collected information on influence of demographic characteristics (level of education, age and livelihood size) on access to agricultural extension services. Lastly, Section F focused on interaction levels of the pastoralists with agricultural extension agents and how these influence access to agricultural extension services.

3.6.1 Validity of the instrument

Validity is the accuracy and meaningfulness of inferences, which are based on the research results, in other words it is the degree to which results obtained from the analysis of data actually represent the phenomenon under study (Mugenda & Mugenda, 1999). The instrument was subjected to validity scrutiny by Agricultural Officers in Wajir County and two supervisors in the Department of Agricultural Education and Extension at Egerton University who assisted in reviewing it to address content and face validity. The review focused on representativeness of the items in relation to the objectives and variables covered in the study.

3.6.2 Reliability of the instrument

A pilot testing was done using 30 households in Wajir South Sub-County. The pilot Sub-County had similar characteristics (in terms of socio-economic factors) as the study area. Pilot testing was to ensure that there were no deficiencies and ambiguities in the final instrument. After pilot testing, reliability of the instrument was estimated using the Cronbach's coefficient test. Reliability is a measure of the degree to which a research instrument yields consistent results or data after repeated trials. According to Fraenkel and Wallen (2000), a reliability of 0.70 or higher is preferable for research purposes. In the case of the instrument used in this study, a reliability of 0.80 was obtained and this was high

enough to warrant the research. This figure was normally considered respectable and desirable for consistency levels (Henerson, Morries & Fitz-Gibbon, 1987; Koul, 1993).

3.7 Data Collection Procedures

Pre-study visits were made to the respective Sub-County Livestock and Agricultural Departmental offices and Provincial administration of Wajir East and Wajir West to plan for the data collection. Data was collected during normal working days. Individual visits were scheduled with household heads for interviews and data collection. In case the household head was absent the most responsible member was interviewed. Key informants to supplement the information were also interviewed from the Ministry of Agriculture, Livestock and Fisheries and from opinion leaders.

3.8 Data Analysis

The data collected was checked for errors, coded and analysed with the aid of the statistical procedure and service solution (SPSS) version 20. Objective one was analysed quantitatively by use of descriptive statistics and the findings presented in percentages and frequency distribution tables. Objectives two and three were tested and analyzed using descriptive statistics and inferential statistics. Hypothesis (H_{01},) was analysed using descriptive statistics and linear regression analysis. Hypothesis (H_{02}) was tested by descriptive statistics, multiple regression and Pearson's correlation while hypothesis (H_{03}) was analysed by descriptive statistics and linear regression. All the hypothesis were in study were tested at α=0.05. The research question was analyzed by descriptive statistics. The summary of data analysis is presented in Table 2.

Table 2
Summary of Data Analysis Procedures

Hypotheses	Independent Variables (Socio-Economic Factors)	Dependent Variable (Agricultural Extension Services)	Statistical Tests
H_{01} The security situation has no statistically significant influence on access to agricultural extension services among pastoralists in Wajir County.	**Security** • Livestock rustling • Conflict over grazing land and water • Conflict over boundaries	• Livestock husbandry services • Animal health services • Crop husbandry services • Natural resource management services	• Descriptive statistics • Linear Regression Analysis
H_{02} The cultural factors have no statistically significant influence on access to agricultural extension services among pastoralists in Wajir County.	**Cultural factors** • Language • Pastoral-nomadic way of life • Gender roles • Religion	• Livestock husbandry services • Animal health services • Crop husbandry services • Natural resource management services	• Descriptive statistics • Multiple Regression analysis • Pearson's correlation
H_{03} Economic factors have no statistically significant influence on access to agricultural extension services among pastoralists in Wajir County.	**Economic factors** • Income of the households	• Livestock husbandry services • Animal health services • Crop husbandry services • Natural resource management services	• Descriptive statistics • Linear Regression analysis

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Introduction

This chapter provides results of data analyses and discussion with reference to research objectives and hypotheses as stated in chapter one. The aspects analyzed and discussed include: selected socio-economic factors influencing access to agricultural extension services among the pastoralists in Wajir County.

4.2 Description of the Study Population

The study sample consisted of 120 household heads randomly sampled. Respondents from Wajir West were 48 (40.0%) while, 72 (60.0 %) were from Wajir East. The distribution was done proportionately according to household figures by KNBS (2009). The demographic characteristics of the respondents included; gender, age, level of education and Household size as presented and discussed in the following subsections.

4.2.1 Gender of the respondents

Gender is an important parameter in livelihood diversification (WIBD, 2005; Freeman, Kaitibie, Moyo, & Perry, 2008; Simtowe, 2009), which could apply to this sample population. The findings on gender of the household heads are presented in Table 3.

Table 3
Gender of the Household Head Respondents, n=120

Gender	**Wajir West**		**Wajir East**	
	f	**%**	**F**	**%**
Male	41	85.4	53	73.6
Female	7	14.6	19	26.4
Total	**48**	**100.0**	**72**	**100.0**

Female respondents in the study comprised 14.6 per cent and 26.4 per cent in Wajir West and Wajir East respectively, while male respondents were 85.4 per cent and 73.6 per cent Wajir West and Wajir East respectively. Wajir East had high number of respondents since the area comprises both agro-pastoralists and pastoralists and also the Sub-County has a high human population compared to Wajir West Sub-County. In both Kenya and Ethiopia, there are more

men than women in the pastoralist populations than in the national population, in which there are generally more women than men (Bushel, 2010).

4.2.2 Age distribution of the respondents

According to the study by Ephraim, John, Edward, Samuel, Helen, and Geresom, (2009) change in age of household head was an important driver of change in livestock productivity. Results on age distribution are presented in Table 4.

Table 4
Sample Age Distribution by Sub-Counties, n=120

Age of respondents	**Wajir West**		**Wajir East**	
	f	**%**	**f**	**%**
20-30	6	12.5	3	4.2
30-40	11	22.9	11	15.3
40-50	21	43.8	23	31.9
50-60	9	18.8	29	40.3
>60	1	2.1	6	8.3
Total	**48**	**100.0**	**72**	**100.0**

The respondents sampled, were of varying ages ranging between 25 and 69, with a mean of 47.22 in both Sub-Counties. This is supported by Engoru and Bashaasha, (2001) who noted that younger farmers are more dynamic in adopting new technologies than their old counterparts. In Wajir West those with ages 20 to 30 years were 12.5 per cent while in Wajir East this was 4.2 per cent. In Wajir West the dominant age categories of 40 to 50 years were 43.8 per cents while Wajir East the dominant age category (50 to 60 years) was 40.3 per cents.

4.2.3 Respondents' level of education

The level of education attained by household head was expected to influence access to agricultural extension services in the two Sub-Counties. In order to determine the level of education, a value of 1 was assigned to no formal education, 2 for adult education, 3 for primary, 4 for secondary, 5 for diploma, while 6 with post diploma education. The results are presented in Table 5.

Table 5
Distribution of Respondents by Education level, n=120

Level of Education	f	%
No formal education	90	75.0
Adult education level	13	10.8
Primary level	12	10.0
Secondary level	5	4.2
Diploma	0	0
Post diploma	0	0
Total	**120**	**100.0**

In both Sub-Counties 75.0 per cent, of the household heads had no formal education; about 10.0 per cent had adult education (courses for adults who are out of school) and primary education while those with secondary education comprised 4.2 per cent. This was in agreement with studies by Ngugi (2013) where, only 4 per cent of Wajir County residents had a secondary level of education or above while, total of 20 per cent of Wajir County residents had a primary level of education but as many as 76 per cent of, Wajir County residents had no formal education. Wajir County has an illiteracy level of 76 per cent (KNBS, 2013). In the former North Eastern Province, literacy level of only 37.7 per cent was recorded in 1999 (GOK, 2005b). IMF, (2001) reported that as most farmers are illiterate or have little primary level education, their ability to access agricultural extension and innovation was restricted.

4.2.4 Household size of respondents

According to (KNBS, 2012) the average household size in Wajir is 7.5, (70%) higher than the national household size of 4.4. In the study the household size of the respondents were determined as in Table 6.

Table 6
Household size of the Respondents, n=120

Household Size	Wajir West		Wajir East	
	f	%	F	%
<=4	10	20.8	6	8.3
5-8	16	33.3	16	22.2
9-12	11	22.9	23	31.9
13-16	9	18.8	24	33.3
>16	2	4.2	3	4.2
Total	**48**	**100.0**	**72**	**100.0**

The sampled household heads had family members of 4 to 16 members in Wajir West, while in Wajir East the Household size was between 3-24 members. In Wajir west 33.3 per cent of the respondents had 5 to 8 members of the family while Wajir East 33.3 per cent of the respondents had the highest number of family members of 13 to 16 members. According to Ngugi (2013) Wajir County has very high fertility rates among women as shown by the highest percentage household size of more than 7 members at 68 per cent.

4.2.5 Livelihoods of the respondents

Nomadic pastoralism is an ancient form of livelihood. It is said to be the most efficient use of the dry lands such as Arid and Semi-Arid Lands (ASAL) of Kenya. Table 7 presents livelihoods of the respondents in the two Sub-Counties.

Table 7
Livelihoods of the Respondents by Sub-County n=120

Livelihoods	**Wajir West**		**Wajir East**	
	f	**%**	**f**	**%**
Pastoral Nomadic	27	56.25	0	0
Agro-Pastoral	21	43.75	72	100
Total	**48**	**100**	**72**	**100**

According to the findings, 56 per cent of the respondents in Wajir West derived their livelihoods from pastoral nomadism while 43 per cent relied on agro- pastoralist as their main source of livelihood. In Wajir East the respondents were mainly agro-pastoralism 72 (100%). The ASAL constitutes about 84 per cent of the total land and populated by about 20 per cent of Kenya's population (GoK, 2007). Pastoralism is practiced in 75 per cent of ASALs (Mugo, Ogwenyi & Ruto, 2009; Krätli, 2001).

4.3 Frequency of access to agricultural extension services

The research question stated that "How frequently do pastoralists access agricultural extension services in Wajir County?" The frequency levels were investigated using descriptive statistics and the results are presented in Tables 8 and 9 respectively.

Table 8
Access to Agricultural Extension Services by Pastoralists in Wajir West n=48

Agricultural Extension Services	**Frequency Access**								**Total**	
	Yearly		**Quarterly**		**Monthly**		**Weekly**			
	f	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Feeding livestock services	1	2.1	13	27.1	14	29.2	20	41.7	48	100
Selection and breeding	7	14.6	35	72.9	5	10.4	1	2.1	48	100
Routine management	2	4.2	33	68.8	12	25.0	1	2.1	48	100
Livestock Value addition	4	8.3	29	60.4	11	22.9	4	8.3	48	100
Record keeping services	6	12.5	28	58.3	10	20.8	4	8.3	48	100
Marketing information	1	2.1	31	64.6	10	20.8	6	12.5	48	100
Vaccination/pest control	0	0	32	66.7	13	27.1	3	6.3	48	100
Treatment of livestock	3	6.3	30	62.5	13	27.1	2	4.2	48	100
Disease surveillance	23	47.9	10	20.8	13	27.1	2	4.2	48	100
Land preparation	0	0	41	85.4	6	12.5	1	2.1	48	100
Planting and field practices	0	0	44	91.7	2	4.2	2	4.2	48	100
Harvesting	0	0	41	85.4	4	8.3	3	6.3	48	100
Value addition on crop	1	2.1	33	68.8	5	10.4	9	18.8	48	100
Crop marketing information	25	52.1	8	16.7	3	6.3	12	25.0	48	100
Gums and resins	5	10.4	10	20.8	33	68.8	0	0	48	100
Range management	31	64.6	16	33.3	1	2.1	0	0	48	100

In Wajir West Sub-County, 16 agricultural extension services were accessed. Eleven (11) agricultural extension services were accessed by more than 50 per cent of the respondents on quarterly basis **(**at least once). The services accessed included: selection and breeding of livestock accessed by 73 per cent of the respondents, livestock routine management (68%), livestock products value addition (60%), livestock records keeping (58%), livestock marketing information (65%), vaccination/pest control (66.7%), treatment of livestock (63%), land preparation (85.4%), planting and field practices (91.7%), harvesting and post harvesting (85.4%), crop produce value addition (68.8%). Accessing these services once per quarter was expected since the Sub-County has few number of agricultural extension services officer.

Gums and resins production services were accessed on monthly bases by 68.8 per cent. Crop marketing was accessed by 52.1 per cent of the respondents once a year, while diseases surveillance was accessed once a year by 47.9 per cent of the respondents. Livestock feeding services were accessed once a week by 20 (41.7 %) respondents. These may have been due to the fact that livestock feeding is crucial for livestock health and production. According to studies by Yazan, Nyariki, Wasonga, and Ekaya, (2012) access to extension services showed positive and significant influence on the per capita daily income and that the households with access to technical advice and information realized higher production and more income than those that did not access extension services.

Table 9
Access to Agricultural Extension Services by Pastoralists in Wajir East n=72

Agricultural Extension Services	**Frequency of Access**									
	Yearly		**Quarterly**		**Monthly**		**Weekly**		**Total**	
	f	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Feeding of livestock	0	0	23	31.9	32	44.4	17	23.6	72	100
Selection and breeding	0	0.0	28	38.9	32	44.4	12	16.7	72	100
Routine management	0	0.0	10	13.9	59	81.9	3	4.2	72	100
Livestock Value addition	0	0.0	34	47.2	32	44.4	6	8.3	72	100
Record keeping services	0	0.0	20	27.8	32	44.4	20	27.8	72	100
Marketing information	0	0.0	6	8.3	32	44.4	34	47.2	72	100
Vaccination/pest control	0	0.0	55	76.4	0	0.0	17	23.6	72	100
Treatment of livestock	0	0.0	52	72.2	4	5.6	16	22.2	72	100
Disease surveillance	62	86.1	7	9.7	0	0.0	3	4.2	72	100
Land preparation	0	0	37	51.4	32	44.4	3	4.2	72	100
Planting and field practices	0	0	69	95.8	0	0.0	3	4.2	72	100
Harvesting crop	0	0	63	87.5	0	0.0	9	12.5	72	100
Value addition on crop	0	0.0	36	50.0	0	0.0	36	50.0	72	100
Crop marketing information	0	0.0	10	13.9	32	44.4	30	41.7	72	100
Gums and resins	1	1.4	33	45.8	33	45.8	5	6.9	72	100
Range management	33	45.8	9	12.5	27	37.5	3	4.2	72	100

In Wajir East Sub-County, 44.4 per cent of the respondents reported to have accessed feeding of livestock selection and breeding of livestock, livestock record keeping services and crop marketing information services once per month. Only 81.9 per cent indicated to access livestock routine management on monthly basis.

However, more than 50 per cent of the respondents accessed the following services on quarterly**,** vaccination/deworming/pests control at 76.4 per cent, treatment of livestock

(72.2%), land preparation (51.4%), planting and field practices (95.8%), harvesting and post harvesting (87.5%), value addition on crop produce (50.0%). Livestock products value addition and gums and resins production were also accessed on quarterly bases as reported by 47 per cent and 45.8 per cent respondents respectively. Livestock marketing information was accessed by 47 per cent of the respondents on weekly.

4.3.1 Level of access to agricultural extension services by Sub-County

The mean level of access to agricultural extensions services was calculated by assigning numeric values to the categories. The most frequent level of access was assigned the highest value of four (4) at least once week and the less frequent interaction was given a comparatively lower value of one(1) that is at least once a year. The categories and respective values were: Yearly =1, Quarterly=2, Monthly =3 and Weekly = 4. Upon comparison of the means, access of agricultural extension services in Wajir East was higher than in Wajir West, as presented in Table 10.

Table 10
Level of Access to Agricultural Extension Services by Sub-County, n=120

	Wajir West		**Wajir East**	
Level of Access	**f**	**%**	**f**	**%**
Quarterly	38	79.2	53	73.6
Monthly	10	20.8	19	26.4
Total	**48**	**100.0**	**72**	**100.0**

Majority of the pastoralists (79.2%) in Wajir West and (73.6%) in Wajir East reported accessing agricultural extensions services once per quarter (a period of three months). The mean access to agricultural extensions services for Wajir East was 2.63, compared to the mean level of overall access to agricultural extension services in Wajir West of 2.19.

In Wajir East, the level of access to agricultural services was higher than that of Wajir East due to the fact that majority of the pastoralists practiced agro-pastoralism and migrated less frequently thus being available than pastoralists in Wajir West. The interaction between extension agents and farmers is a critical component in the farm programs to ensure that farmers are using up-to-date reliable information specific to their needs (National Research Council, 2010).

4.4 Security Situation and Access to Agricultural Extension Services

According to the UNOCHA (2008) the police and security services have lacked the capacity to provide security to pastoralist communities. The discussion below is based on the nature and occurrence of security in the County.

4.4.1 Nature of security situation in Wajir County

Three security situations were analysed: livestock rustling, conflict over grazing land and water, and conflict over boundaries. The result of this analysis is presented in Table 11.

Table 11
Nature of Security Situation by Sub-County, n=120

Area	Nature Security Situation	Wajir West						Wajir East					
		Yes		No		Totals		Yes		No		Totals	
		f	%	f	%	f	%	f	%	f	%	f	%
Within the study area	- Livestock rustling.	41	85.4	7	14.6	48	100	68	94.4	4	5.6	72	100
	- Grazing land and water conflict.	28	58.3	20	41.7	48	100	44	61.1	28	39	72	100
	- Boundaries Conflict.	3	6.3	45	93.7	48	100	1	1.4	71	99	72	100
Between study area and neighbouring Sub-County	- Livestock rustling.	40	83.3	8	16.7	48	100	65	90.3	7	9.7	72	100
	- Grazing land and water conflict.	5	10.4	43	89.6	48	100	0	0	72	100	72	100
	- Boundaries Conflict.	2	4.2	46	95.8	48	100	14	19.4	58	81	72	100
Between study area and neighbouring counties	- Livestock rustling.	42	87.5	6	12.5	48	100	66	91.7	6	8.3	72	100
	- Grazing land and water conflict.	29	60.4	19	39.6	48	100	57	79.2	15	21	72	100
	- Boundaries Conflict.	0	0	48	100	48	100	0	0	72	100	72	100
Between study area and neighbouring countries	- Livestock rustling.	0	0	48	100	48	100	0	0	72	100	72	100
	- Grazing land and water conflict.	30	62.5	18	37.5	48	100	61	84.7	11	15	72	100
	- Boundaries Conflict.	0	0	48	100	48	100	0	0	72	100	72	100

Within the study area, livestock rustling was reported by 85 per cent of the respondents in Wajir West Sub-County compared to 94.4 per cent in Wajir East Sub-County. In Wajir East, livestock rustling could have been high since the Sub-County boarders' Mandera and Somalia. These regions have different clans that are involved in livestock rustling. Similarly, 58.3 per cent of the respondents in Wajir West reported conflict over grazing land and water as a as compared to 61.1 per cent in Wajir East Sub-County. Conflict over water and grazing land is very common, be due to limitation of these resources probably as result of effects of climate change and chronic drought in the study area. Conflict over boundaries on the other hand, was reported by only 6.3 per cent in Wajir West Sub-County and 1.4 per cent in Wajir East Sub-County.

Livestock rustling between the study area and neighbouring Sub-Counties was reported by 83.3 per cent of the respondents in Wajir West and 90.3 per cent in Wajir East. Conflict over grazing land and water was reported by 10.4 per cent in Wajir West and was not reported in Wajir East Sub-County. This may be attributed to the fact that Wajir East has adequate shallow wells for livestock and it is in an urban setting. About 20 per cent of the respondents in Wajir East Sub-County and 4.2 per cent in Wajir West reported conflict over boundaries.

The main security situations between the study area and neighbouring counties as reported by the respondents were livestock rustling and conflict over grazing land and water. Livestock rustling was reported by 87.5 per cent and 91.7 per cent of the respondents in Wajir West and Wajir East respectively. Conflict over grazing land and water was reported by 60.4 per cent of the respondents in Wajir West and by 79.2 per cent in Wajir East as a security situation. This was expected as a result of scarcity caused by chronic drought.

The only security situation reported between the study area and the neighbouring countries was conflict over grazing land and water. This was reported by 62.5 per cent of the respondents in Wajir West and 84.7 per cent of the respondents in Wajir East Sub-County. No respondents reported conflict over boundaries with the neighbouring countries as security situation. According to Mwaura (2005) conflict in pastoral areas is often associated with their marginal areas and weak state penetration, while studies by Bushel (2010) indicated that, lack or inefficiency of governmental structures has generated endemic insecurity and conflict that have put pressure on pastoralist populations.

During livestock rustling, the pastoralists moved away. This is in agreement with the study done by Young, Osman, Aklilu, Dale, Badri and Fuddle (2005) which reported that insecurity leads to migration and the escape may involve long or short distances, depending on the information available about insecurity and the availability of resources. Conflict over grazing land and water reduced access to agricultural extension services by the pastoralists. This may have been due to the fact that, most of the time was spent on resolving conflict.

The perceived security situation was also recorded in order to examine the influence of security on access to agricultural extension services. The results are presented in Table 12.

Table 12
Nature of Security Situation on Access to Agricultural extension Services by sub county n=120.

Sub-County	Level of influence	Livestock Rustling	Conflict over Boundaries	Conflict over Overgrazing
Wajir West	Moderately influence	42	29	43
	Does not influence	6	19	5
	Sub-Total	**48**	**48**	**48**
Wajir East	Moderately influence	69	45	64
	Does not influence	3	27	8
	Sub-Total	**72**	**72**	**72**

Overall results showed that, security situations in terms of livestock rustling, conflict over boundaries, conflict over grazing land and water in both the Sub-Counties moderately influenced access to agricultural extension services negatively. This suggested that the pastoralists may not be accessing the agricultural services fully as they engage most of the time solving the conflicts.

4.4.2 Occurrence of security situations in the Sub-Counties

Studies by Lecoutere, D'Exelle, and Van Campenhout, (2010) showed that, there was a causal relation between scarcities of natural resources and violent conflict. According to Kaimba**,** Njehia, and Guliye, (2011) the practice of livestock rustling was rampant amongst pastoralist communities in Kenya. It destabilizes communities and undermined their normal livelihood strategies, thus contributing to increased poverty. Kaimba**,** et al., (2011) therefore, noted that livestock rustling may have influence on the access to agricultural extension

services. The frequency of security situation was investigated and the results are presented in Table 13.

Table 13
Frequency of Security Situations, n=120

Sub-County	Response	Livestock Rustling		Overgrazing and Water		Conflict Over Boundaries	
		f	%	f	%	F	%
Wajir West	None	6	12.5	5	10.4	19	39.6
	Occasionally	37	77.1	35	72.9	29	60.4
	Frequently	4	8.3	6	12.5	0	.0
	Most Frequently	1	2.1	2	4.2	0	.0
	Sub Total	**48**	**100.0**	**48**	**100.0**	**48**	**100.0**
Wajir East	None	3	4.2	8	11.1	27	37.5
	Occasionally	68	94.4	62	86.1	45	62.5
	Frequently	1	1.4	2	2.8	0	.0
	Most Frequently	0	.0	0	.0	0	.0
	Sub Total	**72**	**100.0**	**72**	**100.0**	**72**	**100.0**

In each of the Sub-Counties, the highest proportion of the respondents reported that the various security situations influencing access to agricultural services occurred occasionally. In Wajir West Sub-County, 77.1 per cent of the respondents reported livestock rustling occurred occasionally. Similarly, 72.9 per cent indicated that conflict over overgrazing and water security also occurred occasionally. In Wajir East Sub-County livestock rustling and conflict over grazing and water resources occurred occasionally as reported by 94.4 per cent and 86.1 per cent of the respondents respectively.

4.5 Cultural Factors on Access to Agricultural Extension Services

The third objective of the study was to determine the influence of cultural factors on access to agricultural extension services among the pastoralists in Wajir County. In the study the main cultural factors analysed in relation to access to agricultural extension services included; language, gender roles, religion and pastoral way of life.

4.5.1 Languages and dissemination of agricultural extension services

The results indicated that languages commonly used in dissemination of agricultural extension services in both Sub-Counties were English and Kiswahili. According to the study, 96.7 per cent of all respondents reported that translation was used during access of agricultural extension services. This shows that respondents were not able to understand the

languages used in disseminating agricultural extension services. This was expected, since 75.0 per cent of the household heads had no formal education whereas 10.8 per cent had received adult education. This is in line with report by FAO, (1997) that, language differences and illiteracy can impede communication of improved technology unless they are taken into account.

4.5.2 Pastoral way of life of the respondents

The nature of pastoral livelihoods demands a high degree of mobility guided by the need for access to water and grazing land without deference to state borders (Mwaura, 2005). According to Rota (2009) mobility enables pastoralists to take advantage of pasture resources that are only seasonally accessible, and allows access to salt patches (critical for animal health) and other resources. The study sought the frequencies of migration in the two Sub-Counties. The results on the frequency of migration are as presented in Table 14.

Table 14
Frequency of Migration by the Pastoralists, n=120

Migration Frequency	**Wajir West**		**Wajir East**	
	f	**%**	**f**	**%**
Daily	1	2.1	0	0
Weekly	2	4.2	0	0
Monthly	13	27.1	0	0
Seasonal	32	66.7	13	18.1
Not at all	0	0	59	81.9
Total	**48**	**100.0**	**72**	**100.0**

In Wajir West Sub-County 66.7 per cent of the respondents reported seasonal migration, while 18.9 per cent in Wajir East Sub-County reported seasonal migration. In Wajir East Sub-County there were no daily, weekly and monthly migrations as compared with Wajir West. A large proportion (81.9%) of the respondents in Wajir East Sub-County indicated that they did not migrate. The high level of migration experienced in Wajir West might have been due to fact that most (56.25%) of the households are pastoralists while in Wajir East all the respondents were agro-pastoralist who migrated less frequently. Otter, Olago and Niang (2007) noted that agro-pastoral land-use systems are on the increase in most of the semi-arid ecological zones due to interaction of cultivation and grazing.

4.5.3 Religion and access to agricultural extension services

In the study all the respondents (100%) interviewed were Muslims. These results are consistent with KNBS (2009) Kenya has a population of about 4,305,016 Muslims; of this 655,034 are from Wajir County accounting for about 15 per cent of Muslims in the entire country. FAO (2003) reported that Islam is an almost exclusively dominant religion among pastoralists. According to Kassa and Temesgen (2011) the pastoral communities have strong ties with indigenous and religious institutions.

The mean influence of religion on access to agricultural extension services was calculated by assigning numeric values to the categories. The values given were used to indicate the level of influence of religion on access to extension services. The 'high influence level' on access was given the highest value (4) and no influence was given a comparatively lower value (1). The categories were given the following values: 1= does not influence, 2= slightly influence, 3= moderately influences, 4= highly influences. The results of the investigation are presented in Tables 15 and 16 respectively.

Table 15
Influence Levels of Religion on Access to Agricultural Extension Services in Wajir West, n=48

Agricultural Extension Services	Level of Influence									
	None		Slightly		Moderately		Highly		Total	
	f	%	f	%	f	%	F	%	f	%
Feeding of livestock	6	13	38	79	3	6	1	2	48	100
Selection and breeding of livestock	7	15	35	73	5	10	1	2	48	100
Livestock routine management	11	23	30	63	4	8	3	6	48	100
Value addition on livestock products	11	23	30	63	1	2	6	13	48	100
Livestock record keeping	35	73	8	17	2	4	3	6	48	100
Livestock marketing information	34	71	8	17	2	4	4	8	48	100
Vaccination/ disease control	38	79	6	13	3	6	1	2	48	100
Treatment of livestock	37	77	6	13	3	6	2	4	48	100
Disease surveillance	37	77	6	13	3	6	2	4	48	100
Land preparation	5	10	38	79	3	6	2	4	48	100
Planting and field practices	3	6	34	71	9	19	2	4	48	100
Harvesting and post harvesting	3	6	34	71	9	19	2	4	48	100
Value addition on crop produce	5	10	32	67	6	13	5	10	48	100
Crop marketing information	4	8	34	71	4	8	6	13	48	100
Gums and resins collection	4	8	25	52	10	21	9	19	48	100
Range management	28	58	4	8	13	27	3	6	48	100

In Wajir West Sub-County 60 per cent and above of the respondents reported that religion slightly influences access to agricultural extension services. However, 70 per cent and above of the respondents noted that religion did not influence access to livestock record keeping, livestock marketing information, vaccination/disease control, treatment of livestock and disease surveillance services.

Table 16
Influence Levels of Religion on Access to Agricultural Extension Services in Wajir East, n=72

Agricultural Extension	**Level of Influence**									
Services	**None**		**Slightly**		**Moderately**		**Highly**		**Total**	
	f	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Feeding of livestock	23	32	11	15	38	53	0	0	72	100
Selection and breeding	23	32	11	15	38	53	0	0	72	100
Routine management	23	32	11	15	38	53	0	0	72	100
Value addition	23	32	11	15	38	53	0	0	72	100
Record keeping	34	47	0	0	38	53	0	0	72	100
Livestock marketing	34	47	0	0	38	53	0	0	72	100
Vaccination/ disease control	34	47	0	0	38	53	0	0	72	100
Treatment of livestock	34	47	0	0	38	53	0	0	72	100
Disease surveillance	34	47	0	0	38	53	0	0	72	100
Land preparation	23	32	11	15	38	53	0	0	72	100
Field practices	23	32	11	15	38	53	0	0	72	100
Harvesting	23	32	11	15	38	53	0	0	72	100
Value addition on crops	23	32	11	15	38	53	0	0	72	100
Crop marketing	23	32	11	15	38	53	0	0	72	100
Gums and resins collection	23	32	12	17	37	51	0	0	72	100
Range management	34	47	0	0	38	53	0	0	72	100

In Wajir East Sub-County, 50 per cent of the respondents reported that religion influenced the access to all the agricultural extension service moderately. This may be due to the fact that occasionally pastoralists break for prayers during access to agriculture extension services.

4.5.4 Gender and access agricultural extension services

According to FAO (1995) it was established that only 20 per cent of women attend agricultural meetings at an average rate of two to three times per year, as compared to 60 per cent of men attending these meetings at the rate of about five times per year. The study sought to investigate the gender accessing agricultural extension services in the two Sub-Counties. The results are presented in the Table 17.

Table 17
Agricultural Extension Services Accessed by Gender by Sub-County, n=120

Selected Agricultural Extension Services	**Wajir West**						**Wajir East**					
	Male		**Female**		**Totals**		**Male**		**Female**		**Totals**	
	f	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**F**	**%**	**f**	**%**
Feeding of livestock	45	94	3	6	48	100	40	56	32	44	72	100
Selection and breeding	45	94	3	6	48	100	72	100	0	0	72	100
Routine Management	28	58	20	42	48	100	44	61	28	39	72	100
Value Addition	17	35	31	65	48	100	4	6	68	94	72	100
Record keeping	40	83	8	17	48	100	67	93	5	7	72	100
Marketing Information	43	90	5	10	48	100	38	53	34	47	72	100
Vaccination	42	88	6	13	48	100	61	85	11	15	72	100
Treatment of Livestock	41	85	7	15	48	100	72	100	0	0	72	100
Disease Surveillance	44	92	4	8	48	100	72	100	0	0	72	100
Land Preparation	25	52	23	48	48	100	44	61	28	39	72	100
Field practices	26	54	22	46	48	100	43	60	29	40	72	100
Harvesting	38	79	10	21	48	100	61	85	11	15	72	100
Crop Value addition	40	83	8	17	48	100	35	49	37	51	72	100
Crop marketing	30	63	18	38	48	100	60	83	12	17	72	100
Gums and Resins	45	94	3	6	48	100	72	100	0	0	72	100
Range management	47	98	1	2	48	100	72	100	0	0	72	100

In Wajir West Sub-County, 90 per cent and above of the male respondents interviewed accessed the following agricultural extensions services, livestock feeding, selection and breeding, livestock marketing information, disease surveillance, gums and resins production and range management, compared to 10 per cent of women respondents. Livestock husbandry and collection of gums and resins is mainly done by male in the pastoral set up.

However, 80 per cent of the respondents of the male in Wajir West Sub-County accessed livestock record keeping, vaccination/disease control, treatment of livestock services, 50 per cent of the male respondents accessed livestock routine management, livestock product value addition, land preparation and planting and field management while 63 per cent and 79 per cent males accessed crop marketing information and harvesting and post harvesting practices respectively.

In Wajir East Sub-County, all male respondents accessed the following agricultural extension services; selection and breeding of livestock, treatment of the livestock, disease surveillance, gums and resin production and range management. This could have been due to the fact that male practiced the accessed agricultural service than female. Ninety three (93) per cent of the male respondents accessed livestock record keeping, whereas 80 per cent accessed vaccination/disease control, harvesting and post harvesting of crops, and crop marketing extension services, 60 per cent of the males accessed livestock routine management, land preparation, and planting and field management practices compared to the female. Fifty (50) per cent male accessed livestock feeding, livestock marketing information and crop value addition. However, female in both Sub-Counties accessed livestock products value addition and crop products value addition extension services more than male respondents.

In the study, it was established that males accessed most of the agricultural extension services compared to females in both Sub-Counties. According to the study by Nambiro, Omiti, and Mugunieri (2005) the male household heads were significantly more likely to seek extension services. Studies by Kristijanson, et al.(2010) indicated that, lack of access by women to extension services include long work days which precluded them from engaging with, or seeking for extension services. According to Cohen and Lemma (2011) the gender division of agricultural activities has constrained women's access to extension services.

4.6 Economic Factors and Access to Agricultural Extension Services

Agricultural extension contributes positively to productivity and income (Dercon, Gilligan, Hoddinott, & Woldenhanna, 2009). The study investigated influence of income from livestock rearing on access to agricultural extension services by the respondents.

4.6.1 Income Sources of the respondents

The majority of the pastoralists live within the marginal areas of the country, on the fringe of the pastoral zone (ILRI, 1995). The study focused on livestock rearing as the main source of income among the pastoralists. The results are presented in Table 18.

Table 18
Sources of Income of the Respondents by Sub County, n=120.

Source of income	**Wajir West**		**Wajir East**		**Totals**	
	f	**%**	**f**	**%**	**f**	**%**
Livestock Rearing	44	91.7	15	20.8	59	49.2
Crop Production	1	2.1	57	79.2	58	48.3
Paid Employment	2	4.2	0	0	2	1.7
No Income reported	1	2.1	0	0	1	0.8
Total	**48**	**100.0**	**72**	**100.0**	**120**	**100**

According to the findings, 49 per cent of the respondents' main source of income was livestock rearing in both Sub-Counties. Wajir West Sub-County had a higher percent of 91.7 than Wajir East, which had only 20.8 per cent. The results also showed that 48.3 per cent of the respondents who derived income from crop production may be due to the fact that some of the pastoralists practiced agro-pastoralism, especially those from Wajir East Sub-County (79.2%). This is in agreement with study conducted by Sodiya et al. (2008), which indicated that, pastoralists derive most of their income or sustenance from keeping livestock while agro pastoralist derives their living mainly from joint crop-livestock operations. Only 1.7 per cent of the respondents in both Sub-Counties reported paid employment as being a source of income. This may be due low levels of employment in Wajir County.

In Wajir East, the agro-pastoralists household have settled around shallow wells and despite sale of livestock and their products, they were also engaged in limited crop and pasture production through bucket irrigation for local market. Livestock sales are the main source of income for the poor and middle pastoralists and also for agro-pastoralists and sedentary farmers (Nin Pratt, Bonnet, Jabbar, Ehui & de Haan, 2005).

4.6.2 Income from livestock rearing per year

The income earned by selling livestock or their products is often the main source of cash for many peasants and other farmers in developing countries (People & Bailey, 2012). Table 19 presents the findings on income derived from livestock rearing in both Sub-Counties.

Table 19
Income from Livestock Rearing by Sub County n=120.

	Wajir West						Wajir East	
	Nomadic Pastoral		Agro-Pastoral		Total		Agro-Pastoral	
Income Per Year	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
<30,000	8	29.6	9	42.9	17	35	58	80.6
30,000-60,000	4	14.8	4	19.0	8	17	8	11.1
60,000-90,000	2	7.4	1	4.8	3	6	2	2.8
90,000-120,000	4	14.8	1	4.8	5	10	0	0
120,000-150,000	1	3.7	3	14.3	4	8	0	0
>180,000	1	3.7	1	4.8	2	4	0	0
No Income Recorded	7	25.9	2	9.5	9	19	4	5.6
Sub-totals					**48**	**100**	**72**	**100.0**

According to the respondents interviewed in Wajir West Sub-County, 4.8 per cent of the agro-pastoral household and 3.7 per cent of the pastoral nomadic earned more than 180,000 shillings from livestock rearing. However, out of 48 pastoral nomadic household interviewed only 29.6 per cent earned 30,000 shillings per year from livestock rearing, while 14.8 per cent earned between 30,000 and 60,000 shillings per year. In Wajir East Sub-County , the main source of livelihood was agro-pastoralism of the 72 household heads 58 (80.6%) earned less than 30,000 shillings per annum from the livestock rearing while 11.1 per cent of the respondents earned between 30,000- 60,000 shillings per year.

The disparity in income for the two Sub-Counties could be because pastoralists and agro-pastoralists may be engaged in alternative sources of income like, planting of crops, collection and selling of gums and resins from the trees in the range land, harvesting of sand, gypsum and stones, transportation, shop retailing and paid employment to manage the risk that is occasionally caused by recurrent drought. Pastoral household income areas are characterized by seasonal fluctuations, which force people to engage in many activities like selling firewood and charcoal (Sandford, 1983). There has also been a trend toward diversification of income sources, seen in pastoral areas including northern Kenya (McPeak & Little, 2004).

High income from livestock rearing in both the Sub-Counties may be due to large tracts of communal range land that can accommodate large number of livestock. However, recurrent droughts occasionally occur. Second source of income, crop production in both Sub-Counties was low. There are various reasons that may be attributed to this situation, among them is adverse weather conditions which cannot support most food crops; salinity of the water and poor soils.

4.6.3 Economic status and Access to Agricultural Extension Services

Economic status in Wajir West highly influenced the access of agricultural extension services than in Wajir East Sub-County. The findings are presented in Tables 20 and 21 respectively.

Table 20
Economic Status on Access to Agricultural Extension Services in Wajir West Sub-County n=48

Agricultural Extension Services	**Influence Levels of economic status**									
	Does not		**Slightly**		**Moderately**		**Highly**		**Total**	
	f	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Feeding of livestock	2	4.17	10	20.83	8	16.67	28	58.33	48	100
Selection and breeding	1	2.08	14	29.17	6	12.50	27	56.25	48	100
Routine management	1	2.08	16	33.33	6	12.50	25	52.08	48	100
Value addition	0	0.00	12	25.00	8	16.67	28	58.33	48	100
Record keeping	1	2.08	14	29.17	8	16.67	25	52.08	48	100
Livestock marketing	2	4.17	9	18.75	12	25.00	25	52.08	48	100
Vaccination	0	0.00	4	8.33	3	6.25	41	85.42	48	100
Treatment of livestock	0	0.00	3	6.25	8	16.67	37	77.08	48	100
Disease surveillance	0	0.00	3	6.25	10	20.83	35	72.92	48	100
Land preparation	1	2.08	11	22.92	6	12.50	30	62.50	48	100
Field practices	0	0.00	10	20.83	7	14.58	31	64.58	48	100
Harvesting	1	2.08	10	20.83	7	14.58	30	62.50	48	100
Value addition on crop	0	0.00	13	27.08	7	14.58	28	58.33	48	100
Crop marketing	0	0.00	17	35.42	3	6.25	28	58.33	48	100
Gums and resins	1	2.08	16	33.33	3	6.25	28	58.33	48	100
Range management	11	22.92	7	14.58	2	4.17	28	58.33	48	100

In Wajir West Sub-County, the accesses to agricultural extension services were highly influenced by economic factors. According to the findings between 52.08 per cent to 58.33 per cent of the respondents indicated that economic status (income) highly influenced the access to the following agricultural extension services; feeding of livestock, selection and breeding of livestock, livestock routine management, value addition on the livestock products, livestock record keeping, livestock marketing information, value addition on crop produce, crop marketing information, gums and resins production and range management. About 60 per cent to 64 per cent of the respondents noted that their economic status influence access to land preparation, field practices, harvesting and post harvesting practices. Lastly, above 72.92 per cent of the household heads interviewed noted that economic status highly influenced the access to treatment of livestock, disease surveillance and vaccination/disease control services. The result implied that income realized from livestock rearing, crop production and natural resources was the driving force to access more of the agricultural extension services.

Table 21
Influence Levels of Economic Status on Access to Agricultural Extension Services in Wajir East Sub-County, n=72

Agricultural extension services	**Influence Levels of Economic Status**									
	Does not		**Slightly**		**Moderately**		**Highly**		**Total**	
	F	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Feeding of livestock	0	0	2	3	42	58	28	39	72	100
Selection and breeding	0	0	2	3	42	58	28	39	72	100
Routine management	0	0	2	3	42	58	28	39	72	100
Value addition	0	0	2	3	42	58	28	39	72	100
Record keeping	0	0	2	3	42	58	28	39	72	100
Livestock marketing	0	0	2	3	42	58	28	39	72	100
Vaccination	0	0	2	3	43	60	27	38	72	100
Treatment of livestock	0	0	2	3	43	60	27	38	72	100
Disease surveillance	0	0	2	3	43	60	27	38	72	100
Land preparation	0	0	2	3	42	58	28	39	72	100
Field practices	0	0	2	3	42	58	28	39	72	100
Harvesting	0	0	2	3	42	58	28	39	72	100
Value addition on crop	0	0	2	3	42	58	28	39	72	100
Crop marketing	0	0	2	3	42	58	28	39	72	100
Gums and resins	0	0	2	3	42	58	28	39	72	100
Range management	0	0	2	3	42	58	28	39	72	100

In determining the overall extent to which economic status influence access to agricultural extension services among the pastoralists, the mean was calculated by assigning numeric values to the categories. The values given were used to indicate the level of influence of economic status on access to extension services. The influence level on access was given the higher value of (4) while no influence was given a comparatively lower value of (1). The categories were given the following values: 1= does not influence, 2= slightly influence, 3= moderately influences, 4= highly influences. Results are presented in Table 22.

Table 22
Influence of Economic Status on Access to Agricultural Extension Services by sub county n=120.

Sub-County	Perceived influence	N	Minimum	Maximum	Mean	Std. Deviation
Wajir West	Economic status on access to agricultural extension services	48	1.25	3.00	2.3	0.7
Wajir East	Economic status on access to agricultural extension services	72	1.00	3.00	2.4	0.5

The study revealed that the mean perception of income status influencing access to agricultural extension services in Wajir East Sub-County was slightly higher (2.35) than the mean in Wajir West Sub-County (2.34). the results may suggest that income of households in Wajir East was high therefore demand more of the agricultural extension services more than households in Wajir West with low incomes.

4.7 Tests of Hypotheses

Tests of hypotheses were carried out to establish relationship between independent variables (nature of security situation, cultural factors and economic factors of household head) and the dependent variable (access to agricultural extension services by the pastoralists; - livestock husbandry services, animal health services, crop husbandry services, natural resource management services).

4.7.1 Security situation on access to agricultural extension services

Hypothesis one (H_{01}) stated that, "The security situation (livestock rustling, conflict over grazing land and conflict over boundary) has no statistically significant influence on access to agricultural extension services among pastoralists in Wajir County. This hypothesis was

tested using linear regression analysis. Linear regression is a technique used to examine the strength of a linear relationship in a set of bivariate or paired data, where one variable acts as the predictor and the other as the response Gallin and Ognibene (2012). The analysis focused on the overall security situation as a predictor, whether it was statistically significant and, if so, the direction of the relationship. The results are presented in Table 23

Table 23
Linear Regression Analysis showing Influence of Security Situation on Access to Agricultural Extension Services n=120.

Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	2.563	0.071		36.210	0.000
Perceived influence of security situation on access to agriculture services.	-0.098	0.055	-0.162	-1.788	0.076

a. Dependent Variable: Overall level of access to agricultural extension services

The perceived mean for the influence of security situation on access to agricultural extension services was not statistically significant (p=0.076). However, the coefficient(r) was negative (b=-0.098) which would indicate that, as security situation worsens (i.e. increase in insecurity) there is a decrease in the level of access to agricultural extension services among the pastoralists. The constant value (2.563) is the predicted value when all security situation predictor is set to 0. Thus it can be concluded that if the security situation is 0, then the model predicts that the access to agricultural extension services will be is approximately 2.563.

4.7.2 Cultural Factors and Access to Agricultural Extension Services

Hypothesis two (H_{02}) stated that, cultural factors (language, pastoral-nomadic way of life, gender roles, religion) have no statistically significant influence of on access to agricultural extension services among pastoralists in Wajir County. This hypothesis was tested using Pearson's Correlation analysis to examine the relationship between cultural factors (independent variables)' and access to agricultural services (dependent variable). According to Greene and D'oliveira (2005) the aim of the Pearson Correlation is to test whether scores on one variable are related to scores on the other variables. The analysis is presented in Table 24.

Table 24
Pearson's Correlation Analysis showing Influence of Cultural Factors on Access to Agricultural Extension Services n=120

		Level of Access to agricultural extension services	**Language**	**Pastoral/ Nomadic**	**Gender Roles**
Language	Pearson Correlation	0.412**			
	Sig. (2-tailed)	0.000			
Pastoral-Nomadic	Pearson Correlation	-0.276**	-0.304**		
	Sig. (2-tailed)	0.002	0.001		
Gender	Pearson Correlation	-0.333**	-0.278**	0.726**	
	Sig. (2-tailed)	0.000	0.002	0.000	
Religion	Pearson Correlation	0.112	-0.238**	-0.471**	-0.413**
	Sig. (2-tailed)	0.222	0.009	0.000	0.000

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

The strength of relationship between the variables (language and access to agricultural extension services) was positively moderate (r = 0.412), however language had a statistically significant influence on access to agricultural services (p-value <0.05). This was expected since most of the agricultural extension services were disseminated in Kiswahili and English, most of the respondents required translation during the access to agricultural services. Extension services have been undermined by communication gaps between agricultural extension agents and pastoralists (Butcher, 1994). Studies by Gustafson et al.(2014) in Iringa Region, Tanzania, showed that working with livestock extension officers educating pastoralists on diverse livestock diseases, the disease names where identified in English, Kiswahili, and the three tribal languages to insure that pastoralists could describe a disease using familiar terminology.

Pastoral-nomadic had a weak negative relationship (r =-0.276) on access to agricultural extensions services. This implies that when the frequency of migration by the pastoralists in search of water and pasture was high, the level of access to agricultural extension services was reduced. However, there was a statistically significant (p<0.05) influence of pastoral nomadic on access to agricultural extensions services. According to FAO (2003) report, extension and education services have had a limited impact on the status of pastoralist societies.

Similarly gender of the respondents had a weak and negative relationship (r =-0.333) on access to agricultural extensions services. However, gender had a statistically significant ($p<0.05$) influence on access to agricultural extensions services. This could suggest that male respondents accessed more of the extension services than the female counterparts. Female farmers are less likely to get extension services through various channels and less likely to access quality service than their male counterparts (Ragasa, Berhane, Tadesse, & Seyoum, 2012).

The strength of relationship between the variables (religion and access to agricultural extension services) was positive but weak (r = 0.112) However, religion did not have a significant correlation (p-value = 0.222) on access to agricultural services. In many countries cultural or religious factors play an important part in preventing women from receiving training in addition, trainers and agricultural extension agents are usually male and thus may not speak to, or get close to women. This is especially true in Muslim countries (CTA, 1993).

A multiple regression was also conducted to determine influence of cultural factors on access to agricultural extension services among the pastoralists. The findings of the study are presented in Table 25.

Table 25
Multiple Regression Analysis showing Influence of Cultural Factors on Access to Agricultural Extension Services n=120.

		Unstandardized Coefficients		**Standardized Coefficients**		
Model		**B**	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	2.565	0.277		9.244	0.000
	Language	0.293	0.068	0.417	4.292	0.000
	Pastoral-Nomadic	0.051	0.084	0.078	0.606	0.546
	Gender	-0.199	0.116	-0.207	-1.714	0.089
	Religion	0.082	0.053	0.163	1.547	0.125

a. Dependent Variable: Overall level of Access to Agricultural Extension Services
Adjusted R-square =0.211, Regression ANOVA F=8.955, df =4, $p < 0.05$

The multiple regression model with all four predictors produced R^2 =0.211, F (8.955), df =4, $p < 0.05$ this indicates that, the regression model statistically significantly predicts the outcome variable (i.e., it is a good fit for the data). The model could only account for 21.1 per cent of the observed variance in the dependent variable (access to agricultural extension services). This is the percentage that was accounted for by the independent variables (i.e. the

cultural factors) in the model. The constant on value the other hand was statistically significant, since the p-value of the model was less than the alpha. Therefore the regression model can be used to make predictions about the value of the independent variable. This implies that, if the cultural factors are kept at constant, the model predicts that the access to agricultural extension services to be approximately 2.565.

The null hypothesis statement; cultural factors have no statistically significant influence on access to agricultural extension services among pastoralists in Wajir County was rejected. In many countries cultural or religious factors play an important part in preventing women from receiving training. Trainers and agricultural extension agents are usually male and thus may not speak to, or get close to women. This is especially true in Muslim countries Technical Centre for Agricultural and Rural Co-operation (CTA, 1993).

4.7.3 Economic factors and access to agricultural extension services

Hypothesis Three (H_{03}) stated that; Economic factors have no statistically significant influence on access to agricultural extension services among pastoralists in Wajir County. This hypothesis was analyzed using linear regression to establish relationship between independent variables (income) and dependent variable (access to agricultural extension services). Linear regression is a technique used to examine the strength of a linear relationship in a set of bivariate or paired data, where one variable acts as the predictor and the other as the response Gallin and Ognibene (2012). The results are presented in Table 26.

Table 26:
Linear Regression Result on Influence of Income Source on Access to Agricultural Extension Services, n=120.

		Unstandardized Coefficients		**Standardized Coefficients**	**t**	**Sig.**
Model		**B**	**Std. Error**	**Beta**		
1	(Constant)	2.080	0.104		20.06	0.00
	Source of Income	0.249	0.064	0.337	3.867	0.00

a. Dependent Variable: Overall level of access to agricultural extension services adjusted R square 0.106, F=14.956 df =1, t = 20.062.

The adjusted R^2 of the model was 0.106. This means that the regression model could only account for 10.6 per cent of the changes observed in the dependent variable of access to agricultural extension services. This contribution was significant as the p-value was less than

the level of significance ($F=14.956$, $p<0.000$, $\alpha =0.05$). This suggests that households that accessed agricultural extension services earned more income than those that did not access extension services. Therefore, the null hypothesis was rejected. Most of the pastoralists in Wajir County accessed agricultural extension services especially those related to livestock production in order to increase their income and standards of life.

Economic factors statistically significantly influenced the access of agricultural extension services among the pastoralists in Wajir County $p<0.05$. This may suggest that pastoralists with access to agricultural extension services tend to realize higher production and therefore more income than those that do not access extension services. According to Elhadi, Nyariki, Wasonga and Ekaya (2012) the extension services are expected to influence critical decisions concerning production, sale and the whole process of income generation activities, and consequently livelihood security of households. Household members who had a chance to be trained or receive information are less likely to be poor compared to those without access to such information.

CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of study, its key findings, conclusions and recommendations. It indicates the theoretical value of the study in terms of filling a gap in knowledge and adding new knowledge in access to agricultural extension services in Kenya. It also gives suggestions for further research.

5.2 Summary

The study was based on the fact that access to agricultural extension services by the pastoralist was inadequate in Wajir County. Owing to this problem the level of agricultural productivity both in livestock and crop production was low; this led to high levels of poverty and food insecurity. It was not clear which socio-economic factors were influencing access to agricultural extension services. The study adopted descriptive survey research design. The population of the study was 52,478 household heads (i.e. Wajir West 21,375 and Wajir East 31,103). The study had four objectives which focused the influence of selected socio-economic factors; security situation, cultural factors and economic factors on access to agricultural extension services. The target population derived their livelihood from livestock rearing. Illiteracy was high with 75 per cent of the household heads having no formal education. Simple random sampling was used to select a sample size of 120 household heads. The sample size was proportionately distributed in the two Sub-Counties in Wajir County. Pilot testing was done in Wajir South a Sub-County. Data analysis was done using inferential and descriptive statistics. Hypotheses were tested using Pearson Correlation and Regression. All tests were computed at $\alpha=0.05$.

The key findings of the study indicated that with respect to pastoralists' access to agricultural extension services, about 50 per cent of the respondents indicated having access to most of the agricultural extension services on quarterly basis. Livestock extension services were mostly accessed by the respondents in Wajir County. This was expected since the main source of livelihood is livestock rearing.

Security situation in terms of livestock rustling, conflict over boundaries, conflict over grazing land and water, moderately influenced access to agricultural extension services.

The cultural factors (language, pastoral-nomadic way of life, gender, religion) influenced access to agricultural extension services among pastoralists in Wajir County. Most of the agricultural extensions were disseminated in Kiswahili and English, and most of the respondents required translation during the access to agricultural services

Economic factors also had a statistically significant influence on access of agricultural extension services by the pastoralists in the County.

5.3 Conclusions

i. Frequent interaction between pastoralist and the agricultural extension agents is key in accessibility to agricultural extension services by pastoralists in Wajir County. This may lead to improvement of agricultural productivity in the County.
ii. Nature of security (livestock rustling, boundaries conflict and conflict over water and grazing land) among the pastoralists in Wajir County is a very important factor to consider in disseminating agricultural extension services among the pastoralist in Wajir County.
iii. Levels of illiteracy among the pastoralists negatively influences access to agricultural extension services, since translation was employed. Therefore, it can be concluded that, in the context of these prevailing cultural factors, level of literacy should be increased by the government and other private partners like the NGO'S in County to enhance access to agricultural services. When disseminating agricultural extension service, migratory pastoral way of life and religion should also be considered.
iv. Economic status of the pastoralist influenced access to agricultural extension services in the County, since the pastoralists with stable economic status will tend to seek more of the agricultural extension services.

5.4 Recommendations

To improve accessibility to agricultural extension services in Wajir County and based on the study's conclusions the following recommendations were made;

i. The County Government of Weir should employ more public agricultural extension agents and provide the necessary facilities. Private partners like the NGOs should also complement the government by providing agricultural extension service providers. These may increase the interaction levels between pastoralists and the agents' thus

increasing level of accessibility of the services; consequently increase in agricultural productivity levels among the pastoralists.

ii. Strengthening traditional conflict resolution mechanisms and linking them with formal police, court and government agents.

iii. The County Government of Wajir and other private partners should also promote and facilitate inter-community dialogues, peace meetings, exposure tours and compensation schemes including trauma-healing sessions.

iv. Community members and elders to participate in policy advocacy, influence and public discourse. Pastoralists should be encouraged by the government, local leaders and parents to acquire education; this may reduce use of translation and better understanding therefore, increase accessibility to agricultural extension services.

v. County Government of Wajir should improve market infrastructure and other amenities like roads and communication to increase market accessibility thus increasing incomes. Improved incomes from sales of agricultural products may increase the demand of more agricultural extension services by the pastoralists.

The findings may inform policy makers in formulating and implementation of policies on improving accessibility to agricultural extension services by pastoralists in Wajir County. Socio-economic factors among pastoralists should be considered in formulating and implementing policies on the development and dissemination of agricultural extension services in Wajir County. Based on these observations one can conclude that agricultural productivity and incomes may increase with increase in access to agricultural extension services by the pastoralists.

5.5 Suggestions for Further Research

Following are suggestions for further research;

i. A study on the quality of agricultural extension services accessed by the pastoralists in the area should be conducted.

ii. A further study to investigate the impact of agricultural extension services on the incomes and livelihoods of the pastoralists in the region

iii. A study on public-private partnerships collaborating in dissemination of agricultural extension among the pastoralists in the arid and semi-arid regions.

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APPENDIX A

QUESTIONNAIRE FOR THE PASTORALISTS

TITLE: Selected Socio-Economic Factors Influencing Access To Agricultural Extension Services Among Pastoralists In Wajir County, Kenya.

The purpose of this study was purely academic and above all, to contribute to the understanding of influence of selected socio-economic factors influencing access to agricultural extension services among pastoralists in Wajir County. As a respondent you are kindly requested to participate in answering this questionnaire and you are assured that any information shared will be strictly confidential. The information generated may assist the pastoralists in accessing agricultural extension services thus improving on agricultural productivity, income and food security.

Instructions

Answer all the questions by filling in the blank spaces provided or put a tick (√) where necessary

Sub-County_____ Ward_____

SECTION A: General information of the Household Head

1. Gender of respondents

   [ ] Male

   [ ] Female

2. Age of respondents in years _____
3. Level of education of the respondents

[1] No formal education [2] Adult education [3] Primary [4] Secondary [5] Diploma [6] Post diploma

4. How many family members are in your household (Household size)? _____

SECTION B: Security Situations Influencing Access to Agricultural Extension Service

5. a**. Cross Border Security Situation**

Cross Border Security Situation	**1= Yes 2= No**	**If Yes , How frequently do you experience the insecurity**		
		Occasionally	**Frequently**	**Most frequently**
Do you experience conflict between your Sub-County and neighboring **Sub-Counties?**				
Do you experience conflict between your Sub-County and neighboring **County?**				
Do you experience conflict between your Sub-County and neighboring **Countries?**				

b. State the Nature of Cross Border Insecurity. Use a tick (√)

Cross Borders	**Nature of Cross Border Conflict**			
	Livestock rustling	**Conflict over water and grazing land**	**Conflict due to leadership**	**Conflict due to boundaries.**
Between your Sub-County and neighboring Sub-County				
Between your Sub-County and neighboring County				
Between your Sub-County and neighbouring Countries				

6. Do the following security concerns influence access to agricultural extension services among the **clans/communities** within your Sub-County?

Key: [1] Occasionally [2] Frequently [3] Most Frequently

Security Concerns	**1. Yes** 2. **No**	**If yes, how frequently does the security concern influence access to agricultural extension services?**		
		1	**2**	**3**
Livestock rustling				
Conflict over Boundaries				
Conflict over Grazing land and water				
Conflict over leadership				

7. a. Do **terrorist threats** influence access to agricultural extension in your Sub-County?

[1] Yes [2] No

b. If yes, how frequent do threats occur?

[1] Occasionally [2] Frequently [3] Most Frequently

8. To what extend do the following security situations influence access to agricultural extensions services in your Sub-County? Use tick (√)

Key: [0]. Does not influence [1]. Slightly influence [2]. Moderately influences [3]. Highly influences

Agricultural Extension Services Accessed	**Security Situations**											
	Cross Border Security Situations				**Inter Clan/Community Security Situations**				**Terrorist Threat Situations**			
	0	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**
Livestock husbandry services												
Feeding of livestock												
Selection and breeding of livestock												
Livestock routine management practices(identification, castration, housing)												
Value addition on livestock products												
Livestock record keeping												
Livestock marketing information												
Animal Health Services												
Vaccination/ de-worming/ pest control												
Treatment of livestock												
Disease surveillance												
Crop Production Services												
Land preparation												
Planting and field practices												
Harvesting and post harvesting												
Value addition on crop produce												
Crop marketing information												
Natural resource management services												
Gums and resins collection												
Range management												

SECTION C: Cultural Factors influencing Access to Agricultural Extension Services to pastoralists.

9. a. Which **languages** do you access agricultural extension services?

[1] English [2] Swahili [3] Somali [4] Boran

b. is translation used during access to agricultural extension services?

[1] Yes [2] No

c. To what extend does your **language** influence access to the listed agricultural extension services?

Key: [0]. Does not influence [1]. Slightly influence [2]. Moderately influences [3]. Highly influences

Agricultural Extension Services Accessed	**Level of influence**			
	0	**1**	**2**	**3**
Livestock husbandry services				
Feeding of livestock				
Selection and breeding of livestock				
Livestock routine management practices(identification, castration, housing)				
Value addition on livestock products				
Livestock record keeping				
Livestock marketing information				
Animal Health Services				
Vaccination/ de-worming/ pest control				
Treatment of livestock				
Disease surveillance				
Crop Production Services				
Land preparation				
Planting and field practices				
Harvesting and post harvesting				
Value addition on crop produce				
Crop marketing information				
Natural resource management services				
Gums and resins collection				
Range management				

10. Which livelihood way of life do you practice?

    [1] Pastoral nomadic (moving in search of water and pasture).

    [2] Agro-pastoral (settled and farming).

    [3] Both (pastoral and agro-pastoral).

b. If practising pastoral nomadic, how often do you migrate in search of water and pasture [1] Daily [2] Weekly [3] Monthly[4] Yearly [5] Seasonaly (when situation is worse) [6] Not at all.

C. To what extend does your **pastoral nomadic way of life** influence the access to the following agricultural extension services? Use tick (√).

Key:

[0]. Does not influence

[1]. Slightly influence

[2]. Moderately influences

[3]. Highly influences

Agricultural Extension Services Accessed	Level of Influence			
	0	1	2	3
Livestock husbandry services				
Feeding of livestock				
Selection and breeding of livestock				
Livestock routine management practices(identification, castration)				
Value addition on livestock products				
Livestock record keeping				
Livestock marketing information				
Animal Health Services				
Vaccination/ de-worming/ pest control				
Treatment of livestock				
Disease surveillance				
Crop Production Services				
Land preparation				
Planting and field practices				
Harvesting and post harvesting				
Value addition on crop produce				
Crop marketing information				
Natural resource management services				
Gums and resins collection				
Range management				

11. Which gender accesses agricultural extension services? Give reasons. Use a tick (√).

Agricultural Extension Services Accessed	Gender			Reasons
	Male	Female	Both	
Livestock husbandry services				
Feeding of livestock				
Selection and breeding of livestock				
Livestock routine management practices(identification, castration, housing)				
Value addition on livestock products				
Livestock record keeping				
Livestock marketing information				
Animal Health Services				
Vaccination/ de-worming/ pest control				
Treatment of livestock				
Disease surveillance				
Crop Production Services				
Land preparation				
Planting and field practices				
Harvesting and post harvesting				
Value addition on crop produce				
Crop marketing information				
Natural resource management services				
Gums and resins collection				
Range management				

b. Use tick (√) to indicate the extent to which **Gender role** influence access to agricultural extension services?

Key: [0]. Does not influence [1]. Slightly influence [2]. Moderately influences [3]. Highly influences

Agricultural Extension Services	**Level of influence**			
	0	**1**	**2**	**3**
Livestock husbandry services				
Feeding of livestock				
Selection and breeding of livestock				
Livestock routine management practices(identification, castration, housing)				
Value addition on livestock products				
Livestock record keeping				
Livestock marketing information				
Animal Health Services				
Vaccination/ de-worming/ pest control				
Treatment of livestock				
Disease surveillance				
Crop Production Services				
Land preparation				
Planting and field practices				
Harvesting and post harvesting				
Value addition on crop produce				
Crop marketing information				
Natural resource management services				
Gums and resins collection				
Range management				

12. Which religion you subscribe?

    [1] Islam

    [2] Christianity

    [3] Hindu

    [4] Others_____

13. Use tick (√) to indicate the extent to which religion practices influence access to agricultural extension services among male and females in your Sub-County.

Key:

[0] Does not influence

[1] Slightly influence

[2] Moderately influences

[3] Highly influences

Agricultural Extension Services Accessed	Level of Influence to religion practices			
	0	1	2	3
Livestock husbandry services				
Feeding of livestock				
Selection and breeding of livestock				
Livestock routine management practices(identification, castration, housing)				
Value addition on livestock products				
Livestock record keeping				
Livestock marketing information				
Animal Health Services				
Vaccination/ de-worming/ pest control				
Treatment of livestock				
Disease surveillance				
Crop Production Services				
Land preparation				
Planting and field practices				
Harvesting and post harvesting				
Value addition on crop produce				
Crop marketing information				
Natural resource management services				
Gums and resins collection				
Range management				

SECTION D: Economic Factors of Household head Influencing Access to Agricultural Extension Services.

14. a. Of the sources of income given below, what are three MAIN sources of income for your household? Rank them from the most important to the least and give the annual income from each

Income source	Annual income from source
First _____	_____
Second _____	_____
Third _____	_____

Key: Sources of income

1 = Livestock rearing,

2 = Crop production,

3 = Off-farm business(es) Specify_____

4 = Paid employment

5 = Rangeland resource (e.g. Gums and resins)

6 = Forestry resources (e.g. wood/charcoal)

7 = Pension

8 = Transfers (income from relatives living elsewhere)

9 = Others (specify) _____

b. If livestock rearing is among the sources income state the numbers you own.

Cattle___ Sheep____ Goats___ Camel___ Donkey___ Poultry___ Beehives___

c. If engaged in crop production, indicate the land size under cultivation ____acres.

d. Indicate the extent to which economic status influence access to agricultural extension services from all agents: Use tick (√).

Key: [0]. Does not influence [1]. Slightly influence [2]. Moderately influences [3]. Highly influences

Agricultural Extension Services Accessed	**Level of influence**			
	0	**1**	**2**	**3**
Livestock husbandry services				
Feeding of livestock				
Selection and breeding of livestock				
Livestock routine management practices(identification, castration, housing)				
Value addition on livestock products				
Livestock record keeping				
Livestock marketing information				
Animal Health Services				
Vaccination/ de-worming/ pest control				
Treatment of livestock				
Disease surveillance				
Crop Production Services				
Land preparation				
Planting and field practices				
Harvesting and post harvesting				
Value addition on crop produce				
Crop marketing information				
Natural resource management services				
Gums and resins collection				
Range management				

SECTION E: Influence of Demographic Characteristics on Access to Agricultural Extension Services

15. Indicate the extent to which the listed demographic characteristics influence access to agricultural extension services from all agents: Use tick (√)

Key:

[0]. Does not influence

[1]. Slightly influence

[2]. Moderately influences

[3]. Highly influences

Agricultural Extension Services Accessed	**Demographic Characteristics**											
	Age				**Education**				**Household size**			
	0	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**
Livestock husbandry services												
Feeding of livestock												
Selection and breeding of livestock												
Livestock routine management practices(identification, castration, housing)												
Value addition on livestock products												
Livestock record keeping												
Livestock marketing information												
Animal Health Services												
Vaccination/ de-worming/ pest control												
Treatment of livestock												
Disease surveillance												
Crop Production Services												
Land preparation												
Planting and field practices												
Harvesting and post harvesting												
Value addition on crop produce												
Crop marketing information												
Natural resource management services												
Gums and resins collection												
Range management												

SECTION F: Interaction Level of the Pastoralists with Agricultural Extension Agents

16. Indicate the agricultural extension agents that provide agricultural extension services to your household?

[1] Public (government) agents.

[2] Nongovernmental organization (NGO's) agents

[3] Private agents.

[4]All agents

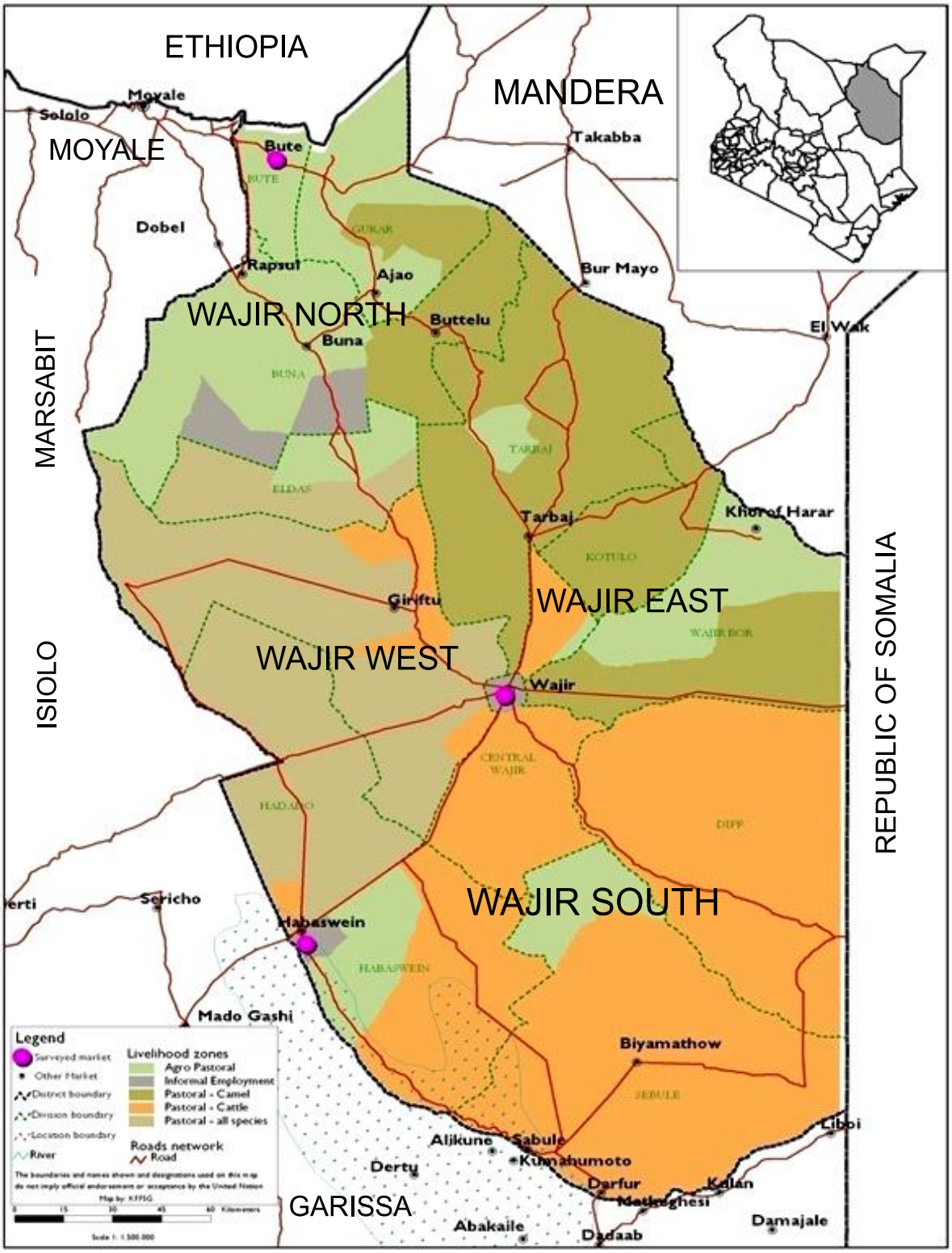
17. Use tick (√) to indicate how often you interact with agricultural extension agents?

Agricultural Extension Services Accessed	**Level of interaction with agricultural extension agents**				
	Weekly (At least once/ week)	**Monthly** (At least once/ month)	**Quarterly** (At least once/ quarter)	**Yearly** (At least once/ year)	**Not at all** (None/ year)
Livestock husbandry services					
Feeding of livestock					
Selection and breeding of livestock					
Livestock routine management practices(identification, castration, housing)					
Value addition on livestock products					
Livestock record keeping					
Livestock marketing information					
Animal Health Services					
Vaccination/ de-worming/ pest control					
Treatment of livestock					
Disease surveillance					
Crop Production Services					
Land preparation					
Planting and field practices					
Harvesting and post harvesting					
Value addition on crop produce					
Crop marketing information					
Natural resource management services					
Gums and resins collection					
Range management					

I wish to thank you for finding time to respond to the questions and I wish you success in your farming activities

APPENDIX B

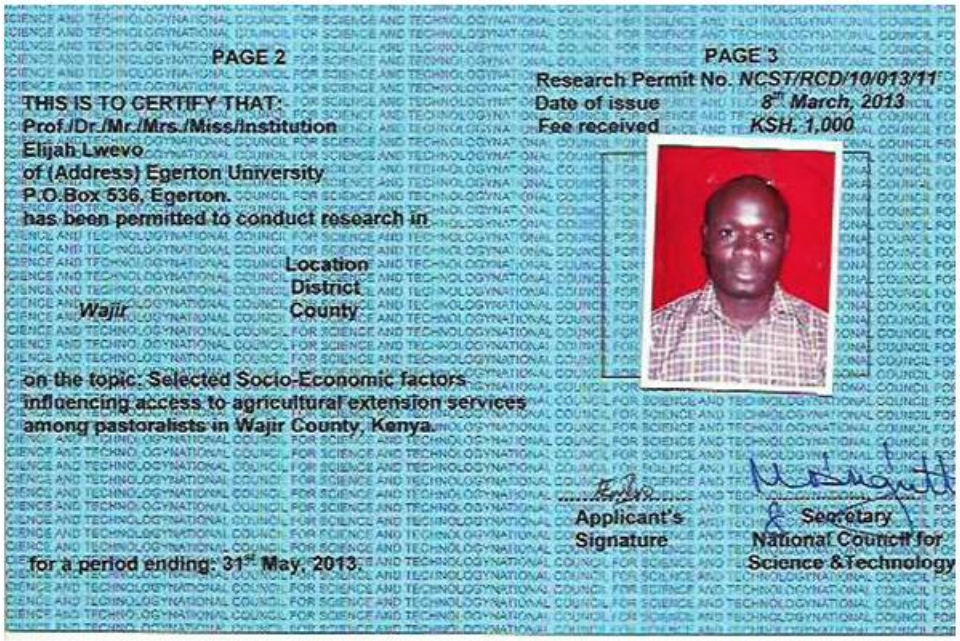
MAP OF WAJIR COUNTY



Source: GOK, KFSSG 2011, Wajir District Rain Assessment Report, 2011

APPENDIX C

RESEARCH PERMIT



PAGE 2

THIS IS TO CERTIFY THAT:
Prof./Dr./Mr./Mrs./Miss/Institution
Elijah Lwevo
of (Address) Egerton University
P.O.Box 536, Egerton.
has been permitted to conduct research in
Location
District
Wajir County
on the topic: Selected Socio-Economic factors influencing access to agricultural extension services among pastoralists in Wajir County, Kenya.
for a period ending: 31st May, 2013.

Applicant's Signature

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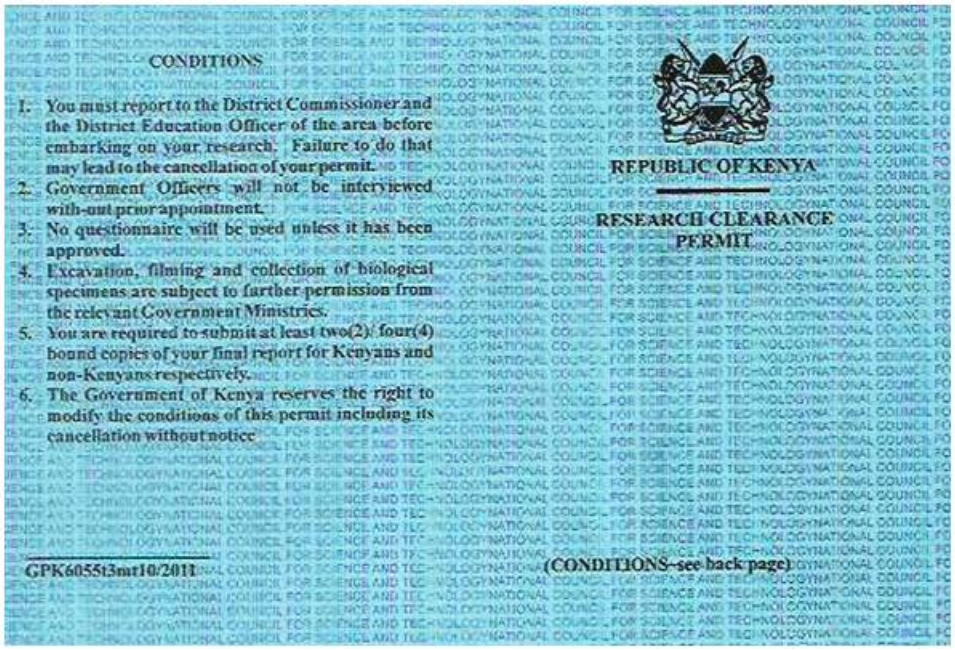
Research Permit No. NCST/RCD/10/013/11
Date of issue 8th March, 2013
Fee received KSH. 1,000

Secretary
National Council for Science & Technology



CONDITIONS

1. You must report to the District Commissioner and the District Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit.
2. Government Officers will not be interviewed with-out prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2) four(4) bound copies of your final report for Kenyans and non-Kenyans respectively.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice

REPUBLIC OF KENYA

RESEARCH CLEARANCE PERMIT

GPK6055t3mr10/2011

(CONDITIONS-see back page)

APPENDIX D

RESEARCH AUTHORIZATION LETTER

REPUBLIC OF KENYA

NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telephone: 254-020-2213471, 2241349, 254-020-2673550
Mobile: 0713 788 787 , 0735 404 245
Fax: 254-020-2213215
When replying please quote
secretary@ncst.go.ke

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

Our Ref: NCST/RCD/10/013/11

Date: 8th March, 2013

Elijah Lwevo
Egerton University
P.O.Box 536
Egerton.

RE: RESEARCH AUTHORIZATION

Following your application dated *25th February, 2013* for authority to carry out research on *"Selected Socio-Economic factors influencing access to agricultural extension services among pastoralists in Wajir County, Kenya,"* I am pleased to inform you that you have been authorized to undertake research in **Wajir County** for a period ending **31st May, *2013*.**

You are advised to report to **the District Commissioners, the District Education Officers and the District Agricultural Officers, Wajir County** 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 Commissioners
The District Education Officers
The District Agricultural Officers
Wajir County.

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

APPENDIX F

REQUEST FOR RESEARCH PERMIT LETTER

EGERTON UNIVERSITY
Tel: Pilot: 254-51-2217620
254-51-2217877
254-51-2217631
Dir.line/Fax: 254-51-2217847
Cell Phone
P.O. Box 536 - 20115
Egerton, Njoro, Kenya
Email: bpgs@egerton.ac.ke
www.egerton.ac.ke

OFFICE OF THE DIRECTOR GRADUATE SCHOOL

Ref: EM12/2172/08 Date: 22nd February, 2013

The Secretary,
National Council of Science and Technology,
P. O. Box 30623-00100
NAIROBI.

Dear Sir,

RE: REQUEST FOR RESEARCH PERMIT – MR. ELIJAH LWEVO – REG. NO. EM12/2172/08

This is to introduce and confirm to you that the above named student is in the Department Agricultural Education and Extension, Faculty of Education and Community studies, Egerton University.

He is a bona-fide registered Masters student in this University. His research topic is **"Selected Socio-Economic Factors Influencing Access to Agricultural Extension Services Among Pastoralists in Wajir County, Kenya".**

He is at the stage of collecting field data. Please issue him with a research permit to enable him undertake the studies.

We have enclosed all the necessary documentation required and a Bankers cheque No. 264466 for your necessary action.

Yours faithfully,

DIRECTOR, BOARD OF POST GRADUATE STUDIES * EGERTON UNIVERSITY P.O. Box 536, EGERTON * 22 FEB 2013

Prof. M.A. Okiror
DIRECTOR, BOARD OF POSTGRADUATE STUDIES

Encl.

MAO/cwk