ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

SOCIO-ECONOMIC CHALLENGES OF SMALLHOLDER FARMERS IN AGRICULTURAL PRACTICE IN ROBE WOREDA, ARSI ZONE, OROMIA REGION

BY

WUBSHET MENGISTU

JUNE, 2014

ADDIS ABABA, ETHIOPIA

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THESIS SUBMITTED TO SCHOOL OF GRADUATE STUDIES OF ADDIS ABABA UNIVERSITY IN PARTIAL FULFILMENT OF THE REQUIREMENT OF MASTERS OF ART IN GEOGRAPHY AND ENVIRONMENTAL STUDIES

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Acronyms

ADLI: Agriculture Development Lead Industrialization

AfDB: African Development Bank

CSA: Central Statistical Agency

DA: Development Agents

FAO: Food and Agricultural Organization

FDRE: Federal Democratic Republic of Ethiopia

FGD: Focused Group Discussion

FTIR: Fair Trade International Report

GDP: Gross Domestic Product

GTP: Growth and Transformation Plan

IFPRI: International Food Policy Research Institute

MDG: Millennium Development Goal

MoARD: Ministry of Agriculture and Rural Development

MoFED: Ministry of Finance and Economic Development

NGOs: Non-Governmental Organizations

UN: United Nations

USD: United States Dollar

WB: World Bank

WFEDO: *Woreda* Finance and Economic Development Office

WWEMO: *Woreda* Water, Energy and Mines Office.

Abstract

The objective of this study is to identify the socio-economic challenges of smallholder farmers in agricultural practices in Robe *Woreda*. To do so, different sampling techniques were employed firstly stage the study *Woreda* was stratified by agro-ecology (Dega, Woinadega and Kola). Secondly, three rural kebeles namely Jawi sire, Ataba Robe and Endato waltahi were purposively selected from Dega,Woina Dega and Kola agro- ecological zone respectively. Thirdly, eligible Respondent households were selected by using systematic Random sampling techniques from selected kebeles. Hence, 150 households were selected randomly for the study from these sample kebeles including both male and female headed households. The necessary data were generated both from primary and secondary sources to answer the research question. Hence, field observation, household survey, key informant interview and focus group discussions were the principal means of generating primary sources of data while secondary data were obtained from by reviewing various governmental and nongovernmental organization documents and reports, books and academic research papers. The data collected was analyzed and interpreted qualitatively and quantitatively depending on available data obtained. Simple statistical descriptions like frequency and percentages were employed with the aid of Statistical Packages for Social Studies (SPSS) for analyzing and interpreting the data collected. The remaining data were discussed, described and narrated qualitatively. The analysis of the study was also supplemented with visual photographs recorded during field observation. According to the results of the study Limited access to modern agricultural technologies, Poor development of rural infrastructure such rural roads, inadeqaute and poor conditions of market facilities for agricultural production, poor development of rural credit services and financial institutions and poor extension services and use of modern farm input are considered by households as the main constraints of the agricultural productivity of the households. Based on the findings of the study, both short term and long term actions from government bodies, different interested parties and households themselves to ensure better agricultural productivity have been recommended.

Keywords: Smallholder farmers, Socio-economic, Challenges, Agricultural practice, Modern agricultural technologies, Rural infrastructure, Credit service.

CHAPTER ONE: INTRODUCTION

1.1.Background of the Study

Agriculture is the mainstay of the Ethiopian economy and the people at large. The share of agriculture to Gross Domestic Product is 43% MoFED (2013), Produces 80% of its exports and nearly about 84% of the population depends on this sector for their livelihood CSA (2011). It also serves as the main source of food and generates foreign exchange earnings.

The agricultural sector of many african countries are characterized by smallholder farmers and Smallholder agriculture remain to be the key and leading sector in overall economic development Quan (2011). East African countries like Kenya, Ethiopia, Uganda and Tanzania, are agriculture based countries that agriculture is the backbone of these economies and smallholder farming accounts for about 75 percent of agricultural production *(Salami et al., 2010).*

Like many other african countries Ethiopian agriculture is also dominated by smallholder farmers who occupy the majority of land and produce most of the crop which includes cereals, pulses and oilseeds. In Ethiopia, about 11.7 million smallholder farmers cultivate on approximately 95 percent of the total farmland area and produce more than 95 percent of the total agricultural output *(Mahlet, 2007; S.Tafesse et al., 2007; MoARD, 2010)*. This confirms the dominant contribution of smallholder farmers to the overall agricultural growth in the country.

In short, as the overall economy of Ethiopia depends on agriculture sector development, the entire movement of the agriculture sector depends on what is happening in smallholder sub-sector. Accordingly, achieving accelerated and sustained economic growth in agricultural sector so as to eradicate poverty had been one of the priority and different policies and growth strategies has been implementing in the country that sees agriculture as an engine of growth. Agricultural led-industrialization (ADLI) was agricultural strategies targeted to improve agricultural extension service, enhance agricultural transformation and rural development the strategy calls for human resource development to create modern farmers in rural areas, enhance access to financial services and provide rural infrastructure.

The current Growth and Transformation Plan **(GTP)** [1]of the country, also positions smallholder farmers as a principal source of agricultural growth and agriculture as the main source of overall economic growth.

Within Agriculture the predominant focus is on smallholder farmers with greater weight given to crop production to bring about rapid growth in agricultural production so as to enable the country to be self-sufficient in food (Dessalegn, 2010). For example, commercialization of smallholder farming received high government policy priority in GTP (MoFED, 2010). These smallholder farmers are the major actor in the agricultural sector and are likely to be central to rural development and rural poverty alleviation and also to meet the Millennium Development Goal in particular -MDG1 eradicate extreme poverty and hunger.

Despite its importance in the livelihood of the people and its potential, agricultural sector in Ethiopia has remained subsistence, low level of productivity, low input-low output, rain-fed farming system and unable to adequately feed its own population sufficiently and the country is not self-sufficient in food production and prevailing both chronic and transitory food security (MoARD, 2010) and (Degefa, 2002).

The key long–standing challenge of the smallholder farmers are mainly related to poor agricultural practice stemming from lack of access to modern agricultural technology, agricultural inputs, lack of access to better agricultural markets and credits, high population pressure, agricultural land fragmentations, low level of education among smallholder farmers and poor infrastructure AfDB, (2010).

In Ethiopia the agricultural productivity of smallholder farmers are low and their farms are often fragmented, produce mostly for farmers own consumption and generate only very small marketed surplus Alemayehu (2012). The majority of these farmers do not generate sufficient income from

[1] The GTP is a medium term strategic Ethiopian national framework for the Five-year period (2010/11- 2014/15) and it is directed towards achieving the Millennium Development Goals (MDGs), Ethiopia's long term vision and sustaining the rapid, broad based and equitable economic growth in the country (MoFED, 2012).

agriculture to provide basic nutrition, health or living condition of their families almost throughout the year.

Agriculture is the main economic base of Robe *Woreda* smallholder farmers to support the livelihood of their families. The smallholder farmers agricultural practice is characterized by mixed farming system, producing of crop and livestock on subsistence and follows traditional method of farming. The *woreda* is also characterized by low agricultural production and productivity due to various interrelated socio-economic challenges faced the smallholder farmers during agricultural practice. The main challenges phased smallholder farmers during agricultural practice are traditional methods of farming for long period of time, lack of access to modern agricultural technologies, lack of access to agricultural infrastructures such as to better market for agricultural output and input and lack of credit service and financial institutions. The low level of agricultural production and productivity existed in the area results in the existence of seasonal food shortage and vulnerability of the households to food insecurity almost throughout the year.

Therefore, given the agriculture based economy of Ethiopia and the dominance of smallholder farmers, it is imperative to conduct a study which focuses on the identifying of major socio-economic challenges faced smallholder farmers in their agricultural practice; in the case of Robe *Woreda* smallholder farmer is the main concern of the current study.

1.2.Statement of the Problem

Agricultural practice in Ethiopia is characterized by traditional farming practice which cause land resource depletion and threatening food security as well as the livelihoods of the poor rural people. The agricultural sector is also characterized with poor production technology and highly depending on rain-fed and low input-output mode of production and the sector has stayed less productive for long period of time and the country failed to achieve food security. Many reasons can be mentioned for the poor performance of the agricultural sector in the country these are poor application of modern agricultural technology, fragmented agricultural land because of population growth, loosing soil fertility and degradation with over exploitation and environmental change, less developed infrastructure and financial institutions.

A large body of literature has analyzed smallholder farmer productive capacity in the face of several interrelated socio-economic challenges *(Hazell et al. 2007, World Bank, 2008).* These challenges include insufficient access to markets, infrastructure and agricultural technology, high marketing and transport costs and limited resources (land and human capital). While these challenges persist, increasingly complex natural and human-caused shocks are making smallholders farmers more vulnerable to food insecurity. Given these, in Ethiopia where smalllholder farmers are the main players in the sector the challenges are more pressing than anywhere.

Most of the study conducted in the country focus on the challenges of natural factors such as climate variability, rainfall shortage and land degradation for low agricultural productivity and food insecrity in Ethiopia. Thus, the agricultural sector in Ethiopia is highly depending on rainfall and natural inputs that are directly related to climatic conditions wondemagegn (2012). Drought and famine are rooted with deep poverty in the country's history inherently caused by climate and some geological change. Thus, the problem of weather change can be regarded for the country as the problem of survival. Indeed, farmers' dependency on rainfall and its erratic patterns have largely contributed to the food shortages and crises *(Zenebe, et al., 2011).*

However, this study mainly focus on the challenges faced by smallholder farmers in agricultural practices in respect to socio-economic aspects that have termendiuos impact on agricultural productivity and food security situation. The smallholder farmers agricultural productivity is too low to support the livelihood of the communities almost all year round mainly due to these socio-economic challenges perevelent among smallholder farmers in the district.

The smallholder farmers agricultural practices has been characterized by traditional method of farming with poor farming technologies. Low agricultural productivity of smallholder farmers can be attributed to limited access by smallholder farmers of the *Woreda* to modern agricultural technologies, improved agricultural inputs and extension services. Low level of education among the smallholder farmers about modern agricultural technologies and adoption, inappropriate agricultural techniques combine with poor agricultural land management practices of smallholder farmers are the main challenges that threaten the sustainability of agricultural production and has led to food insecurity situation in the district.

More importantly, Poor development of rural infrastructure such rural roads, inadeqaute and poor conditions of market facilities for agricultural production, poor development of rural credit services and financial institutions were also among major challenges for the smallholder farmers agricultural practices in Robe district. Although similar studies are conducted in other parts of the country, this study specifically focuses on socio-economic challenges of among the smallholder farmers agricultural practices of the study area. Accordingly, this research study is conducted in three rural *kebeles* of Robe *Woreda*: namely Ataba Robe, Jawi Sire and Endato Waltahi to identify the main socio-economic challenges facing the smallholder farmers in their agricultural practice. In general, the above mentioned challenges negatively impact the agricultural productivity and food insecurity of smallholder farmers in the district.

1.3. Objective of the Study

The general objective of this study is to identify major socio-economic challenges of smallholder farmers agricultural practices in Robe *Woreda.*

Specific tasks pursued under thisis main objective include:

- To explore the agricultural practice of the smallholder farmers in the study area.
- To identify the constraints that hinders the smallholder farmers to use modern agricultural technologies.
- To explore the existing infrastructure of the smallholder farmers and its accessibility to input-output markets in the study area.
- To assess the smallholder farmers access to financial institutions?

1.4. Basic Research Questions

The main intent of this thesis is to throughly investigate and answer the following questions.

1. Do smallholder farmers agricultural practices make the household agriculturally productive?
2. What are the constraints that hinder the smallholder farmers to use modern agricultural technologies?
3. Does sufficient infrastructure exist to enable smallholder farmers access to input-output markets?
4. Can the smallholder farmers have better access to financial institutions?

1.5. Significance of the Study

Comprehensive understanding of the smallholder farmers agricultural practice and its socio-economic challenges is crucial in designing future research and development strategies mainly related with examining the relationship between socio-economic challenges and agricultural practices. This study willl help policy makers to develop evidence for future research, extension, and development programs aimed at benefiting smallholder farmers. Policy makers will benefit from the research output, since they require micro-level information to formulate policies and strategies so that their effort would be appropriate in meeting smallholder farmers need in particular and to bring change in agricultural practice in general.

This research result will also benefit agricultural experts, development planners, other researchers and ultimately the small holder farmers. In addition to this, this piece of work tries to assess the major socio-economic challenges of agricultural practice by the small holder farmers. Therefore, the study will generate information on diverse set of issues related to socio-economic challenges in agricultural practices of smallholder farmers in Robe *Woreda.*

1.6. Scope and Limitation of the Study

This study was focused on the socio-economic challenges of smallholder farmers in agricultural practice in Robe *Woreda.* Therefore, its scope is limited in terms of coverage and depth owing to financial and time constraints. The study was carried out by surveying a sample of smallholder households including both male and female headed households. Nevertheless, the result of this study can also be used as a reference for other similar areas.

1.7. Organization of the Thesis

This research thesis is organized into five chapters. The first chapter introduces the background, the statement of the problem, objectives, basic research questions, significance and limitation of the study as well as Research methodology, which consists of sample and sampling techniques, data collection instruments, data types and data sources and methods of Data analysis. Chapter two reviews the relevant literature that is related to the subject matter under study. Chapter three focuses on brief description of the study area. Survey results were analyzed and discussed under chapter four. Finally, chapter five presents the conclusion and recommendations of the study.

CHAPTER TWO: REVIEW OF LITERATURES

2.1. Theoretical, Empirical and Conceptual Frameworks

2.1.1. Definition of Smallholders

The term 'smallholder' refers to their limited resource endowments relative to other farmers in the sector (FAO, 2004a). Acording to (AfDB, 2010) Smallholder farming is often referred to as family farming, subsistence farming and low-income farming. Smallholder farming is the backbone of African agriculture and food security. Of the two-thirds of sub-Saharan Africa's population that resides in the rural areas, the majority can be considered as smallholder farmers. Their importance derives from their prevalence, their role in agricultural and economic development and the concentration of poverty in rural areas.

African smallholder farmers can be categorized on the basis of the agro ecological zones in which they operate the type and composition of their farm portfolio and landholding or on the basis of annual revenue they generate from farming activities *(Dixon et al, 2003).* The most common measure is farm size: many sources define small farms as those with less than hectare of crop land. Others describe small farms as those depending on household members for most of the labour or those with a subsistence orientation, where the primary aim of the farm is to produce the bulk of the household's consumption of staple foods *(Hazell et al., 2007).*

In areas with high population densities, smallholder farmers usually cultivate less than one hectare of land, which may increase up to 10 ha or more in sparsely populated semi-arid areas, sometimes in combination with livestock of up to 10 animals *(Dixon et al, 2003).* On the basis of farm revenue, smallholder farmers range from those producing crops only for family consumption to those in developed countries earning as much as USD 50,000 a year *(Dixon et al, 2003).* Yet, others define small farms as those with limited resources including land, capital, skills and labour. The World Bank's Rural Development Strategy defines smallholders as those with a low asset base, operating less than 2 hectares of cropland (World Bank, 2003). According to (AfDB, 2010) Smallholder farmers in Ethiopia have on an average less than 1 hectare of land per house hold.

2.1.2. Definition of Agricultural Practice

Agriculture is the science, art and business of cultivating land, producing crops, and raising livestock. Agriculture is the process of producing food, feed, fiber and many other desired products by the cultivation of certain plants and the raising of domesticated animals (livestock). It is also conservation of soil and water, atmospheric and biological resources, livestock and range management issues and development. ***The practice of agriculture*** is also known as "farming" while scientists, inventors and others devoted to improving farming methods and implements are also said to be engaged in agriculture. Agricultural practice can be in the form of ***Subsistence farming***, who farms a small area with limited resource inputs and produces only enough food to meet the needs of his/her family wich is common in most of developing country including Ethiopia. At the other hand, ***commercial intensive agriculture***, including industrial agriculture. Such farming involves large fields or numbers of animals, large resource inputs (imroved seeds, pesticides, fertilizers, etc.), and a high level of mechanization. These operations generally attempt to maximize financial income from grain, produce, or livestock. Modern agriculture extends well beyond the traditional production of food for humans and animal feeds.

2.1.3. Concept of impact of smallholder traditional agricultural practices on productivity

The Ethiopian economy is supported by agricultural sector which is also a fundamental instrument for poverty alleviation, food security, and economic growth. Agriculture, although the dominant sector of the economy is constrained by age-old production practices (MoFED, 2003). The agricultural sector was characterized by tradition agricultural practice mostly rely on rain-fed agriculture for their production.

The problem of Ethiopian agriculture cannot be primarily explained by natural endowments. By any measure, Ethiopia is well endowed at least in part with a fertile soil, abundant water resources and good climatic conditions until recently. What needs careful analysis is why Ethiopian farmers continue to practice essentially the same farming methods with very little technical or management improvement for so long period of time and the low level of agricultural productivity as the key problem (Samuel Gebreselasie, 2006).

Traditional agricultural practice of smallholder farmers are often on small plots farm land with poor application of modern agricultural technology and agricultural inputs such as chemical fertilizer,improved seeds and agricultural credits and other inputs wich makes the farm land low productive to support the livelhood of the society food demand throughout the year.

The diffussion of Modern agricultural technology is the major problem for acheiving better productivity in Ethiopian agriculture. Furthermore, productivity is essentially regarded as a technical or technological problem. Since the technology required for enhancing productivity is internationally available, what remains to be done is to widely diffuse this technology particularly fertilizers and improved seeds to increase low productivity in agriculture Berhanu Nega (2003). Several litrature indicates that agricultural productivity was increase with large plots of agricultural land with application of modern agricultural technology, inputs and better access to input-output markets and infrastructure.

Agricultural productivity is one of the key determinants of high and sustained agricultural growth, and in fact a key determinant of its growth over the longer term. Faster agricultural growth has put countries on the path of a much broader transformation process: rising farm incomes raising demand for industrial goods, lowering food prices, curbing inflation and inducing non-farm growth, and creating an additional demand for workers (AfDB, 2010). Rising on-farm productivity also encourages broad entrepreneurial activities through diversification into new products, the growth of rural service sectors, the birth of agro-processing industries, and the exploration of new export market (Harvey, 2006; World Bank, 2008).

Agricultural growth is the primary source of poverty reduction in most agriculture-based economies. The expansion of smallholder farming can lead to a faster rate of poverty alleviation, by raising the incomes of rural cultivators and reducing food expenditure, and thus reduces income inequality (Mellor 1966, 1976; Magingxa and Kamara 2003; Diao and Hazell 2004; Resnick 2004; Bahram and Chitemi 2006; Anríquez G. and K. Stamoulis, 2007; and World Bank, 2008). As observed by (Ravallion, 2001), a rise in average household income by 2 percent leads to a fall in the poverty rates by about 4 percent on average.

The 2008 World Development Report also observed that GDP growth originating in agriculture is about four times more effective in reducing poverty than GDP growth of other sectors (World Bank, 2008). Small farms are estimated to produce four-fifths of the developing world's food (FAO, 2011). Moreover, they are home to approximately two-thirds of the world's 3 billion rural residents, the majority of people living in absolute poverty, and half of the world's undernourished people (IFPRI, 2005).This is mainly related with smallholder farmers traditional agricultural practice for long period of time with out any modern method of farming technologies, modern agricultural inputs (improved seeds, fertilizers, pesticides and insectisides) for their farm land, poor infrastructure such as better roads, input and output market and poor development of credit services in rural areas.

2.2. Review of Constraints to Smallholder Farmers in Ethiopia

2.2.1. Land Tenure, Access Rights and Land Management

Land is one of the most important elements to be considered in the context of urban and rural development. It is the source of almost all material wealth and the main resource for human settlement. The interrelation of people and land is fundamental to human existence. The shortage or inaccessibility of land therefore has very negative effects and can seriously hamper social and economic development.

Land is a public property in Ethiopia. It has been administered by the government since the 1975 radical land reform (Samuel Gebreselasie, 2006). The reform brought to an end the exploitative type of relationship that existed between tenants and landlords. Tenants became own operators with use rights, but with no rights to sell, mortgage or exchange of land. The change of government in 1991 has brought not much change in terms of land policy. The 1994 Constitution of the Federal Democratic Republic of Ethiopia proclaimed that 'Land is a common property of the nations, nationalities and peoples of Ethiopia and shall not be subject to sale or to other means of transfer'. Ethiopia is one of the few countries in Africa that has not made significant changes in its basic land policy for over three decades except for occasional land redistributions to accommodate the growing population.

One of the major land-related problems in Ethiopia is insecurity of tenure. Land tenure is derived from the Latin word tenure, which means, "to hold", and it generally refers to the right, mode or terms of holding. Hence land tenure defines the method by which individuals or groups acquire, hold and transform property in land. The uncertainties regarding land tenure and the inadequate access to land have been acritical challenge to smallholder farming in Ethiopia. These problems can be examined from different perspectives. The constraints related to the tenure system,such as insecurity of land tenure, unequal access to land, lack of a mechanism to transfer rights and consolidate plots, have resulted in under-developed agriculture, high landlessness,food insecurity and degraded natural resource. Tenure insecurity in Ethiopia could not only triggered by fear of future land redistribution. Weak land administration which the government has been struggling to address through the issuance of land certificates could also lead to arbitrary violation of farmers' land use rights by local authorities or institutions, in which farmers' usually have low confidence. (*Deininger et al 2003b),* for instance, documented a link between higher levels of off-farm employment and lower levels of tenure security in the form of farmers' fear of being affected by future land redistribution. Smallholders also face perceived tenure insecurity as the proportion of people with no land or alternative livelihood has been growing in every village.
Tenure insecurity, coupled with the subsistence nature of farming, has discouraged long term investment and exacerbated the problem of land degradation many argue (Alemu, 2005; Berhnau Gebremedhin and Berhanu Nega, 2005; Fafchamps, 2000; Samuel, 2005). Insecurity of tenure has prevented farmers realizing economic and non-economic benefits that are normally associated with secure property rights in land. A recent study by EEA and World Bank researchers *(Deininger et al, 2003)* confirmed that improving security of land ownership and transferability of land in Ethiopia could have a significant impact on overall output and household welfare.

Tenure affects virtually all decisions concerning land use systems and agriculture-based development, be it croplands, grazing lands, or forestlands. Equally important, in terms of access to additional land, is proper management of the existing one. According to Kimaru and Jama (2005), in East Africa sustained gains to agricultural productivity are threatened by land degradation, especially land erosion and loss of fertility.

2.2.2. Agricultural Land Fragmentations

The major problems of agriculture in Ethiopia are shrinking of agricultural land and high farm fragmentation due to high population pressure for the farm land that undermines the farm land productivity, farm income and agricultural growth in general.

Ethiopia is a country of smallholder agriculture. In the 2000 cropping season, 87.4 % of rural households operated less than 2 hectares; whereas 64.5 % of them cultivated farms less than one hectare; while 40.6% operated land sizes of 0.5 hectare and less (CSA, 2002; Negatu, 2005). Such small farms are fragmented on average into 2.3 plots. A study by *Nega et al (2003)* shows that landholding is one of the factors that constrains farm income and the level of household food security. As landholding declines, per capita food production and farm income also decline, indicating that extremely small sized farms cannot be made productive even with improved technology and certainly not enough to address rural poverty issues by the extension programs that primarily focus on technology diffusion. Such farmers have little or no surplus for investment and for input purchase. Because of high vulnerability to food and income insecurity, farmers with relatively small farm holdings turn frequently to trading crop residue and animal manure as a source of fuel, rather than applying them for soil fertility improvement. The increasing decline of farm size also leads to a reduction of fallowing practice or shortening of fallow cycles, and rotation, with a consequence of declining soil quality and fertility in some highland areas. The average farm size is considered by many to be small to allow sustainable intensification of smallholder agriculture.

Empirical evidence shows that the probability of adopting fertilizer and improved seeds decreases with declines in farm size *(Croppenstedt, et al., 1998; Mulat et al., 1998; Wolday, 1998; Mulat, 1999 cited in Samuel Gebreselasie, 2006*). The BASIS/IDR study in South Wollo, for instance, has found that farm size has a positive and statistically significant impact on fertilizer use. In the study, the relation of technology use and farm size was observed by categorizing farm holdings into three size groups: (i) small size farms, 0.50 ha and less; (ii) medium size farms, 0.51 ha - 2.0 ha, and; (iii) large size farms, above 2.0 ha. Large size farm holders were found to be significant users of fertilizer, improved seeds and manure (Negatu,

2005). This implies simply that the size of the operated farm is a crucial factor in the intensification of smallholder farming systems.

According to,(Negatu, 2005 cited in Samuel, 2006) a unit change in size of farm operated entails more than two and half times higher chance of using chemical fertilizer, other factors remaining constant. Those farm households with larger farm size benefit from economies of scale in using chemical fertilizer as they can better afford to purchase it. Households with relatively small farm size are generally poor in cash income, have less access to extension services and credit, and have less risk coping opportunities to take risks of rain failure, and less profitable technologies given higher transaction costs of acquisition and application of fertilizer per unit of operated land (Negatu, 2005).

The diminishing farm size has not only affected the profitability and level of technology use, but also the sustainability of rural livelihoods. A study carried out at national level, for instance, indicates recently that, the average farm size can generate only about 50% of the minimum income required for the average farm household to lead a life out of poverty, if current levels of farm productivity and price structure remain constant.

The average land holding size in the Ethiopian highlands would thus be insufficient to feed a family of five, even if production could be successfully increased three times using improved technologies (Masefield, 2000, cited by EEA, 2004). Farm fragmentation has increasingly emerged as one of the key problems of subsistence farming of Ethiopia. According to a recent national survey data the average farm size in the highlands (in 2004) was fragmented into 2.3 plots, each with 0.35 hectares.

The process of farm fragmentation has been in part induced by farmers' voluntary actions of sharing part of their farm to children reaching working age and forming their own family farm but without securing any additional alternative livelihood. This process has, however, increasingly become infeasible as depict by official rural employment data. Between1984 and 1994, the size of family labor in Ethiopian smallholder sector increased from 38% to 55%. This

implies that smallholders reach to the point where they cannot redistribute their already miniscule and fragmented land to the growing labor within their family.

Even though the process of further farm fragmentation has become less practical, the current level of farm fragmentation is high, especially considering together with existing farm sizes and level of land productivity. This may hinder sustainable intensification of smallholder agriculture in many ways.

The incentive to apply sustainable land management practices like rotation, agroforestry, inter-cropping and soil erosion control is generally affected negatively by farm fragmentation and diminution of farmland. Small farm households face higher overhead costs of application of technology and sustainable land management practices. Moreover, smallholders are less risk tolerant and the opportunity cost of participation in sustainable land management practices is not high, when compared to farmers with relatively higher farms.

2.2.3. Under Developed Infrastructure

Poor infrastructure continous to impede agricultural activities in Ethiopia. The body of literature indicate that, inadequate infrastructure and social service development such as road, transportation, communication, electrification, education and health services, and agricultural extension services would be the major challenges to sustain the growth of agricultural production and thereby ensure households food security. Thus, infrastructural constraints such as inaccessibility to roads, absence of irrigation facilities, absence of rural credit, inadequate extension services, poor storage facilities, low price of agricultural output, and inadequate veterinary services are reflected on household's food insecurity (Degefa, 2002).

Households diversify their source of income by engaging in off farm and nonfarm activities. Thus, households need credit facilities as the most infrastructural factors. According to AfDB(2010), in Ethiopia access to formall credit mainly confined to large urban and town centers at the expense of smallholder farmers in rural areas. This is one of the constraints of smallholder farmers in agricultural practice. Basically, the sources are expected to be either from formal or informal institutions such as NGOs, Governments, Microfinance Institutions, private money lenders, traders, and the like Mesay (2008). However, Degefa (2005) indicated that,

obtaining loans from local money lenders has largely declined due to the inability of poor households to repay loans. This has led to mistrust among them and become a major problem to obtain loan.

Underdeveloped rural roads and other key physical infrastructure have led to high transport costs for agricultural products to the market as well as of farm inputs and reducing farmers' competitiveness. As a result of poor road network,smallholder farmers depend on inefficient forms of transportation including use of animals. Lack of storage and processing facilities constrains marketability of perishable goods such as fish, dairy products, and vegetables.in addition due to poor condition of market facilities the smallholder farmers has not access to input and output markets for agricultural production.

2.3. The concept of Food Security

The conceptual framework of food security has progressively developed and expanded particularly on the basis of the growing incidence of hunger, famine, and malnutrition in developing countries (Debebe, 1995). The concept of food security is broad, diversified, and dynamic. The rationale behind this is the varied geographical, social and economic set up of the world communities that tend to understand the concept differently (Hussein, 2006 cited in Meskerem, 2011).

The concept of food security was coined following the first world food conference in 1974 in Rome. In the mid-1970s, food security was conceived as the availability of adequate food supply at global and national levels, though significant proportion of the population has suffered from hunger and malnutrition (Debebe, 1995). However, mere availability of adequate food supply at global or national levels does not guarantee for security at the household level. For instance what is available in world market or surplus food in developed countries cannot be accessed by famine prone people in sub-Saharan Africa due to lack of adequate foreign currency to purchase food from the world market. Even at national level, adequate availability of food means there is self-sufficiency, but that a condition does not necessarily imply the achievement of food security in the country (Ellis, 1992 cited in Mokonen, 2011).

Today, in the third world where hunger and famine are rampant, food security is a topic of considerable attention. Nearly thirty definitions of it have been identified by Maxwell and Franken Berger (1992). But food security definition has considerably been changed over the time and recently cited to have reached more than 250 (Degefa, 2008 cited in Mokonen, 2011).

In this respect, the definition formulated in the first world food summit is "All people at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and health life" (FAO, 1996). This definition constitutes core elements such as (i) Sufficiency of food which represents the calorie needed for an active and health life; (ii) Access which refers to the ability to produce, purchase, exchange or receive food as a gift (transfer); (iii) Security that refers the balance between vulnerability, risk and insurance. Vulnerability by itself has two important dimension: exposure to external shocks, and the resultant stress and risks; and lack of means to cope with crisis without damaging loss; and (iv) the time dimension that deals with whether food insecurity can be chronic, transitory/seasonal.

The history of food security definitions shows that, the focus has moved from global and national Perspective to household and individual level (Maxwell, 1996). Household food security is the ability of households to produce, purchase, or acquire an adequate amount of food through public or private transfer to meet biological requirements whereas food consumption insecurity/individual insecurity exists when some individual or groups cannot gain access to adequate food given their nominal incomes and the price as well as availability of food. Food consumption insecurity often takes the form of chronic insecurity amongst vulnerable groups. Generally, household food security is very important since the household is the basic unit of analysis that determines the production and consumption level of its members' (Chambers 1983, cited in Mokonen, 2011).

A nation could be food secure because it has the resource to provide sufficient food for all of its citizens, but could still have food insecure households who may not access to the food. In extreme cases, it may even be the reality that food insecure people could live in food secure households due to inequalities in intra- household distribution. Thus, genuine food security is achieved only when

the concept is applied at the individual level' (WB, 2000 cited in Mokonen, 2011). In a given country, food security can be viewed from national or household or individual perspectives.
National food security is viewed as the ability of the country to produce, secure, and maintain adequate levels of supply to meet demand throughout the year, both through domestic production and imports. Food supply insecurity, also called national aggregate insecurity, arises when a country is unable to supply its aggregate food requirement either through domestic production, imports and reserves (Harrigan, 1990 cited in Mokonen, 2011).

Moreover, (Getachew,1995) define food security in the context of subsistence farmers as "ability to establish access to production resources such as land, livestock, agricultural inputs and family labor combined to produce food or cash" (Getachew 1995:29 cited in Meskrem, 2011). Hence, food security analyzed at the household level is determined by a households own production and members' ability to purchase food of the right quality. With regard to this definition, Bonnard (1999) cited in meskerem(2011) argued that, with respect to the three components of food security, agriculture constitutes the most important factor in food availability, a primary factor in food access and a complementary factor for food utilization where livelihoods are agriculture-based.

Food insecurity is a *situation in which individuals have neither physical nor economical access to the nourishment they need.* Food insecurity is lack of access by people to enough food for active and health life (WB, 1986). A household is said to be food insecure when its consumption falls to less than 80% of the daily minimum recommended allowance of caloric intake for an individual to be active and healthy. In particular, food insecurity includes low food intake, variable access to food, and vulnerability- a livelihood strategy that generates adequate food in good times but is not resilient against shocks. These outcomes correspond broadly to chronic and transitory food insecurity, and all are endemic in Ethiopia (Devereux, 2000).

Food insecurity can be classified as chronic or transitory in terms of time dimension: chronic and transitory food insecurity. Chronic food insecurity is a situation that exists when food supplies are persistently insufficient to provide adequate nutrition for all individuals, either by production, barter, purchase, gift, sharing or aid. The terms generally represent a constant failure in access to food. Chronic food insecurity is a typical symptom of poverty and reflects a long term structural deficit in

production and lack of purchasing power. In this connection, poverty the determinant of chronic food insecurity can be described as lack of entitlement to the means of generating income to satisfy basic human needs. Therefore, low income groups such as the urban poor, the rural landless, small food deficit farmers, and herders are the most vulnerable to chronic food insecurity (WB, 2000). Besides, pastoralists and agro pastoralists in arid and semi-arid areas are the main categories of chronically food insecure people (FAO, 2010).

Transitory food insecurity is a temporary short fall in food availability caused by instability in food production, a fall in income, increase in food prices, food unavailability as a result of natural disaster and war. It includes seasonal food shortage as well as catastrophic food short falls due to economic, meteorological and/or pest disease problems. Transitory insecurity therefore, is not one time event. The situations recur seasonally or cyclically (WB, 2000).

Food security/insecurity situation in Ethiopia is discussed by putting more emphasis on the local context/problems. As stated in (Dessalegn, 1991 cited in Mesay, 2008), the history of Ethiopia is highly linked with severe recurring food shortages and famine. Adverse climate changes, environmental degradation combined with socio-economic conditions such as high population pressure, poor infrastructure, technological and institutional factors have led to a decline in the size of per capita landholding causes a serious growing of food security problem in Ethiopia (PASDEP, 2005).

Ethiopia and most sub-Saharan Africa nations have experiencing a decline in per capita income and food production which have led to food insecurity (Sisay, 1995). Getachew (1995) relates the problem of food insecurity in Ethiopia with recurrent drought and long term secular decline in resource endowment.

Similarly, (FDRE, 2002) indicates that, the cause of food insecurity in Ethiopia related with man-made and unusual shocks, such as drought and lack of productive assets. Currently, there is growing consensus that the food insecurity and poverty problems are closely related in the Ethiopia situation.

Ethiopia is listed among those countries in Sub-Saharan Africa with the most perilous long term food situations. Various historical records revealed that, Ethiopia has faced some 44 severe famine catastrophes with a series of rain failures and substantial livestock loss. About 8 million Ethiopians were affected, and 1 million were estimated to have died (Webb and von Braun, 1994; Degefa, 2005). According to Devereux (1993), the term famine is used to explain severe food insecurity and it is referred as the worst manifestation of food insecurity. sen (1981) argues that, famine prevails when people lack the ability to command affect a subsistence production system. On the other hand, (Degefa, 2002) in his study conducted in Oromiya region indicates that, though the causes of household food insecurity vary from household to household, the major causes of food insecurity in Ethiopia are closely related to environmental, demographic, economic, social, infrastructural and political factors.

Similarliy, Meskerem(2011) in her Study conducted on food security situation and coping strategies in Girar Jarso woreda oromiya region also catagories the main causes of food insecurity as environmental, demographic, economic, social, infrastructural, and political dimension in their nature. Generally speaking, the main causes of food insecurity are environmental, demographic, economic, social, infrastructural, and political dimension in their nature.

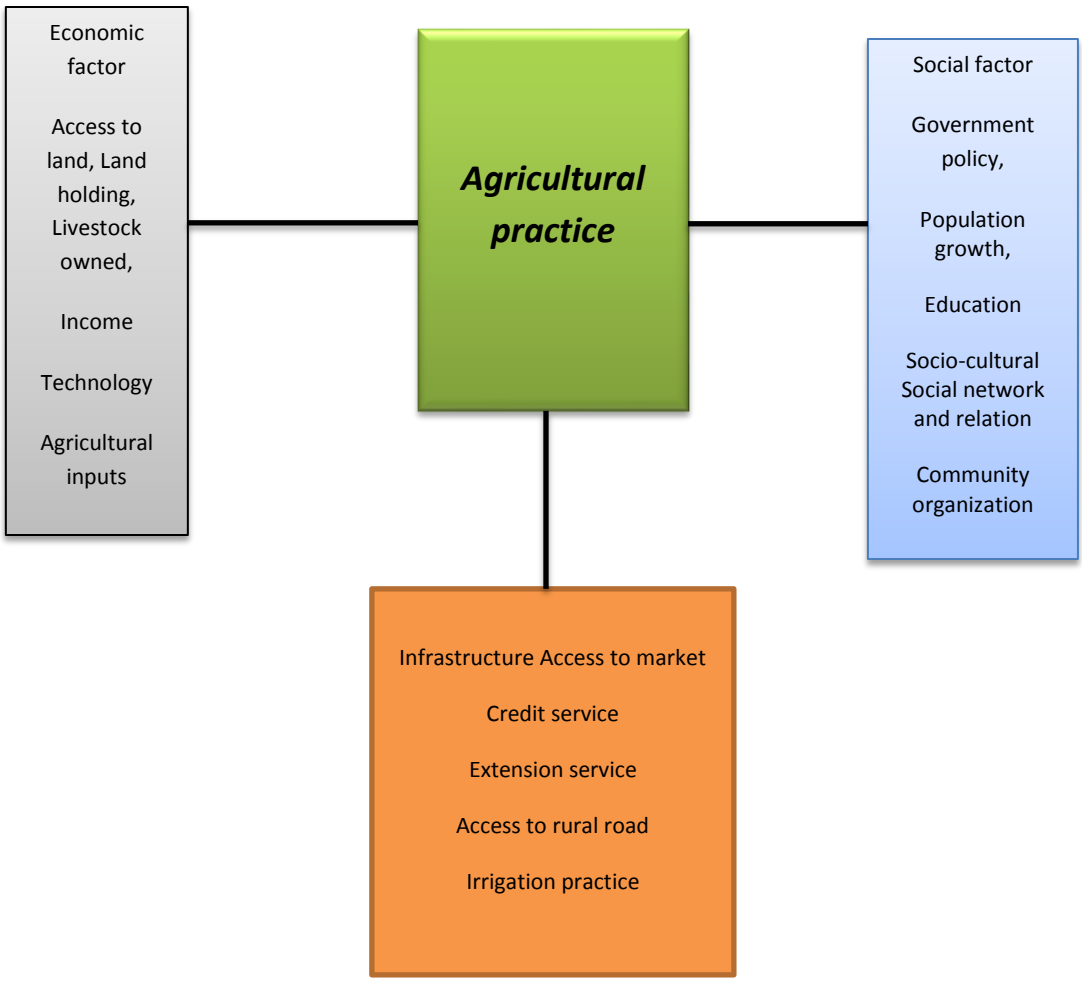


Figure 1: Conceptual framework

(Source: Researcher Own construction, 2013)

CHAPTER THREE: METHODS AND MATERIALS

3.1. Sampling Design

The sample size of this study was determined or calculated using the following formulas of sample size determination which was adopted from Yamane, Taro (1967). The formula was given as, $n=N/1+N(e)^2$

Where n= is the sample size

N= total population size

e= sampling error

This formula was used since the population under study is homogenous in character so the marginal error (SE) of this study was 8%, which is equal to 0.08 and the confidence level is about 92 %. The sample size of this study was therefore determined:

$n=N/1+N(e)^2$

n= 2483/1+2483(0.08)2

= 150 households

3.2. Sampling Technique

Robe *woreda* has 32 *kebeles* of wich 28 are rural and 4 are town *kebeles* having different agro-climatic characterstics. The sampling frame for this study was rural households that are found in three agro-ecological zone of Robe *woreda.*

The study employed different sampling techniques to select the representative samples. Firstly, rural *kebeles* were stratified by agro-ecology (*Dega, Woina Dega* and *Kola*). Secondly, three rural *kebeles* namely Jawi Sire, Ataba Robe and Endato Waltahi were purposively selected from *Dega,Woina Dega* and *Kola* agro- ecological zone respectively.The selection is made through the use of *Woreda* map in the agricultural office of the district that catagorized these selected *kebeles* as *Dega, Woina Dega* and *Kola* agro-ecology.Thirdly,eligible Respondent households were selected by using systematic Random sampling techniques from selected *kebeles.* Hence, 150 households were selected randomly for the study from these sample *kebeles* including both male and female headed households.

Since the sample *kebeles* differ in terms of the total households they encompass and So as to generate relevant information, the households in the sample *kebeles* were proportionately selected with respect to the number of total households of each sample *kebeles* through the following formula:

$$n = N(S) / \sum N$$ (Source: Tadesse Dejenie, 2011)

Where, n= the number of required samples of each kebeles.

N= Total households of each kebele.

S= Total sample households to be treated.

$\sum N$= Total households of the sample kebeles.

S is determined to be 6% of the total households of all sample kebeles.

Table 1: Distribution of sample respondents per each *kebeles*

Name of sample *Kebeles*	**Total Number of household of sample *kebeles*****				**Sample household***		
	Male Headed	Female headed	Total	Percent	Male headed	Female Headed	Total
Jawi sire (*Dega*)	842	177	1019	41	50	11	61
Ataba Robe (*Woina Dega*)	742	96	838	34	44	6	50
Endato Waltahi (*kola*)	562	64	626	25	35	4	39
Total	**2146**	**337**	**2483**	**100**	**129**	**21**	**150**

Source:own survey, 2014

*Note : *Obtained based on the above sampling thechnique*

*** Obtained from basic data of the woreda agricultural office*

According to data obtained from Robe *woreda* agricultural office the total households are:

Jawi sire *kebele* = 1019 =N1

Ataba Robe *kebele* = 838=N2

Endato Waltahi *kebele*= 626 =N3

Total = 2483 Σ (N1, N2 and N3)

Based on the above formula the required sample household (n1, n2 and n3) are drown from each sample *kebeles* (Jawi sire, Ataba Robe and Endato waltahi) resulting 61, 50 and 39 Sample households respectively.

3.1. Data Collection Instruments

The most important instruments employed to generate relevant information were questionnaire, key informant interview, field observation and focus group discussions with farmers.

3.1.1. Questionnaires

To generate qualitative information at household level, household survey was undertaken by developing structured questionnaires. So as to gather primary information from smallholder farmers these structured questions have been administered to household samples. The questions were formulated in both open ended and close ended forms and administered through face to face contact with smallholder households.

To make it convenient and simple for understanding, all the questions were translated into Afan Oromo and Amharic languages. The survey was conducted on the selected **150** sample households (129 male and 21 female). In order to avoid redundancy of respondent households and make the research valid, sampled households were selected randomly from *kebele* administration registration book.

3.1.2. Key Informant Interviews

Interviews were carried out with the three rural *Kebeles* administrators, the head of *Woreda* Agriculture Office, Agriculture and Rural Development experts, the head of Disaster Risk Management Office, Environmental Protection and Land Administration and Use experts of the *Woreda,* and DAS of the sample *Kebeles.*

3.1.3. Field Observation

Field observation was necessarily used to gather primary information and one of the most common methods for qualitative data collection since the researcher becomes a participant on the context being observed. Accordingly, the study area was observed before and during the study period. Prior to collecting data the study area were visited to know the means of livelihood of the communities, Physical factors like topography including (agro-ecology) of the study area. Infrastructural facilities such as feeder roads connecting to the main roads, means of transportation, irrigation facilities, marketing situations, financial institutions (rural credit services) of the study area were also observed.

Above all, field observation were made to gather primary information with regard to the current condition of agricultural practice, agricultural farmland size, cultivated lands and the overall surrounding socio-economic conditions relating to the agricultural practice of the study area. Visual photographs were taken during field observation especially on the sources of water supply for smallholder farmers, marketing situation, transportation mechanism, farmland and agricultural activities of smallholder farmers in the study area.

3.1.4. Focus Group Discussion

Focused group discussion were also undertaken to gather primary information from respondent households in study area. Focused group discussion was conducted in all three *kebeles* with 21 selected farmers. From Ataba Robe *kebele* 7 farmers (two were the so called 'model farmers'), from Jawi Sire *kebele* 8 farmers (two were the so called 'model farmers') and 6 farmers from Endato waltahi *kebele.* The interviewer introduced a list of topics and encouraged the participants to discuss issues and forward their opinions. In addition, discussion with *Kebeles* and *Woreda* officials, DAs and concerned *woreda* agricultural office experts were held.

3.2. Data Types and Data Sources

In this study, both qualitative and quantitative data was collected to attain the stated objectives from primary and secondary data sources. The primary data sources were Male and Female respondents, Key Informants, as well as DAs and Agrictural experts. Secondary data was collected from Documents, Books, registered books at the respective sampled *kebeles* offices, Articles, Records, Reports of Government and Non Governments bodies.

3.3. Methods of Data Analysis

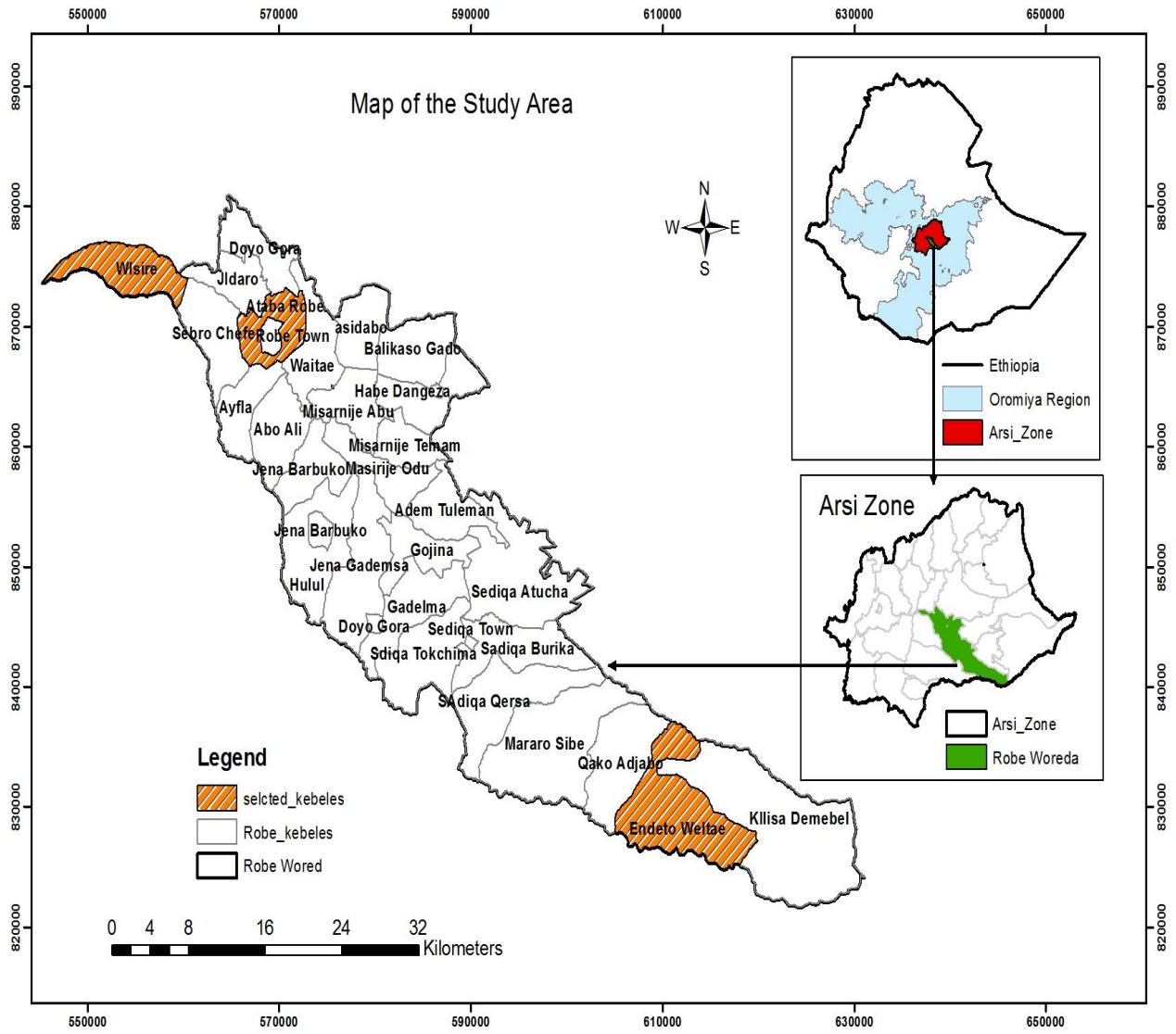
The data generated from primary and secondary sources through questionnaires, key informant interview, observation and formal and informal discussions was presented, analyzed and interpreted qualitatively and quantitatively depending on the available data obtained. Simple statistical descriptions like frequency and percentages were employed for analyzing and interpreting the data collected. The remaining data were discussed, described and narrated qualitatively. The analysis is supplemented with visual photographs recorded during field observation.

3.4. Description of the study area

3.4.1. Physical setting

The study was conducted in Robe *Woreda* of Arsi zone the Oromia Regional State. Robe is located in the southeastern part of the country. It is situated at 09°36′N latitude and 39°08′E longitude and about 225 km South East of Addis Ababa and 98km East of Asela, the capital town of Eastern Arsi Zone. It is bordered by on the south of the Shebele River wich separate it from Bale Zone, on the south west by Sherka *Woreda*, on the west by Tena, on the north by Sudie, on the north east by Amigna district and on the east by Seru *Woreda*. The total area of the *Woreda* is about 1322.5km2 and 5.3% of Arsi zone. The altitude of the *Woreda* ranges from 1150 to 2435 meters above sea level (m.a.s.l). The topography is characterized by undulating relief and dissected plateus, plain and vertical cliff, up and down landforms in kola areas. The gorge of the Wabe is a local landmark between the woreda and Bale zone. The elevation of the district reduces from northwest to southeast.

Rivers include 45 kilometers of the Hulull and 40 kilometers of the Wabe. According to Robe Meteorological Station data the maximum and minimum rainfall is about 1300mm and 700mm, respectively. The area exhibits a bimodal pattern of precipitation, with the ’big’ rains that constitute about two-thirds of the annual total rainfall amount falling between July and September, and the ’small’ rains between March and May. Temperature of the *Woreda* ranges from a minimum of 10.50c to a maximum of 250c. According to clamatic callasification Agro-ecologically, the *Woreda* is categorized into three agro-ecology; these are the *Dega, Woina Dega* and *Kolla* constituting 24% ,62% and 14% of the total area of the *Woreda* respectively.



Source: Geographic information system, 2007

Figure 2: Map of the study area

3.4.2. Demographic characteristics

Depending on the CSA results of (2013) the total population of the *Woreda* is 197,234 of wich 117,742 (90%) of its population are rural and 19,492(10%) are urban dwellers. The number of female and male population is 97,942 and 99,292 respectively giving sex ratio of 100 female to 101 male. The average population density of the *Woreda* is 147 persons per km^2 With in an estimated area of 1,338.6 square kilometers (CSA, 2013). Robe *Woreda* consists of people with different ethnic groups.The three largest ethnic groups in Robe were the Oromo (86.11%), the Amhara (11.25%), and the Soddo Gurage people (1.39%) all other ethnic groups made up 1.25% of the population. Oromiffa was spoken as a first language by 84.15%, and 15.22% spoke Amharic, the remaining 0.63% spoke all other primary languages. Commonly, people living in woina dega areas speak Afan Oromo while Amharic is spoken mostly by people living in kolla areas. With regard to religion, the majority of the inhabitants were muslim, with 59% of the population practiced this belief, while 40.4% of the population of the *Woreda* are followers of Christianity.

3.4.3. Socio-Economic condition

The main economic stay of the population of Robe *Woreda* is agriculture with mixed farming system at subsistence level, producing both crop and livestock. More than 90 percent of the population depends on subsistence farming as the livelihood strategy. The main source of income of the study area is obtained from agricultural produce, sale of livestock and livestock products such as milk, cheese and butter, livestock by-products. Besides, Non-farm activities such as trade, daily labor,charcoal and feul wood selling, pottery production and the like are the main sources of income in the study area. However, income obtained from non-farm activities is limited as compared to farm activities.

Robe *Woreda* has poorly developed basic social services such as transport, communication,electric power, water supply(in limited extent) and health services (WFEDO, 2013). Eventhough the *Woreda* is accessible to water sources, however, due to poor use of water sources and the abesences of irrigation system causes the *Woreda* to depend on rain-fed agriculture and seasonal dependent farming style. This causes low agricultural production and productivity in the study area.

The major crops grown in Robe *Woreda* include cereals, pulses and oilseeds. Cereals include Teff, Wheat, Barley, Maize and Sorghum whereas, Pulses include Bean, Peas and field pea. Besides, very small amount oilseeds such as linseeds and nug are grown.

3.4.4. Land use Type and Pattern in Robe *Woreda*

According to Robe *Woreda* agricultural office, the land use type and pattern of the *Woreda* is classified as cultivated land, Cultivable land, Grazing land, land that has potential for irrigation, swampy land, forest land, Built up areas, bush land and unusable land.

With regard to land use pattern, the researcher observed from basic data of *Woreda* agricultural office that cultivated land (the land covered by annual and perennial crops) covers the largest share which accounts for about 33 percent of the total land while bush land is the second largest land use pattern that covers 23 percent. About 21 percent of the *Woreda* land area is unusable land which is neither cultivated nor grazed. This includes, rugged topography, mountainous and exhausted or degraded land areas. Land under grazing accounts for 12 percent whereas; land that has potential for irrigation covers 1.8 percent. The remaining proportions include settlement areas i.e. built up and forest land use pattern of the *Woreda* is about 4 and 0.94 percent respectively.

Table 2: Land use pattern of the study area

No.	**Land Use Pattern**	**Area Coverage in Hectare**	**Percent**
1	Cultivated land	41,658	33
2	Cultivable land	6,604	5
3	Grazing land	14,763	12
4	Land potential for irrigation	2,310	1.8
5	Swampy land	697	0.5
6	Forest land	1211.07	0.94
7	Bush land	28,790.93	23
8	Built up areas	5020	4
9	Unusable land	26,446	21
Total		**127,500**	**100**

Source: Robe *Woreda* agricultural office, 2013

3.4.5. Social networks and organizations of smallholder farmers

Social network relations and connectedness among the smallholder farmers in rural areas of the country play pivotal role in facilitating relationship among the smallholder farmers. Traditional social organizations such as *Edir, Ekub, and Mahiber* which have a long history in the *Woreda* and play key roles to facilitate and harmonize the socio-economic cooperation of the community.

Besides, these social organizations *Wonfel and Jigi/Debo* are labor organizations practiced by the community especially for its economic importance. For instance, *Jigi/Debo* is a labor sharing mechanism in which household mobilize large number of individuals to work on his/ her farm land without remuneration. *Jigi/Debo* formed from 10 to 20 parties who are willing to help each other on work like ploughing, weeding and harvesting of crops. The number of parties participated in *Jigi/Debo* is larger in number than *wonfel* and the work would be undertaken on/covered large farm lands per day. The arrangement is based on neighborhood and the strength of the person. The person who calls the *Jigi/Debo* has to provide lunch to the working parties in the field area and dinner at his home at night. Most of the focused group members during survey argued that the importance of *Jigi/Debo* has reduced/declined due to shortage of farm land as the work could be covered by the household members. In addition, the number of household heads who take part in one working party is also reduced due to lack of access to farm land in the district. *Wonfel* is another labor sharing mechanism among households on the basis of reciprocation of labour with with equivalent labor.

Wonfel is an exchange of labour among household especially at peak season. The labour is used in rotation and the working groups vary from two to ten. *Wonfel* is common in the district at the time of ploughing, weeding and harvesting.

Mahiber is one of the social organizations in Robe *Woreda*. Mahiber is a religious oriented Organization which is composed of people of the same religious background. The members have an obligation to abide by the rules and regulations of the organization. The organization has the Authority of solving problems or conflicts arising among the members. Members in each *mahiber* vary from twenty to forty and the membership is mainly based on friendship. *There are a number of St. Georgis Mahibers held on the 23rd day of every month, in which most male*

household heads are members. Every member has a meeting at selected residence of household heads or church compound near to all members. At this meeting, members discuss about social issues as well as economic concerns. Besides, they have to contribute from two to four birr based on the rules and regulations of the *mahiber* for their common economic and social problems. Each members of the *mahiber* prepares the monthly feast in turn. They also help each other when problems occur to members. In addition, if there is a shortage of farm oxen and labor in the household members, the members of the *mahiber* are responsible to plough, weed and harvest the farm land of the household depending on the need of the household. Similarly, if the members of the *mahiber* become ill, have no farm oxen and is not able to cultivate his farm plot, those members of the mahiber could lend farm oxen for certain days to plough and harvest his farm land to feed his family. Therefore, besides religious purpose and social ties *mahiber* is also used as means of support in the livelihood of each member, thus it has economic function too.

Edir is one of the most common social organizations practiced in the study area. *Edir* is organized in the district at *got* level. Every *got* has one to two *Edirs* depending on the area and the number of household in the *got*. Usually one *Edir* in each *got.* Though the membership is on voluntary basis by paying *2 birr* per month, and every household head is a member of *Edir* due to its social value. Each Edir has an elected committee wich include chairman, secretary and tresurer.The main purpose of Edir is to conduct funeral ceremonies and help members with labour when they need to prepare weeding feasts. *Edir* is most probably wider than the remaining traditional organizations in the district. But they are likely organized on the basis of the will of the members to respect and led by the rules and regulations of the organizations. *Edir* plays a great role to help each other principally when unexpected risks like destruction of assets or death happen, whereas ***Equb*** is another social organization practiced by the community of the district. *Equb* is preliminary organized to save money and to support one another by those peoples of common interest. Unlike *Mahiber, Edir* and *Ekub* are not most probably religious based. But they are likely organized on the basis of the will of the members and led by the rules and regulations of the organizations. According to survey result obtained almost all of the sampled household participated in both social and labor organizations. Especially, labor organizations(Debo/Jigi) are widely practiced in the area during agricultural practice.

CHAPTER FOUR: RESULTS AND DISCUSSION

This chapter deals with the analysis and interpretation of major findings of the study on the socio-economic challenges of smallholder farmers in their agricultural practices in Robe *Woreda.*

4.1. Demographic Characterstics of Sample Households

The Demographic characteristics of sample households such as Sex, Household size, Age and Educational status plays pivotal role in the agricultural practice and food security sitution of smallholder farmers in the study area. The total households participated in the study were 150, Out of these interviewed sample households, 21(14%) of them were female headed and the remaining 129 (86%) were male headed households. Male and female sample distributions of the sample *kebeles* were also 81.9 and 18.0% from Jawi sire, 88.0 and 12.0% from Ataba Robe, 89.4 and 10.5 % from Endato Waltahi respectively(Table 3).

The distribution of household size given on (Table 3) reveals that the majority of the sampled households have a size of 4-6 memebers of family size (46%) followed by 7-10 members (31.3%) and 18 and 10.6% of the sampled household have 0-3 and 10+ sized of household members respectively. When the comparison of the family size is seen among the sampled *kebeles* the family size of 4-6 members ranges from 38.4 percent in Endato Waltahi to 49.1 percent in Jawi sire kebeles.

The age distribution of the household indicates that the majority of the sampled households are in the age group of 25-59 years for all sampled *kebeles.* When the comparison of age distribution is seen among the sampled *kebeles* the age group of 25-59 years ranges from 59 percent in Jawi Sire to 67 percent in Endato Waltahi *kebeles*. According to the Ethiopian age group classification, these age groups are considered to be the working labor forces while the lowest lies in the age group of 15-24 years followed by those whom they are in the age group of 60 years and above. The overall mean age of the sampled household was about 45 years.

Level of education is one of the demographic features of households which has crucial role in the agricultural practice of smallholder farmers. Education is associated with farmers agricultural

practice because it is believed to increase farmers ability to obtain and analyze information that helps him/her to make appropriate decision in their agricultural practice.

Education may either increase prior access to external sources of information or enhance the ability to acquire information through experience with new technology. Education enables the smallholder farmers better knowledge on how to use and adopt modern agricultural technology, farm inputs and also the economic efficiency of agricultural out puts and extension service.

According to data obtained from survey conducted in the study area the distribution of Educational backgrounds of the sampled households were 52% illiterates, 34.6% write and read and 14.6 formally educated. The maximum and minimum illiteracy rates have been respectively recorded in Jawi Sire *kebele* (62.2%) and Ataba Robe *kebele* (38%), in the same manner the maximum and minimum rates of formally educated respondents have been surveyed in Ataba Robe *kebele* (22%) and Jawi Sire (9.8%) respectively. Generally, the distribution of Educational status among the sampled respondents indicated the majority are illitrate that have direct impact on the agricultural practices and production in the study area. Similarliy, according to data obtained from survey conducted in the study area litrate farmers are more likely to adopt the use of farm inputs and better in using agricultural information delivered from extension agents than those who are illiterate though the quantity of farm input such as fertilizer demand does not depend upon literacy.

Even though, most farmers in study area have been experiencing indigenous knowledge that have developed over the years, being litrate has an important role to play in increasing agricultural production in the study area.Thus, their agricultural Productivity may be enhanced either through the adoption of more productive inputs and techniques or through improvements in productive efficiency for a given technology despite the traditional nature of farming. Furthermore, litrate farmers are more likely to increase the agricultural outputs and better in accessing market information for agricultural outputs and inputs than illterate farmers.

Table 3: percentage distribution of sampled respondents by selected demographic characteristics

Variables		Sample kebeles							
		Ataba Robe		Jawi sire		Endato Waltahi		Total	
		No.	%	No.	%	No.	%	No.	%
Number of sample households	Male	44	88.0	50	81.9	35	89.4	129	86.0
	Female	6	12.0	11	18.0	4	10.5	21	14.0
	Total	**50**	**100**	**61**	**100**	**39**	**100**	**150**	**100.0**
Household size	0-3 members	5	10.0	8	13.1	5	12.8	18	12.0
	4-6	20	40.0	34	55.7	15	38.4	69	46.0
	7-10	21	42.0	11	18.0	15	38.4	47	31.3
	10 and above	4	8.0	8	13.1	4	10.2	16	10.6
	Total	**50**	**100**	**61**	**100**	**39**	**100**	**150**	**100**
Age	15-24	4	8.0	5	8.1	3	7.6	12	8.0
	25-59	33	66.0	36	59.0	26	66.6	95	63.3
	60 and above	13	26.0	20	32.7	10	16.3	43	28.0
	Total	**50**	**100**	**61**	**100**	**39**	**100**	**150**	**100**
Educational status	Illiterate	19	38.0	38	62.2	21	54.0	78	52.0
	Only writing and reading	20	40.0	18	29.5	14	35.8	52	34.6
	Formally educated	11	22.0	6	9.8	4	10.2	21	14.6
	Total	**50**	**100**	**61**	**100**	**39**	**100**	**150**	**100**
Marital status	Single	7	14.0	6	9.8	4	10.2	17	11.3
	Married	39	78.0	47	80.3	28	71.7	114	77.3
	Widowed	4	8.0	3	4.9	3	7.6	10	6.6
	Divorced	2	4.0	3	4.9	4	10.2	9	6.0
	Total	**50**	**100**	**61**	**100**	**39**	**100**	**150**	**100**

Source: Researcher own survey, 2013

4.2. Agricultural Landholding Status

In a country like Ethiopia where agriculture employs the vast majority of the population, land is an important economic resource for the development of rural livelihoods. Agricultural landholding size under subsistence agriculture also plays a significant role in the household food security situation. Many study revealed that, landholdings in many rural parts of the country are too small for adequate agricultural production to meet the minimum household consumption requirements. The average land holding is only about one hectare per household and the population growth rate is creating increasing pressure on land and other natural resources (Belay & Maning, 2004).

Survey results of the study indicates that about 95% of respondents own land. That means, only 5% of sampled households did not posses their own land. When farmland holding can be seen among sampled *kebeles* 52 percent of respondents from Ataba Robe *kebele* have owned 0.125-1 hectar of farmland while 24 and 10 percent have owned 1.125-2and 2.125-3 hectras of farmland respectively. 6percent have owned 3.125-4 hectars of farmland whereas the remaining 2 percent of the respondents have owned 4 and above hectars of farmland. The survey result also show that 59 percent of respondents from Jawi Sire *kebele* have owned 0.125-1 hectar of farmland while 22.9 and 6.5 percent have owned 1.125-2 and 2.125-3 hectars of farmland respectively. About 4.9 percent have owned 3.125-4 hectars of farmland whereas the remaining 3.2 percent of the respondents have owned 4 and above hectars of farmland. Table 4.2 result also show that 56 percent of the repondents from Endato Waltahi *kebles* have owned 0.125-1 hectars of farmland. While 25.6, 7.6 and 5.1 percent of the respondents have have owned 1.125-2, 2.125-3, 3.125-4 hectars of farmland holdings respectively. However, non of the respondent households have owned morethan 4 hectars of farmland for agricultural practices.

Table 4: Farm landholding category of sampled *kebeles*

Farm landholding in hectares	**Sample kebeles**							
	Ataba Robe		**Jawi Sire**		**Endato Waltahi**		**Total**	
	Frequency	%	Frequency	%	frequency	%	Frequency	%
No farmland	3	6.0	2	3.2	2	5.1	7	5.0
0.125-1.0	26	52.0	36	59.0	22	56.4	84	56.0
1.10-2.0	12	24.0	14	22.9	10	25.6	36	24.0
2.10-3.0	5	10.0	4	6.5	3	7.6	12	8.0
3.10-4.0	3	6.0	3	4.9	2	5.1	8	5.0
Above 4	1	2.0	2	3.2	0	0	3	2.0
Total	**50**	**100**	**61**	**100**	**39**	**100**	**150**	**100**

Source: Researcher own survey, April, 2013

Generally, the above table 4 depicts that, among households who had farmlands, the majority of the respondents(56 percent) have own 0.125 – 1hectare of farmland whereas only 2 percent have owned 4 and above hectars of farmland for agricultural practice. The average landholding of the sample respondents is 1.09hectares per household. This clearly shows the existence of shortage of farmland in the study area in that land which is the major source of income and subsistence is in short supply relative to the large family size of households. Above all, diminishing farmholding size is one of the main constraints in the agricultural practice of smallholder farmers to increase agricultural production and productivity there by ensures household food security of the farmers in the area under study.

Eventhough, farmland productivity has siginificant role for agricultural production than farmland holding size by the smallholder farmers, large farmland holding size enables to increase agricultural production and productivity in the study area. The basic ground here is that avaliability of relatively large farmland holding by the smallholder farmers has importance to increase agricultural productivity and ensuring food security than small farmland holding households thus, those households with large farmland holding gain the benefit of renting-out his/her farmland even if they did not have sufficient capital and resource to practice agriculture on their farmland and has an advantage to support the livelhood of their family and also participate in non-agricultural activities that inturn would increase household food avaliability.

The sampled smallholder farmers have got access to farmlandland through land redistribution, inheritance from parents, share cropping and the combinations of these. In the study area the question of land is one of the serious issues that challenge agricultural production.

Some FGDs participants indicate that, it is quite difficult to get farmlands formally through land distribution especially for the newly established households and demobilized soldiers headed households. Therefore, households access to farmlands through informal ways such as sharecropping, inheritance, shared with relatives, on rental basis and cultivating borrowed fields. Most of the time, female headed households, disabled and elderly people who cannot operate their farmland sharecropped out their farm. In addition, lack of farm oxen and unable to purchase agricultural inputs causes to sharecropped-out farm plots. Households, who have enough farm oxen, labor as well as able to purchase agricultural inputs sharecropped-in farmland from these farmers so as to increase their farm holding and enhance household food security.

In response to a question regarding the size of their land holding with respect to changes occurred to farmers landholding size over the last ten years, the majority of the respondents (78%) of the sample respondents responded that it had declined whereas 31.3 percent of the respondents responded that it had remained the same while the remaining 1.3 percent responded that it has increased. When the change of farlmland holding size can be seen among sampled *kebeles* about 37(74%) of the respondents from Ataba Robe kebeles Responded that it had declined whereas 26 percent of the respondents responded that it had remained the same. Similarly, 47(77%) of respondents from Jawi Sire *kebeles* Responded that it had declined whereas 23 percent of the respondents responded that it had remained the same. In regard to Endato Waltahi *kebeles* 53.8 percent of the respondents responded that it had declined and about 41 percent responded that it had remained the same while the remaining 1.3 perecent responded it increased mainly due to family inheritance.

Table 5: Change in the size of farm holdings over the last decades

Responses	Sample *kebeles*							
	Ataba Robe		**Jawi Sire**		**Endato Waltahi**		**Total**	
	Frequency	%	frequency	%	frequency	%	frequency	%
How is the trend of change in the size of farmland holding?								
Increasing	0	0.0	0	0.0	2	5.1	2	1.3
Decreasing	37	74.0	47	77.0	21	53.8	111	74.0
Remain the same	13	26.0	14	22.9	16	41.0	47	31.3
Total	**50**	**100**	**61**	**100**	**39**	**100**	**150**	**100**
What are the Reasons for the decreasing of farmland holding? **								
Large household size	27	61.3	33	63.4	28	51.8	88	58.6
Decline in the quality of land	9	20.4	14	26.9	18	33.3	41	27.3
Land distribution	2	4.5	3	5.7	4	7.4	9	6.0
Others	6	13.6	2	3.8	4	7.4	12	8.0

**Percentages do not add up because of multiple responses for reasons of decreasing in the farmland holding of sampled respondents

Source: Researcher own survey, 2013

As shown in the above table 5 the principal reason for the reduction in the farmland holding that has responded by the majority sample respondents (59%) was due to large household size and the ensuing demand for land by newly formed households. The survey results show that as there is no spare arable farmland in the study area, access to cultivable land by those who reached the age of adulthood and/or newly-married members would be through sharing land from their parents. The survey result show that the majority of the smallholder farmers practice agriculture on almost fargemented farmland wich is the most common problem among all households to practice agriculture and to increase agricultural production and productivity to support the livelhod of their family in the study area. The above table 5 also reveals that about 41(27%) percent of the respondents had responded that their farmland holding has declined due to decline in the quality of land.

where as 8 percent had responded that, their farmland has declined due to other reason such as water erosion and losing land for various development activities such as health posts, school and road construction.

4.3. Livestock production

Smallholder farmers in the study area undertake both crop production and livestock rearing activities. Therefore, the importance of livestock was indespensable and play avital role in the farming systems of the smalholder farmers in the studied area. In the study area, livestock are kept for various economic and social reasons include supply of draught power, generation of cash income, source of food, manure and transportation. Though the holding size varied among the sample households the majority of the sampled respondents owned livestock. Similar to that of the landholding size of the smallholder farmers in the study area, the livestock holding size of the household highly determine the agricultural practice and food security situation. Moreover, households who have large number of livestock maintain better social credibility and status even at times of agricultural production shortfall.

The most commonly reared livestock in the study area are cattle, sheep, goats, horses, donkeys, mules, chiken and honey bees. According to data obtained from survey result, the main constraints to livestock rearing in the study area include shortage of grazing land, lack of additional fodder, prevalence of animal diseases and poor condition of veterinary services. Above all shortage of feed is the most important problem in the district.

Table 6: Average number of livestock owned by rural households

Types of livestock	Average owned(heads of animals)
Oxen	1.6
Cow	1.8
Sheep	2.4
Goat	0.6
Horse	0.2
Mule	0.05
Donkey	1.2

Source own survey,2013

Oxen are the most porductive animal used for ploughing in Ethiopian agriculture. The importance of having sufficient draught power obtained from oxen determines the production capacity of households in traditional agriculture of Ethiopia. Similarliy, Oxen are the most important source of draught power in the study area. Smallholder farmers that lack farm oxen typically face problems in agricultural practice and farming their land, being dependent on borrowing or hiring farm oxen from other households. Those households who can not possess farm oxen and those who cannot afford to maintain a pair of oxen tend to be vulnerable to food insecurity as compared with those who owned a pair of farm oxen. The role of oxen under traditional agricultural practice is very high and determine the overall agricultural production and productivity.

Table 7: Farm oxen owned by the sample households

Farm oxen owned	**Sample kebeles**							
	Ataba Robe		Jawi Sire		Endato Waltahi		Total	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
No farm oxen	9	18.0	4	6.5	5	12.8	18	12.0
One	13	26.0	9	14.7	14	35.8	36	24.0
Two	23	46.0	38	62.2	17	43.5	78	52.0
Three	3	6.0	6	9.8	2	5.1	11	7.0
Four	2	4.0	4	6.5	1	2.5	7	5.0
Total	50	100	61	100	39	100	150	100

Source: survey results, 2013

From the above table 7 about 52 percent of the sample respondents had owned two pair of farm oxen while 24 percent of respondents possess only one farm oxen, this household needs another farm oxen for ploughing their farm land therefore, those sampled farmers obtain farm oxen to pair his/her farm ox through borrowing from another neighboring farmers or their relative. This households rent out his/her farm oxen or through *qixira*, system of oxen use arrangement in which households who lack farm oxen rent in an ox or more to use its draught power. The remaining, 7 and 5 percent of households possess three and four and farm oxen respectively. As shown in above table about 26, 14.7 and 35.8 percent of respondents from Ataba Robe, Jawi Sire and Endato Waltahi kebeles had owned one farm oxen Whereas 46, 62.2 and 43.5 percent of the respondents had owned two farm oxen for agricultural practice respectively. About 6, 9.8 and 5.1 percent of respondents from Ataba Robe, Jawi sire and Endato Waltahi kebeles were possess three farm oxen while the remaining 4, 6.5 and 2.5 percent of respondents had owned four farm oxen to practice agriculture from the above kebeles respectively.

4.4. Agricultural Practice in the Study Area

Preparation of land is the first step in cultivating a crop. The first round of ploughing is the breaking of the surface of land wich locally known as *Bakakisa*. The process of loosening and upturning the soil is called ploughing. Ploughing is done by using a plough, which is made of either wood or iron. In the first ploughing, as the plough tip is very small, the furrow is also very shallow and narrow. It is also hard, as it requires uprooting different grasses grown on the plot since Ploughing uproots the unwanted plants already growing in the field. Ploughing roots of plants can penetrate the loose soil easily and it leads to aeration of the soil.

The power of oxen and implements is also limited. Therefore, informants said that to prepare a good seedbed and in-depth furrow, the farmers have to plough the plot several times in opposite direction. Ploughing the plot several times helps to eliminate weeds and prepare a good seedbed with in depth and wide furrow. Farmers know that this mode of ploughing is very important to the growth of crops and productivity. The preparation of the plot for next year is always started just from the end of February to June for *meher* season cultivation. Whereas, October, February to march for *belg* season. Ploughing activity is made in the district especially after the harvest of *belg* season crops such as barley, beans, peas, maize and some other crops. Of course some of these plots are reused to grow other crops in the same production year. And yet, the frequency of ploughing varies from crop to crop and from one soil type to another.

The method of sowing the seed in the study area was traditional; by means of broadcasting and the smallholder farmers use traditional Varieties. Recently sowing of the seed in row is practiced for maize, wheat and beans. However, Broadcasting is still a very important means of sowing in the study area. According to sample respondents, for instance Teff and other oil seeds are difficult to plant in rows as the size of the seed is very small. Eve though, according to agricultural experts of the study area planting of crops in a row is advantageous for proper utilization of fertilizer, distribution of the seed and weeding and even it increases agricultural production and minimize wastage.

Smallholder farmers of the area also practice traditional method of weeding. Weeding as a practice of sorting out and removing unwanted plants from a given plot is also part of cultivation. However, a delay in weeding has a consequence of great agricultural production loss and major constraint in crop production in the study area. They have a great contribution in decreasing the amount of crops produced/ production both before and post-harvest time.

Key Informants responded that weeding has become a very important operation for all crops and the major crop pests in the district are Aphids, African ball worms and stalks borer, while the major diseases are rust and smut. To avoid these problems, the farmers are advice to use disease resistant variety of seeds, hand weeding rather than herbicides. The weeding of Teff has become a very important feature in smallholder agriculture of the study area. However, according to agricultural expert of the study area the weeding of other crops also necessary element of cultivation to get very good yield. The contribution of social organizations such as *Jigi/Debo* and *wenfel* are decisive means of access to labour in weeding time of crops.

4.4.1. Farmland productivity

Farmland productivity is one of the major necessities for agricultural production. Since productivity can be explined as the amount of yield obtained per unit area of land. Agricultural production can not be neccessarily increased by expanding the farm land holding and access to farm land of the smallholder farmers but the most important thing is the fertility status of farmland holding situations.

The sampled smallholder farmers of the district have senced that farmland productivity their farm land is declining from time to time. The major reason responded by the sampled respondents were absence of fallowing because land holding by the smallholder is small, crop is harvested at the ground surface leaving only roots to be ploughed in and what ever left is grazed by livestock, fertilizer are applied at very low rates**,** because of the fertility decline,farmers have understood/perceived that it is not possible to produce crop without fertilizers. According to survey results obtained the sampled smallholder farmers classify their farmland fertility situation as poor, medium and good. Accordingly, 71, 25 and 4 percent of respondent households who own farmland responded that productivity of their farmland is poor, medium and good

respectively. About 74, 24 and 4 percent of respondent farmers from Ataba Robe kebele perceived their famland fertility as poor, medium and good respectively. Whereas 63.9, 27.8 and 4 percent of respondents from Jawi Sire kebele perceived their famland fertility as poor, medium and good respectively. 77 and 23 percent of respondents from Endato waltahi kebele perceived their farmland fertiliy situation as poor and medium for agricultural practice respectively.

Table 8: Classification of fertility level of farmland as perceived by farmers

Responses	Sample kebeles							
	Ataba Robe		Jawi Sire		Endato Waltahi		Total	
	No.	%	No.	%	No.	%	No	%
What is the fertility level of your farmland for agricultural production?								
Poor	37	74.0	39	63.9	30	77.0	106	71.0
Medium	12	24.0	17	27.8	9	23.0	38	25.0
Good	2	4.0	4	6.5	0	0.0	6	4.0
Total	50	100	61	100	39	100	150	100
What are the constraints to your farmland to practice agriculture?								
Poor soil fertility	49	98	59	96.7	38	98.0	147	98.0
Soil errosion	17	34.0	57	93.4	32	82.0	106	70.6
Water logging	44	88.0	0	0.0	12	30.7	56	37.3

Source survey results,2013

According to survey results obtained the main factors constraining agricultural practice and causing decline in agricultural production of the smallholder farmers in the study area are mainly related with poor soil fertility condition of the farmland, framland water logging, soil errosion and the like. Accordingly, about 94, 88, and 34 percent of respondents from Ataba Robe kebele were responded that poor soil fertility condition, water logging and soil erossion are the main constraints for agricultural production respectively.

Farmland water logging is the main constraints for the sampled farmers of Ataba Robe to practice agriculture these farmers also understand the problem and *they explained the problem by saying that "if you go to the field with oxen and start plowing after heavy rain, you find that the soil becomes very sticky that made plowing difficult" This phenomenon is most common in the extreme stickiness of the soils when wet and their intractability when it got dry.*

About 96.7 and 93.4 of sampled respondent from Jawi Sire responded that poor soil fertility and soil errossion was the constraints to practice agriculture and agricultural production respectively.

Similarly, 98 and 82 percent of respondents from Endato waltahi kebele had replied that poor soil fertility and soil errosion are the main constraints to practice agriculture respectively (table 4.6). Generally, the sampled householdes were responded this constraining factors results in decline farmland production and productivity thereby reduce crop production which in turn, would, leads household to food security problem in the study area.

Figure 3: Livestock grazing on wheat farmland plot after harvesting

(Source: picture taken during field survey, 2013)

4.4.2. Farmland Soil Fertility Maintaining Mechanism

To reduce runoff, soil erosion and to maintain and replenish farmlands fertlity and thereby enhance farm production anumber of farmland management practices are being introduced recently in to the *woreda.* Accordingly various soil conservation work is done in the district by mobilizing all able bodied community members for almost four working days per week. This is a strategy that is implemented in the *woreda* with the consent of the people. The two main activities undertaken to reduce runoff and soil erossion and protect fertility of soil were locally known *Dhaga* and *Borati*. The *dhaga* is normally a soil/stone bund constracted with the aim of reducing soil loss. The *dhaga* were mainly constracted on the illivated/daget areas that took soil to the botom where as, *Borati* were constracted in avery flat areas were water is highly accumulated. The main purpose of *Borati* is to remove accumulated water and it enables the water to go to down stream it is up to **1050** meters long. The construction of both was made by traditional way through digging by hand.

Figure 4: The practice of soil/stone bund (left) and *Borati* (right)

(Source: Photo taken during field survey, 2013)

Fallowing was nearly absent due to land shortage. Instead of fallowing, some smallholder farmers plant either grass pea or chick pea to restore fertility and reduce weed infestation.

According to agricultural experts of the district the problems among the sampled *kebeles* smallholder farmers are mainly attached with traditional farming method that prevailed for a long period of time and producing crop on the same agricultural land with poor application of modern agricultural technologies. Especially the farmers are unable to distinguish which agricultural land is suitable for which crop production and which are not suitable throughout the year. For instance if the farmland is used for Teff growing they already call it "Lafa Xafii" this is to mean that the farmlands were already presumed to be used for Teff growing only. Thus, once the farmland is used for a single crop production they will no longer be changed this is mainly due to traditional perception among farmers that he/she believed that the farmland used for one type crop do not support to grow other crop type. So they are not interested to change the type of crops to be planted on the farmland.

4.4.3. Availability and Utilization of Agricultural Inputs

Agricultural inputs help in increasing productivity in nourishing crop with minerals that are necessary for production. Therefore, access to agricultural inputs are crucial for smallholder farmers to increase their agricultural productivity and to overcome the food insecurity problems. An extent to which the smallholder farmers utilize agricultural inputs determine the agricultural productivity of the households in study area. One of the reasons for the persisting food insecurity in the district were the low level and inappropriate use of improved agricultural inputs, which acts as a principal barrier to increase farm productivity.

Smallholder farmer of the district is characterized by poor agricultural practice and low agricultural productivity mainly due to the in appropriate utilization of agricultural inputs. According to data obtained, the number of smallholder farmers who used agricultural inputs are smaller due to low level education, rise in price of farm inputs and inappropriate time of distribution particularly chemical fertilizer and improved seed.

The survey result shows that, sampled households used farm inputs for agricultural production though the amount of input utilized per hectare of land is not indicated appropriately.

Table 9: Agricultural input utilization by the sampled respondents

Responses	Sample kebeles						Total count (N=150)	Percent (%)
	Ataba Robe n=50	Percent (%)	Jawi sire n=61	Percent (%)	Endato waltahi n=39	Percent (%)		
Did have you used Agricultural inputs on your farmland?								
Yes	44	88	51	83.6	32	82	127	84.6
No	6	12	10	16.3	7	17.9	23	15.3
Which type of agricultural inputs do you use for your farmland?								
Organic fertilizer	3	6.8	7	13.7	2	6.2	12	9.4
Chemical fertilizer	41	93.1	44	86.2	30	93.7	115	90.5
Improved seed	9	20.4	23	45	8	25	40	31.4
Herbicides, insecticides and pesticides	36	81.8	39	76.4	21	65	96	75.5
How is the trend of farm input application?								
Increasing	29	65.9	37	72.5	27	84.3	93	73.2
Decreasing	11	25	11	21.5	5	15.6	27	21.2
Remain the same	4	9	3	5.8	0	0.0	7	5.5
Do you apply farm inputs on your farmland as per the recommendation of agricultural experts?								
Yes	4	9.0	2	3.9	0	0.0	6	4.7
No	40	91.0	49	96.2	32	100	121	96.3
What are factors that hinder from purchasing agricultural inputs?								
High cost of agricultural inputs	43	97.7	50	98.0	31	96.8	124	97.6
Lack of income to purchase	37	84.0	46	90.1	29	90.6	112	88.1
Limited accessibility	0	0.0	36	70.5	27	84.3	29	49.6

Percentages do not add up because of multiple responses

Source: Researcher own survey, 2013

From the above table 9 84.5 percent of the sampled respondents used agrcultural inputs on their farmland while 15.3 percent were not used agricultural inputs on their for their agricultural practice. Regarding the individual sampled *kebele* about 88, 83.6 and 82 percent of respondents

from Ataba Robe, Jawi Sire and Endato Waltahi *kebeles* used agricultural inputs on their farmland respectively. While 12, 16.3 and 17.9 percent of respondents not used agricultural inputs on their farmland from each above kebeles respectively. Regarding the application of farminputs as shown in the table 9 the majority of the respondets(90.5) percent were used chemical fertilizer for agricultural production while 75.5 percent were used insecticide, pesticide and herbicedes. Whereas 31.4 percent used improved seed and only 9.4 percent of the sampled respondents used organic fertilizer on their farmland during their agricultural activities.

As shown in the above table the proportion of chemical fertilizer application is higher as compared to organic fertilizer and improved seeds. This is mainly due to govenments intervention to supply chemical fertilizer and neccessarily used by each smallholder farmers who has land for agricultural production. In addition, the sampled smallholder farmers prefer to use inorganic fertilizer than organic fertilizer, due to the most important negative impacts or limitation of organic fertilizer as peceived by the smallholder farmers point of view that it fails to practice since it is time taking and laborious to prepare, transport and adress several farm plots. Mainly the raw materials, particularliy animal manure are not easily avaliable for those smallholder famers who have no and small number livestock/cattle.

According to survey results of the study area the most prominent inorganic fertilizers which are widely used in the study area are Diammonium Phosphate (DAP) and Urea. These fertilizers applied to the soil with seeds simultaneously. Sometimes, unlike DAP, Urea can be added to the soil after germination of the crops. They are commonly and widely used for cereal crops like *Teff, Wheat, Maize and Barley.* Accord-ing to sample respondents of the study area, Compared to Urea, the proportion of DAP utilization is larger.

As shown in the above table the majority (96.3 percent)of respondents were not appliying agricultural inputs on their farmland according to the recommendation of agricultural experts. Only 4.7 percent of the respondents were appliying agricultural inputs on their farmland according to the reccommendation of agricultural experts.

The above table also depicts that about 9 and 3.9 percent of respondents from Ataba Robe and Jawi sire were applying agricultural inputs on their farmland according to the recommendation of agricultural experts respectively. While non of the respondents from Endato Waltahi kebele were

appliying agricultural inputs on their farmland as per recommendation of agricultural experts. According to agricultural experts of the study area, almost the entire sample population used chemical fertilizer for agricultural production. However, this does notmean that they used sufficient amount of fertilizer. The smallholder farmers mainly used chemical fertilizer for economic reasons that they sold the chemical fertilizer and bought another food material rather than utilization of these agricultural inputs for their farm land this is one of the most common problems existed in the study area for along period of time.

Thus, only small amount of of chemical fertilizer are utilized on smallholder farmers farmland with out the recommendation of agricultural experts that limits the amount of crop produced per unit of land area which in turn limits smallholder farmers food security situation. In appropriate utilization of farm inputs by the smallholder farmers in the study area also reasonable to cause several problems mainly attached with poor soil fertility situation of the smallholder farmers farm land. As the farm landgets poor in soil fertility situation it becomes diffcult to enhance farm production and Consequently, this leads to low food production and erodes the capability of households to feed their family on own production.

Regarding trend of farm input application the above table 9 depicts that about 73.2, 21.2 and 5.5 percent of respondents reported that it was increasing, decreasing and remain the same respectively. About 65.9, 25 and 9 percent of respondents from Ataba Robe replaid that the trend of farm input application was increasing, decreasing and remain the same respectively.
About 72.5, 21.5 and 5.8 percent of respondents of Jawi sire kebele responded that the trend of farm input application was increasing, decreasing and remain the same respectively. Whereas 84.3 and 15.6 percent of respondents from Endato waltahi responded that the trend of farm input application was increasing and decreasing respectively.

From the above (table 9) 97.6 percent of the respondents reported that high cost of fertilizer as the main constraints that hinder sampled smallholder farmers from purchasing agricultural inputs. Some sampled participants in FGDs responded that the cost of chemical fertilizer is very high to purchase for instance, 50kg of DAP/UREA were sold in 630 birr wich is difficult for all smallholder farmers to purchase taking in to consideration the economic back ground of all

farmers. Lack of income was also constrained sampled smallholder farmer to purchase the farm inputs. Accordingly, 88.1 percent of sampled respondents reported that lack of income were constrained the sampled respondents to purchase agricultural inputs during agricultural practice. In addition, agricultural inputs were not accessible for all farmers and the distribution of these inputs were mainly concentrated to the near town kebles and agricultural inputs were not distributed on the demand and right time were the farmers were in need. Accordingly, about 70.5 and 84.3 percent of respondents from Jawi sire and Endato Waltahi *kebeles* respectively had no access to farm inputs for agricultural production due to limited accessibility. According to some sampled respondents response they travelled long distances to collect their inputs and transport it by pack animals. In addition, the distribution system is very inefficient which affects the sensitive period of planting and labor allocation.

A 48 years sampled farmer from Endato Waltahi kebele complained about the delays of farm inputs and the inefficient and corrupt system of distribution of inputs. He wasted lot of time and working days waiting to receive the inputs due to this factor the planting time of Teff passed and he was forced to sow the farmland another type of crop.

4.4.4. Agricultural Extension Contact

The agricultural extension service is one of the institutional support services that have play a central role in the agricultural transformation process, since it contributes to the development of the skill and knowledge of farmers to adopt new and improved technologies.(*Swanson et al. 1997)* defined agricultural 'extension', as extending relevant agricultural information to farmers. According to the World Bank definition, agricultural extension service is a process that helps farmers become aware of improved technologies and adopt them in order to improve their efficiency, income and welfare. However, the agricultural extension service in Ethiopia is broader in its service reach to include credit, input supply and agricultural produce marketing.

The agricultural extension service has also created a situation where farmers are utilizing farmlands both to produce new crops and increase their level of production. Agricultural extension services in Ethiopia were also focused on increasing production and productivity in view of achieving food security.

Though agriculture has been practiced by the country's smallholder farmers for centuries, coordinated agricultural extension service is a recent phenomenon. Lack of the necessary knowledge and skills to utilize technologies, the country's agriculture has been for centuries limited to subsistence level Even though, the government has been focusing on extending the service to as much areas of the country as possible.

Agricultural Extension contact have a direct influence on the agricultural practice of smallholder farmers in the study area. When there is contact with agricultural extension agent, the greater are the possibilities of farmers being better in agricultural practice and to adopt agricultural innovations use modern agricultural technologies and improved seed and other agricultural inputs.

Table 10: Smallholder farmers contact with agricultural extension

Responses	**Sampled kebeles**						**Total (N=150)**	
	Ataba Robe (n=50)		Jawi Sire(n=61)		Endato Waltahi(n=39			
	No	%	No	%	No	%	No	%
Do you get advices from DAs and other agricultural experts with regard to your agricultural practice?								
Yes	32	64	34	55.7	23	58.9	89	59.3
No	18	36	27	44.2	27	43.5	61	40.7
Total	50	100	61	100	39	100	150	100
How frequently do you contact with agricultural extension workers?								
Once a week	3	9.3	0	0.0	0	0.0	3	3.37
Every month	9	28.1	7	20.5	3	13	19	21.3
Once every six month	14	43.7	18	52.9	13	56.5	45	50.5
Once a year	6	18.7	9	26.4	7	30.4	22	24.7
Total	32	100	34	100	23	100	89	100
Are you benefiting from the extension service to enable you to produce better from your agricultural practice?								
Yes	4	28.1	6	17.6	5	21.7	20	22.4
No	23	71.8	28	82.3	18	78.2	69	77.5
Total	32	100	34	100	23	100	89	100
What constrained you to be not benefiting from the extension service?								
Their advice don not consider the economic background and ability of farmers	16	50	18	56.2	13	56.5	47	52.8
Farmers were not familiar with the work of DA	13	40.6	11	32.3	6	26	30	33.7
DAs are not interested to do so	3	9.3	5	14.7	4	17.3	12	13.4

Source survey results, 2013

Agricultural Extension workers assigned at *kebele* and village level locally known by the name DAs was one of the most important sources of information on new agricultural innovations to smallholder farmers, especially those who are earlier adopters of modern agricultural technologies. Later adopters, however, tend to rely more for information on relatives, friends, and neighbors who have already tried out the innovation and adopted.

Table 10 show the result of sampled respondent farmers contact with agricultural extension agents indicated that of the total 150 sample respondents, 89(59.3%) of sampled farmers reported having contact with development agents(DA) and 61(40.7%) of sampled smallholder farmers reported having no contact with development agents.

With regard to the sampled *kebeles* 64, 55.7 and 58.9 percent of respondets from Ataba Robe, Jawi sire and Endato Waltahi were contact and got advices from agricultural extension respectively. Whereas 36, 44.3 and 43.1 percent of respondents reported having no contact and got advice from agricultural extension workers from each respective sampled *kebeles.*

Table 10 result depicts that the majority of the respondents (50.5%) were responded having contact with agricultural extension agents once every six month while only 3.37 percent of respondents contact with agricultural Extension workers once a week. When the comparison of agricultural extension contact can be seen among sampled kebeles only those respondents from Ataba Robe (9.3%) were having contact with agricultural extension workers once a week. This is mainly due to the proximity of the kebele to the town of Robe.

As shown in the above table 10 most of the sampled smallholder farmers of the study area (77.5%) were not benefiting from the agricultural extension service whereas,(22%) were benefited from the extension service deliverd by agricultural extension workers. With regard to sampled kebeles 28.1, 17.6 and 21.7 percent of respondents from Ataba Robe, Jawi sire and Enadato Waltahi were benefited from the agricultural extension service respectively. While 71.8, 82.3 and 78.3 percent of respondents from Ataba Robe, Jawi sire and Endato Waltahi were not benefited from the agricultural extension service respectively.

Regarding the constraints of sampled respondents not benefiting from the agricultural extension service most of the the sampled respondents (52.8%) argue that the advices offered by agricultural extension workers do not consider the economic background and ability of

smallholder farmers so that they are not easy to make functional(table 4.8). About 33.7percent of the sampled respondents were not benefited from agricultural extension service since they do not know what types of benefits can be obtained from the service and was not familiar with the work of DA and so they prefer traditional ways and method of farming developed throughout their life. The remaining 13.4 percent of respondents can not benefited from agricultural extension service due to DAs lack of interest to offer the service. According to some sampled households response the extension workers are overloaded by other managemet work and having other job in the town and only contacting with the very near rural kebeles than the farthest one.

4.4.5. Water Resources

Water availability and access are key determinants to agricultural practice and food security as well as poverty reduction. crop production in the study area is dominantly rain fed and no significant irrigation practice were done by the smallholder farmers. The main sources of water for smallholder farmers household and livestock consumption, and other agricultural uses in the study area are river, protected and unprotected spring water, piped water, and hand-dug wells.

Some key informants and agricultural experts in the study area responded that the woreda has plenty of water sources for household consumption and irrigation activities however, the problem is poor development of irrigation structure and poor application of water for agricultural activities mainly related with farmers low capacity to use the water sources for agriculture and the disputes among smallholder farmers on the land area were the irrigation canals passed through. This mainly farmer's lack of interest on the irrigation canals not to pass through their farmland for irrigation purpose.

The other problems related to irrigation activities in the study area is that the irrigation structure was not constructed for the woreda from the zone mainly on the two main rivers namely *kachino* and *Robe* river that are the main source of river water that flow in the woreda though out the year. According to the woreda water, energy and mines office report the potable water supply coverage in the study area is about 62 percent (WWEMO, 2013). Thus, one can assume that even though, the study area has plenty of water source the scarcity of potable water supply in Robe woreda are the main challenges for the smallholder farmers main those found in kola areas. Mini

pond construction that was introduced in the last few years with the objective of harvesting water for supplementary irrigation was not successful in the study area.

Some FGD participants in Endato waltahi *kebele* one of the sampled kebeles from the *kola* agro-ecology reported that scarcity of potable water supply exist that exacerbates the vulnerability of the community to food in security almost throughout the year. Of course, the *kebele* has potential for sources of ground water but it is confined to urban areas and well developed piped water was not constructed. Thus, despite poor application of water for irrigation and poor, river water is widely used for household and livestock consumption purpose in the study areas.

Figure 5: Rural drinking water source in Ataba Robe kebele

Source: Picture taken during survey,2013

4.4.6. Crop Production and Cropping Patterns

Crop Productivity is a major issue in smallholder agriculture. Bimodal type characteristic of the rainfall gives a wide opportunity for the district to produce crops and use the same land twice a year (for Meher and Belg season). However, the low level of productivity has long been the feature of smallholder farmers of the study area. Key informants of the study area describe the low level of productivity in terms of many factors. They put the loss of soil fertility as the major factor for decline of agricultural productivity. They consider the loss of soil fertility as resulting from repeated cultivation, without giving ample time for the plot to recover (absence of fallowing and crop rotation).

Particularly, small size and increasing demands for food crop production forced farmers to cease long-stayed traditional ways of soil fertility management such as fallowing, manuring, terracing, and leaving crop residues on the fields. Some elderly farmers also blame the introduction of fertilizer as the causes of deterioration of soil fertility. They justify their traditional perception/belief of smallholder farmers by associating the failure of plots to grow crops without fertilizer as before.

Some key Informants argue that the smallholder farmers of the study area use the the same methods of cultivation for along peroid of time. Therefore, the farmland loss its productive capacity to produce more agricultural products as before with out maintaining its fertility level. The decline of productivity was the major issue that had worried the smallholders farmers of the study area. Thus, the declining of productivity has resulted food insecurity in most households.

The Cropping Pattern of crops in the study area has directly related with the agro- ecological defference, dietary habits and other social factors. Although household grows different crops, they grow some crops more frequently than others. Teff, Wheat and Barley are the major staple crops for households in *Dega* and *Woinadega* areas while sorghum and maize are the main crops in *kola* areas. The livelihood means are often prone to food crises in kola areas as compared to *Dega* and *Woinadega* areas. Key informants said that their need to diversify the crop patterns is shaped and reshaped every year by landholding size, dietary, cash and capacity of cultivation. Therefore there were no permanent cropping patterns in all households.

On the basis of dietary habits, Teff, and wheat were widely grown in almost equal proportions and covered the largest plot of the household. The cultivation of Teff depends on the capacity of households and soil types. The soil type and capacity of cultivation first of all dictate the production of food crops.

Table 11: Average crop productivity of major crops in good and bad years

Crop type	Good year qt/ha	Bad year qt/ha	Primary purpose
Teff	10	4	Home consumption/ sell
Wheat	16	4	Home consumption
Barley	19	6	Home consumption
Maize	21	13	Home consumption
Sorghum	19	6	Home consumption
Chick pea	6	2	Home consumption
Beans	5	2	Home consumption
Oil seeds	4	2	Home consumption/sale

Source : survey results,2013

As indicated in the above table 11 sampled rural households produce small amount of crop per hectares of farmland. Due to this factor most of all crop produced were used for home consumption purposes. Most of the sampled respondents could produce more than three types of crops and the majority of them produced Teff, Wheat, Maize and Sorghum.

4.5. Farming Practice and the use of Modern Agricultural Technologies

Modern farming methods matter for the smallholder farmers agricultural productivity and food security in the study area. Adoption to improved agricultural technologies is the major factor in the agricultural production and productivity of sampled smallholder farmers in the district. One of the primary constraints to increased agricultural production and productivity of smallholder farmers of the study area stems from the limited access of farmers to modern farming technology. As shown in table 12 almost all (99 percent) of respondents were not appliying modern agricultural technologies and only 1 percent respondents were applying modern agricultural technologies during their agricultural practice.

Regarding the sampled *kebeles* as shown in table 12 only 2 respondents (3.2 percent)from Jawi Sire were applying modern agricultural technologies during their agricultural practice.

Table 12: Constraints to Adoption of new Technologies in Agricultural practice in the district

Responses	Sample kebeles							
	Ataba Robe n=50		**Jawi Sire n=61**		**Endato Waltahi n=39**		**Total N=150**	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Do you have applying modern agricultural technologies in your agricultural practice?								
Yes	0	0.0	2	3.2	0	0.0	2	1.0
No	50	100	57	93.4	39	100	146	99
Total	50	100	61	100	39	100	150	100
What constrained you not to adopt new agricultural technologies in your agricultural practice?								
Lack of adequate credit service	42	82.0	54	88.5	37	94.8	134	89.3
Owned fragmented farmland	38	76.0	31	62.0	37	74.0	106	70.6
Low level of education	16	32.0	24	39.3	23	56.4	62	41.3
Lack of information about new technologies	9	18.0	11	18.0	12	30.7	32	21.3
Lack of interest	8	16.0	7	11.4	7	17.9	22	14.6

Percentages do not add up because of multiple responses

Source: Survey results, 2013

According to survey results the main constraints of smallholder farmers in adopting new agricultural technologies were primarily related with income of the farmers. Accordingly the above table 12 depicts that about 88.4 percent of the sampled household were constrained by lack of capital to adopt new agricultural technologies. Lack of aduquate credit service facility is also one of the constraints to adopt new agricultural technologies for the sampled respondent household of the study area. When the comparison of credit service facility constraint can be seen among sampled *kebeles* the highest percentage (95percent) of the respondents were from Endato waltahi *kebeles*. According sampled respondents response the problem is mainly related with the poor development of rural infrastructure that the credit service providing institutions where not yet established in the kebele. About 89 and 82 percent of sampled household from Jawi Sire and Ataba Robe *kebeles* responded lack of credit service facility is the constraints to adopt new agricultural technologies during their agricultural practice respectively.

The sampled respondent farmers reported that not only credit service facility but also the timely supply credit particularly, institutional credit affects the adoption pattern of agricultural technology by the farmers thus, farmers who got credit facility were found to be more responsive to the adoption of improved agricultural technology.

Fragemented farmland is the most common problems of all sampled *kebeles* to adopt modern agricultural technologies as responded by 76, 74 and 62 percent of the respondents from Ataba Robe, Endato waltahi and Jawi Sire kebeles respectively. According to these sampled respondents their farmland are often fragemented in to small plots mainly due to high population growth that can be difficult for the practice of modern agricultural technologies. From the above table 12 about 41 percent of sampled households constraints to adopt new agricultural technologies due to low level of education.

About 21 percent of sampled respondent were constrained to adopt new technologies due to lack of information about new technologies. This is related with either insufficient or non-existent source of acquiring new knowledge or information regarding new agricultural technologies by the sampled household.

Traditional practice of agriculture also play important role in affecting the adoption pattern agricultural technology by the farmers in the study area. About 14.6 percent of sampled respondents were constrained to adopt new agricultural technologies due to lack of interest to adopt it and they prefer the traditional technologies and they are found to be less responsive towards the adoption of new agricultural technology to practice agriculture.

4.6. Agricultural Practice and Rural Infrasturucture

4.6.1. Market Access

The avalibility of different types of infrastructures in agiven area play an important role in improving the agricultural practice of smallholder farmers as well as rural agricultural productivity and access to market. The avaliability and affordability of physical infrasturacture is an important inconnecting rural agricultural producer's access to market. Access to markets is a key constraint to smallholder farmers agricultural practice in the study area. The problems of market accessebility in the study area mainly attached with poor rural infrastructure such rural roads that connect rural kebeles with the market areas and smallhoder farmers market information for their agricultural products.

The only mode of transport avaliable in study *kebeles* is road transport. The majority of villages in rural areas are served by an inadequate and poorly maintained road network.The quality of road network in the study area is very poor and this poor conditions of roads, which are often impassable during the rainy season, have an adverse effect on the transportation of agricultural products.The all-weather woreda roads are also very limited that access the smallholder farmers to the market areas. The market access is very limited for agricultural out products and farm inputs. Many rural households are found at the distant from the town. They need road infrastructure for marketing agricultural output and get services.The condition of the infrastructure and service is not efficient or non-existent to link town to rural areas.

The natures of the road networks surrounding rural kebeles of Robe *Woreda* do not encourage the free movement of agricultural products. Smallholder farmers in rural areas used animal back and walking on foot to go to town.

Specially agricultural products are transported to and from rural are by the help of donkey back. Using donkey for the transportation purpose is not efficient and effective relative to the modern modes of transportation system.

Table 13: Rural infrastructures and marketing situation of sampled households

Responses	**Sampled kebeles**							
	Ataba Robe		Jawi sire		Endato Waltahi		Total	
	No.	%	No.	%	No.	%	No.	%
Is there any feeder road that connects your kebeles to the market areas?								
Yes	18	36	17	27.9	9	23	44	29.3
No	32	64	44	72.1	30	76.9	106	70.6
Total	**50**	**100**	**61**	**100**	**39**	**100**	**150**	**100**
How well it is?								
Poor	18	100	17	100	9	100	44	100
Good	0	0.0	0	0.0	0	0.0	0	0.0
Very good	0	0.0	0	0.0	0	0.0	0	0.0
Total	**18**	**100**	**17**	**100**	**9**	**100**	**44**	**100**
Do you have access to transportation service to and from market areas for your agricultural output and inputs?								
Yes	12	24	11	18	6	15.3	29	19.3
No	38	76	50	82	33	84.6	121	80.6
Total	**50**	**100**	**61**	**100**	**39**	**100**	**150**	**100**
What are the types of transportation mode you use?								
On foot	43	86	11	18	14	35.8	68	45.3
Animal back	7	44	38	62.2	18	46.1	63	42
Car	0	0.0	12	19.6	7	17.9	19	12.6
Total	50	100	61	100	39	100	100	100
Do you have access to convenient market place for your agricultural outputs and inputs?								
Yes	26	52	9	14.7	6	12.9	48	27
No	24	48	52	85.2	34	87.1	102	73
Total	**50**	**100**	**61**	**100**	**39**	**100**	**100**	**100**
How do you rate the impact of lack of adequate transport service and local market have in your agricultural activities?								
Low	0	0.0	0	0.0	0	0.0	0	0.0
High	9	18	6	9.8	0	0.0	24	10
Very high	32	82	55	90.2	39	100	126	90
Total	50	100	61	100	39	100	150	100

Source survey result, 2013

From above table 70.6 percent of respondents did not have accesses to feeder roads that connect to the near market areas while 29.3 were access to feeder roads. Among sampled kebeles 64, 72, 77 percent of respondents from Ataba Robe, Jawi sire and Endato Waltahi did not have access to feeder roads that connect to the market areas respectively. Not only accessibility but also the sampled respondents responded that the existing feeder road is of poor qualities for transportation.

Regarding the transportation service to and from market areas about 19.3 percent of sampled respondents had access to transportation service whereas the remaining 80.6 percent did not access to transportation services. Comparison of transportation service access was observed among sampled *kebeles* 15.3, 18 and 24 percent of respondents from Endato Waltahi, Jawi Sire and Ataba Robe were accessed to the service respectively. While 84.6, 82 and 76 percent of respondents not accessed transportation service from respective *kebeles.*

The majority of sampled respondents used animal back and walking on foot to go to the market areas. Accordingly, about 45.3 and 42 percent of respondents used walking and animal back mode of transportation respectively. The remaining 12.6 percent were used car for the transportation purpose. As indicated in figure 4.4 the majority of rural households are still using donkey for transportation. Others carry by themselves. It takes a lot of time and money using this way of transportation system. In addition to this, donkey and human labor cannot carry many resources. It is difficult to transport perishable vegetable from rural areas to the town. Rural households also need processed industrial products from the town. Above all the market situation is very limited to exchange agricultural agricultural and other products.

Figure 6: Pack animal transportation (donkey back) in the study area

Source: *photo taken during field survey, 2013*

According to sampled respondents market access is very limited to exchange their agricultural products as well as to buy other products from the market and therefore 27 percent of the sampled respondents accessed market while 77 percent did not access convenient agricultural markets. Similarly, 90 percent of the respondents responded that the existing meager transportation and market condition had great impact on the agricultural practice of smallholder farmers for a long period of time.

Figure 7: Marketing Activities in Robe town

Source: photo taken during field survey, 2013

4.7. Access to Rural Credit Service and Financial Institutions

Access to credit service is one of the most determining factor in agricultural practice of smallholder farmers of the study area. Access to Credit service by the smallholder farmers either in the form of cash or kind from different sources, is an important institutional service to finance poor farmers for agricultural input purchase and ultimately to adopt new agricultural technologies. Credit service help the smallholder farmers to be finacially benefited or alternative source of income for households those with financial constraints to buy agricultural inputs such as chemical fertilizers and improved seeds. Smallholder Farmers also need credit to purchase farm emplements and for startup capital to participate in nonfarm income to support the livelhood of their family. In the study area some sampled smallholder farmers have access to credit while others do not during agricultural practice the challenges were dicussed in table 14.

Table 14: Access to credit service by the sampled households

Responses	**Sampled kebeles**							
	Ataba Robe		Jawi sire		Endato waltahi		Total	
	No.	%	No.	%	No.	%	No.	%
Do you have access to rural credit service that facilitates your agricultural practice?								
Yes	9	18	9	14.7	4	10.2	22	14.6
No	41	82	52	85.2	35	89.7	128	85.4
Total	**50**	**100**	**61**	**100**	**39**	**100**	**150**	**100**
What are your sources of credit?								
Friends/relatives	27	54	33	54	24	61.5	84	56.0
Micro finance institutions	4	8	5	9.8	0	0.0	9	6.0
Money lenders	17	34	15	24.5	11	28.2	43	28.6
Personal savings	2	4	7	14.7	4	10.2	13	8.6
Do you have access to credit services from formal financial institutions?								
Yes	4	8	4	6.5	0	0.0	8	5.3
No	46	92	57	84.5	39	100	142	94.7
Total	**50**	**100**	**61**	**100**	**39**	**100**	**150**	**100**
What are your constraints accesses to credit from formal institutions?								
High interest rate	48	96	59	96.7	36	92.3	143	95.3
Limited capacity to reach all	0	0.0	36	59	38	97.4	74	49.3
Unfavorable repayment period	45	90	55	90.1	33	84.6	133	88.6

Percentages do not add up for some responses in the table because of multiple responses

source: Survey results, 2013

The above table depicts that 85.7 percent of respondents did not access to credit service while the remaining 14.6 accessed credit service for agricultural practice. Among sampled kebeles 18, 14.7 and 10.2 percent respondents from Ataba Robe, Jawi sire and Endato Waltahi kebeles accessed credit service respectively. Comparison of access to credit service of sampled *kebeles* respondents show that Ataba Robe share the highest percentage mainly due to proximity of the *kebeles* to credit providing institution in Robe town.

According to survey result conducted in the study area most of the sampled household got credit service from informal sources. Some FGDs revealed that friends and relatives are the most important sources of credit to the farmers followed by money lenders this is mainly due to the flexiblity of the agreement on the repayment period of the credit. While formal institutions such as banks were not accessible to the sampled respondents. Accordingly, the above table 14 depicts that about 56 percent of the sampled respondents get the credit from their friend or near relatives and about 28.6 percent of respondents got the credit from money lenders whereas, 8.6 percent from personal saving and the remaining 6 percent of the sampled respondents get the service from micro-finance institutions.

According to survey results micro-finance institutions in the study area are *Maklit and Walko. Maklit* is micro-finance institution that gives credit for small scale organized communities. They give up to 50, 00 birr however the credit taker must have a house and could deliver the master plan. That is not favorable for the smallholder farmers in rural *kebeles*. In addition the interest was high that is up to 18 percent annually. *Walko* another micro- finance institution in the town that gives credit for a group of five to ten households. The credit was given for maximum of one year and each group member must save 10-20 birr individually per each month. This micro finance institution were also not favorable for the smallholder farmers due to restricted arrangement of the agreement, for instance it is difficult for the smallholder farmers to pay 10-20 birr monthly.

The farmers Union is also another source of credit for the smallholder farmers in the study area. The Union delivers agricultural inputs specially improved seed and fertilizer for the farmers and

the farmers should repay in the form money during the time crop harvesting. Sampled smallholder Farmers also did not receive much advantages from the Union due to farmers fear of the productivity of his/her farmland to repay the credit. Due to the inconvenient methods of providing credit and unfavorable repayment period which is restricted with harvest time when grain price is low at market that require high amount of food crop to sale out, the sampled respondents did not access the farmers unoin. According to sampled respondents response almost 95 percent did not access credit service from formal financial institutions while the remaining 5 percent did access to the service.

The main constraints of sampled respondents were high interest rate, unfavorable repayment period and limited capacity to reach all that were responded by 95, 88.6 and 49.6 percent of respondents respectively.

4.8. Household Food Security Situation in the study area

Food security and food self-sufficiency are two concepts having different meanings. Food self-sufficiency refers to the ability of households to cover its household consumption from own crop and livestock production. From the perspective of subsistence farmers, food self-sufficiency requires whether the crops and livestock produced at home can cover their annual food consumption requirements or not. Generally it deals with availability of food supply while food security apart from food availability addresses the issues of access, utilization, security and variability. It is not an issue of whether they can produce sufficient amount or not, but access to food requirements. Therefore, households can produce, purchase from the market, or obtain food or cash in the form of transfer in order to sustain their household food security (Degefa, 2005 cited in Meskrem, 2011).

During the survey, the sampled households were asked about whether they are food secure or not? Accordingly, 85 percent of respondent household of sampled *kebeles* were perceived as they are food insecure. According to sampled respondents it is understood that food security problem have deep-rooted in the area from year to year due to various problems mainly related to challenges faced in agricultural practice such as, insufficient farm land holdings, lack of access to agricultural technologies, lack of access to adequate credit service for agricultural activities

and poor market situation for agricultural produce are accountable for the prevailing food insecurity situation of the household.

Due to these factors, agricultural production and productivity have declined overtime. Consequently, most farmers have failed to cover their annual food requirements from own production.

Production of food crops is a primary requirement to smallholder farmers. However, not all farming households can feed themselves throughout the year. According to key informants the socio-cultural expenses such as weeding, memorial feast, religious association and others, lack of proper planning and low level of production have also affected food sufficiency of the household in the study area.

According to key informants, rich households can have three to four meals per day. But poor households can not, in addition to the poor quality of food they consume, they cannot afford more than two meals per day.

Table 15: Household food security situation

Responses	**Respondents of sampled kebeles**						**Total**	
	Ataba Robe		Jawi Sire		Endato Waltahi			
Do you meet all year round food requirements from your agricultural production?								
Yes	9	18	13	21.3	0	0.0	22	14.6
No	41	82	48	78.6	39	100	128	85.3
Do you believe that the challenges faced on your agricultural practice are responsible for your food insecurity situation?								
Yes	38	92.6	44	91.6	39	100	121	95
No	3	7.4	4	8.4	0	0.0	7	5
How many Months of a year do your households face food shortage?								
Nine Months	6	14.6	4	8	20	51.2	30	23.4
Six Months	22	53.6	29	60.4	12	30.7	63	49.2
Three Months	13	31.7	15	31	7	17.9	35	27.3

Source survey results, 2013

From the above table 15 the challenges faced in agricultural practice can be liable for food insecurity situation of sampled smallhoder farmers of the study area that can be responded by 95 percent of sampled respondents. About 92.6 and 91.6 percent of respondets from Ataba Robe and Jawi sire kebele respectively, responded that challenges phased during agricultural practice

can be responsible for food insecurity situation of the household. All respondents of Endato Waltahi kebele responded that the challenges phased during agricultural practice can be responsible for food insecurity situation.

Though most of the farmers are experienced food shortage every year, there is a difference in duration for which households have exposed to the problem. Results of the study show that, 27.3percent of households face food shortage for about three months whereas 49.2 percent of the households faced food shortage for about six month. The remaining 23.4 percent face food shortage for long period of time, about nine months almost ayear.

Among sampled kebeles the highest percentage(51.2%) of respondents from Endato waltahi faced food shortage for about nine months. While the lowest(8%) of respondets from Jawi sire faced food shoratge for about nine month. About 53.6, 60.4 and 30.7 percent of the respondents from Ataba Robe, Jawi Sire and Endato Waltahi respectively faced food shortage for about six month. Similarliy, 31.7, 31 and 17.9 percent of respondents from Ataba Robe, Jawi Sire and Endato Waltahi kebeles faced food shortage for about three months respectively.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

The smallholder farmers of the study area practice traditonal method of farming system for along period of time and what is observed today. The smallholder farmers have been depending on mixed farmig system in producing crop and livestock rearing. The study area was catagorized in to three agro-ecological zones agricultural practices and production mainly attached to these differences. Teff, Wheat and Barley are the primarily crops for households in *Dega* and *Woinadega* areas while sorghum and maize are the main crops in *kola* areas. The low agricultural production and productivity in the study area has been due to the challenges faced the smallholder farmers face during their agricultural practices. These low agricultural production and productivity is the underlying cause of household food in security situation in the study area nearly throughout the year. Smallholder farmers in the study area faced problems of small farmland holding size wich is mainly due to large family size in the household that exert increasing pressure and demand for farmland causing the shortage of available cultivable land especially for the newly established households.

According to survey result the majority of the respondent smallholder farmers owned less than 1hectar of farmland for agricultural activities. This clearly shows the prevalence of shortage of farmland which is the major source of income and subsistence is in short supply relative to the large family size of households. Besides, the gradual loss of farmland productivity particularly depletion of soil fertility and hence the low yield and low productivity of agricultural production aggravate the problem of household food insecurity. The study revealed that the challenges faced smallholder farmers agricultural practice was attached with lack of access to modern agricultural technologies, lack of access to rural infrastructures that access smallholder farmers to input-output markets and lack access to financial institutions that provide credit service.

According to the study result the major constraints that hinder smallholder farmers access to modern agricultural technologies are low income of smalholder farmers, lack of aduqaute credit service, fragemented farmland owned by smalholder farmers, lack of information about new technologies among smalholder farmers and low level interest to accept and adopt modern technologies. According to survey results the problems of market accessebility in the study area mainly attached with poor rural infrastructure such rural roads that connect rural kebeles with the

market areas, transportation facilities and convinent market place for smallholder farmers agricultural output marketing.

In the study area some sampled smallholder farmers have access to credit while others do not during agricultural practice. According to the study result the majority of smallhoder farmers in the study area did nothave accessed to credit services. The main source of credit service of smallholder farmers in the study area were from informal sources mainly from friends/relatives, money lender and personal savings. Acording to the results of data obtained in the study area the main problem facing with farmers not accessing credit service of formal financial institutions and ingeneral were attached with high intrest rate, unfavorable repayment period and limited accessibility of the credit service.

According to the result of the study food security problem is deep-rooted problem in the area from year to year. Among the studied households, 85 percent are food non-self-sufficient and the majority of respondents faced food shortage for about six months. The proportion of food in secured households was high in Endato waltahi kebele (from kola agro-ecology). Generally the challenges faced smallholder farmers during their agricultural practice can liable for the existing fod insecurity of the study area.

5.2. Recommendations

According to the findings of the study the following issues are forwarded as recommendation to improve the agricultural practice of smallholder farmers of the study area. The causes of poor agricultural practice in the study area are mainly related with traditional method of farmland cultivation, lack of access to modern agricultural technologies, low level of Education among the smallholder farmers, poor condition of rural infrastructures such as rural roads, market accessibility for agricultural outputs and inadequate credit service. Accordingly the following indicative remarks are forwarded that were targeted to improve the current agricultural practices of smallhoder farmers in the study area. So as to improve the agricultural production and productivity poor agricultural practice is the main factor in the study area. Therefore,

- Improving the traditional method of farmland cultivation, improving the use of crop varieties and agricultural inputs and promoting small scale irrigation should be taken in to consideration by the concerned bodies at different levels and the household themselves.
- It was found that total farmland holding significantly affects the agricultural production and productivity in the study area. The result show that the agricultural productivity of smallholder farmers with large farmland holdings is better and is more likely to be adopting modern agricultural technologies and farm inputs therefore there was the needs were the smallholder farmers with low level of farmland holdings to be agriculturally productive and support the livelihood of their families through developing and disseminating technologies that are relevant to their needs.
- The frequency of contact with agricultural extension has positively and significantly affects the agricultural practice of smallholder farmers especially in disseminating and adopting modern agricultural technologies that suggesting for the need for more targeted and continued extension service for the smallholder farmers in the study area. Thus, the agricultural extension service operating in different kebeles need to be strengthened further to increase the flow of information for rural smallholder farmers.
- Trainings, participatory community forums and panel discussion should be held among farmers from different areas with different experiences. Farmers should be trained on the adoption of new agricultural technologies. As a result, when the discussions are held among these people, they can share various relevant experiences and knowledge. Training of both village extension workers and farmers should be emphasized so as to

improve their understanding and skills. This makes adoption and implementation of new technology simple and reduces unwanted failure. Trainings and discussions should be accessible for all farmers.

- Further works should be, generally, undertaken to develop farmers' awareness how to properly integrate indigenous and introduced farmland management practices and enhance the application of improved management practices throughout the kebeles.
- Rural infrastructure has direct and strong relationship with farmers agricultural production and productivity thereby promoting agricultural growth and household food security condition. The agricultural infrastructures such as rural roads and access to market are indispensable in the agricultural production of smallholder farmers of the study area. For instance, Road and transportation facilities need to be developed in the rural areas of the study area to make the appropriate linkages with market areas. Effective and efficient market access should be enhanced and increasing agricultural production of rural households and also access agricultural output in both spatial areas. Not only market access, market information by the smallholder farmers for their agricultural products needs to be improved in the study area through provision of market information. Thus priority should be given to all- weather rural road as it helps to take resource such as agricultural out puts from rural areas and agricultural inputs to rural areas.
- Above all the credit service should be strengthened and accessible by all famers in rural kebeles of study area. Since the credit service strengthen the capacity of smallholder farmers and enables them to adopt modern agricultural technologies easily. This can be done specially through facilitating condition for interested parties or establishment of credit providing institutions in rural kebeles of the study area by the government.

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APPENDIXES

APPENDIX I

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

QUESTIONARIERS TO BE FILLED BY SMALLHOLDER HOUSEHOLDS

You have been selected to participate in the study designed to collect information on the agricultural Practices of farmers in reference to some selected kebeles of Robe woreda. As a result, I kindly ask you to share me your opinion and experiences, taking few minutes from your schedule of time. Your genuine cooperation is very important, because you represent many other farmers who have similar experiences. The genuine response you provide is highly valuable and determines the effectiveness of this investigation. Please, be assured that I will treat your responses confidentially and will not be used for any purpose other than research. You are not expected to write your name on the questionnaire.

Thank you in advance for your cooperation!

Part one: General Information

1. Agro-ecology :(Dega _____Woina Dega_____kolla_____)
2. Zone: _____ Woreda _____ kebele Name_____
3. Date of interview: _____

Part two: Household Demographic Characteristics

1. Sex of household head: A) Male B) Female
2. Age: _____
3. Marital status : A) single B) Married C) Divorced) D)Widowed E)Others specify____
4. Family size : A) 0-3 Members B) 4-6 Members C) 7-10 Memers D) 10 and Above
5. Educational status:

   A) Illiterate B) Read and write C) Formally Educated D) other, specify
6. Number of permanent household including household head at a time of survey

   (Male _____Female _____Total_____)

Part three: Access to Land and other productive Resources

1. Do you have plots of land? A) Yes B) no
2. Do you have access to land for agricultural use? A) Yes B) No
3. If your answer is 'yes' to question No.2, how do you get access to it?

A) Through land distribution B) Inherited from parents

C) Shared with relatives D) Sharecropping E) Other, specify

4. What is the total size of the following land types that you use?

NO	Land Type	Size in Timad	Size in Hectares
1	Cultivated land		
2	Grazing land		
3	Forest land		
4	Others, specify		
Total			

5. What happened to the size of land holding over the last decades?

A) Increasing B) Decreasing C) no change

6. If your response is 'Decreasing' to question no.5 what were the reasons?

A) Because of large family size C) Because of declining in the quality of land

B) Redistribution of land D) others, specify

7. How do you rate the sufficiency of your produce of the land holding for farming?

A) Scarce B) Sufficient C) others ,specify

8. What is the fertility status of your farm land?

A) Poor B) Medium C) Good

9. How much is your farm land size in hectares? _____

10. Is produce of yield farm land you own is enough for your family? A) Yes B) No

11. If your answer for question no.10 is 'No' how do you overcome the problem?

A) By engaging in non-agricultural activities C) By sharecropping with other farmers

B) By renting additional plot of land D) Other

12. Have you ever sharecropped and/rented out your plot to other peasants?

A) Yes B) No

13. If your response is 'yes' to question no.12 why did you share crop out?

A) Lack of draught power B) unable to purchase farm inputs

C) Illness D) Elderly and unable to work E) having large farm size F) others, specify___

14. If you sharecropped in, what was the size of land in Timad? _____

15. Why you sharecrop/rent in land?

A) Need extra land B) Able to operate on more land

C) Due to infertility of your farm land D) No farm land

16. Do you have farm oxen? a) Yes b) No

17. If your response is 'yes' to question no 16, how much? In number_____

18. If your response is 'No' to question no 16, how you access?

A) Through borrowing B) Through sharecropping

C) Through Qixira D) No means

19. What is your maximum production in Quintals per hectare Or Timad in Bad/Good year? ___

20. The major crop you produce? A) Teff B) Wheat C) Sorghum D) Barley E) Maize

21. Have you produced any surplus for sell? A) Yes B) No

22. If your answer for question 21. 'No' what are the reasons for not producing?

A) Due to low production from agriculture it is only consumed at home

B) Due to shortage of farm land it not sufficient to produce any surplus for market

C) Due to poor markets for agricultural production D. Other

Part Four: Agricultural practice

1. Do you have applying modern agricultural technology on your farm land? A) Yes B) No

2. If your answer for Question no.2 is no please explain the

reasons_____

3. Do you use irrigation during your agricultural practice? A) Yes B) No

4. If your answer for question no.4 is 'No' what might be the reasons behind?

A) Because I do not have the capacity to use B) Lack of water source for irrigation

C) Lack of interest D) because I have a small plot of land and is not suitable for such practice

E) Because my farm lands are fragmented and are found at different areas

F) Because I do not know the importance of these practices

G) Lack of technical skills

H) If any other reason, please specify_____

6. Do you apply modern agricultural techniques like terraces (keter, soil bund, soil terraces) and vegetation in your farmlands?

a. Yes b. No

7. If your answer for question number 6 is '**No'**, what might be the reasons behind?

A) Because I have a small plot of land and is not convenient for such practices

B) Because my farmlands are fragmented and found at different areas that made difficult to apply such techniques

C) Because I do not know the importance of these practices

D) Because there is information gap between the agricultural experts and farmers how they can be constructed and implemented making their relevance poor.

E) Because they create insects and affect crops

F) Because they make plowing difficult

G) They are laborious to be made, but I am working alone so that I can not do such activities

H) Because they results extravagancy on my farmlands

I) If any other reason, please specify

8. Do you have practice agricultural land management for your farm land? A) Yes B) No

If your answer is 'Yes' for question No.8 Which of the following agricultural land management practice do you carry out in order to maintain and replenish the soil fertility of your farm land?

No	Management practice	Yes	No
1	Use of organic manure		
2	Use of chemical fertilizer		
3	Crop Rotation		
4	Inter –cropping		
5	Fallowing (field rotation)		
6	Using modern farming techniques		

9. What are the main constraints for your farm land? Identify the four main bottlenecks according to the order of hindrance?

No	Constraints	A) Yes	B) No	Rank in Order
1	Poor soil fertility			
2	Water logging			
3	Soil erosion			
6	Others			

10. What do you think caused/aggravate the problem?

A) Poor farming practice C) Removal crop /vegetation cover

B) Population growth D) others, specify

11. What constrained you not to adopt new agricultural technologies in your agricultural practice?

No	Constraints	Yes	No
1	Lack of credit service facility		
2	I have owned fragemented farmland		
3	Lack of education		
4	Lack of information about new technologies		
5	Lack of interest among farmers on adopting modern technologies		

Part Five: Agricultural inputs

1. Did have you used Agricultural inputs on your farm land? A) Yes B) No

2. If your answer is 'yes' from where did you get it and which one do you use and in what amount?

No	Type of inputs	Yes	No	Amount in kg/liters
1	Chemical fertilizer			
2	Organic fertilizer			
3	Improved seeds			
4	Herbicides, insecticides and pesticides			
5	Others			

3. If your answer is 'No' what are the factors that hinder you from using?

A) shortage/lack of capital B) High cost of agricultural inputs C) Lack of access D) other, specify

4. Do you apply organic fertilizers such as animal manure, crop residues and compost in your farmlands? A) Yes B) No

5. How is the trend of farm input application during your agricultural practice ?

A)Increasing B) Decreasing C)Remain the same

6. Do you apply farm inputs on your farmland as per the recommendation of agricultural experts?

A) Yes B) No

7. If your answer for question number 4 is 'No' what do you think the reasons?

A) My farmlands are far from my home making the transportation laborious

B) The animal manures and crop residues are necessarily important for fuel and livestock feeding and also sold for market

C) If other reasons, please specify

Part six: Agricultural Extension Service

1. Do you get advices from DAs and other agricultural experts with regard to your agricultural practice? A) Yes B) No

2. If your answer for question number 1 is '**yes'**, how frequently do you contact with them?

A) Once a week B). Every month C) Once every six month D) Once a year E) if other, specify

3 What constrained you to be not benefiting from the extension service?

A) Their advice don not consider the economic background and ability of farmers

B) Because I am not familiar with the work of the DAs, so am not benefiting

C) DAs are not interested to do so

D) If any other reason, please specify

4. Do you think that the extension services are adequate to enable you to produce better from your agricultural practice? A) Yes B) No

5. If your answer is 'No' to question no.4 what you recommend to be included or improved?

_____

_____

Part Seven: Agricultural Infrastructure

1. Is there any feeder road that connects your kebeles to the market area? A) Yes B) No
2. If yes how well it is? A) Poor B) Good C) Very good
3. Do you have access to transport service? A) Yes B) No
4. What are the types of transportation you use to go to town? A. Animal B. On foot C. Car
5. Do you have access to convinent markets for your agricultural outputs and inputs? A) Yes B) No
6. If your response for question No.1 is 'no' please specify the reasons?
7. How do you rate the impact of lack of adequate transport service and local market have in your agricultural activities? A) Low B) Medium C) High D) Very High
8. Do you have access to credit services that facilitate your agricultural practice such as giving loan? A) Yes B) No
9. What are your sources of credit?

10. Do you have access to credit services from micro-finance institutions to support your livelihood?
11. What are the constraints accesses to credit from formal institutions?

A) High interest rate B) limited capacity to reach all C) unfavorable repayment period D)other, specify

Part Eight: Food Security Situation

1. Do you meet all year round food requirements of your household members from your own agricultural production? A) Yes B) No
2. According to your own self-assessment is your household food secure? A) Yes B) No
3. If you are food insecure in which month of the year do your household face food shortage(mention name of months)_____
4. Do you think that your current agricultural practice makes your household food self-sufficient? A) Yes B)No
5. Do you believe that the challenges faced on your agricultural practice are responsible for your food insecurity situation? A) Yes B) No